

From: Ulrich Hilger <Ulrich.Hilger@t-online.de>
To: bbemer@wf.net <bbemer@wf.net>
Date: Tuesday, January 25, 2000 1:05 PM
Subject: Re: AllDay

Dear Bob,

below please find the requested information.

Is it a computer program? For what platforms or operating systems?

AllDay is a computer program I originally developed for the Apple Macintosh some year ago. At a certain point in time I decided to discontinue maintenance for the Mac and ported it to Windows. It now is available for Windows 9x/NT while the last version for the Mac still is available.

I created it because I oftenly use these well known little cards that show a whole year on one small page along with lots of basic calendrical information. At the time I created it there was no application which was able to display these overviews of one year with all relevant information about events occuring such as holidays on a computer in a similar layout and graphical complexity. Even today I do not know of any application combining AllDay's current features although there are lots of applications doing partly comparable things in a partly comparable manner.

I wanted to have a tool where I can define my own personal set of events once and for which my mac would display their occurrences correctly for any past present or future year once entered.

I was wondering how these information can be computed in general without relying on support by operating system routines, tables or any other information whatsoever. I started to do my own sort of little research looking for the pure algorithms and basic circumstances making up time and calendar measurement.

Apart from coding basic algorithms it was necessary to invent certain routines for a fast display of such a lot of information at once and in a good graphical layout.

Commercial?

While the last version for the Mac still is freeware, because of the added value of the Windows version, this one is shareware.

Then sold or available where?

The original source of AllDay is my homepage at <http://www.calcom.de>. From there it can be registered online as well. However, there are a lot of other sources mainly on the web from which the application can be obtained. Some of them I do not even know. Currently I work on setting up a full version of AllDay to be sold through Electronic Software Distribution (ESD) channels.

What are the inputs and outputs?

AllDay shows an overview of any year in either the gregorian or julian calendar system without any input necessary other than the year in question. It computes all relevant information like weekdays and week numbers. For any day of the overview it computes number of day in year, remaining days in year, week number, remaining weeks in year, julian date, jewish date, times of sunrise, sunset, moon rise, moon set, time of next full moon respectively new moon.

It allows input of events which can be repeated in various ways including related to the date of easter or a date in the jewish calendar. Events can be related to a group. Groups can be entered separately with certain attributes such as color and visibility. For proper time computation (sun and moon) the user's location can be entered like the groups in a personal preferences area. Events can be stored in files at the user's choice. File contents can be imported and exported. Aside of events being shown in the year overview an event list shows events sorted either alphabetically by name or chronologically by occurrence. A filter allows to show or hide events related to certain groups. A day calculator can compute the number of days between two dates while allowing to omit certain weekdays and/or days related to certain groups.

Cost to users?

Usage of a single copy of AllDay costs US \$ 20.00.

Principles of operation?

The year overview is built each time the year is changed by computing the weekday of the first day in the year according to the system currently activated (gregorian or julian) and then building a temporary table for the proper date to weekday relation. From the temporary table a graphic is drawn day by day making up the year view taking into account the weekday and possible events for that day. The graphic is built offscreen and then copied to the visible region of the year window to allow for fast partial screen updates.

To show events in the year view, another temporary table is rebuilt each time the year is changed. The temporary event table holds the date in the year displayed for any event in the currently open event file. The table is recalculated by taking the repeat method and base date as an argument and passing it to a set of computation functions (one for each repeat type).

Event files hold the name of each event entered by the user along with the base date, repeat method and group. Groups are stored centrally in a separate file. Language can be changed between english and german and is taken from a text file to allow for easy translation to other languages.

Times of sun and moon are computed using the appropriate astronomical algorithms.

Why is it useful more than any others?

It gives instant access to a calendar with everything in it that is related calendarwise. It leaves out appointment planning/scheduling by intention and is a pure and complete calendar. Events have to be entered only once to be shown for any past present and future year. Once configured for personal needs it starts almost immediately and shows all relevant calendar information right when it is needed. Having AllDay and a PC, a user hardly has the need to buy paper calendars anymore.

Where would I find the documentation and description? Anywhere on the Web?

It is installed as online help file along with the application, which is available at <http://www.calcom.de>

If commercial, what company supplies it? Address?

Please refer to <http://www.calcom.de>

Let me know if there is anything else you like to know.

Best regards
Ulrich

CalCom
E-Mail info@calcom.de
Internet <http://www.calcom.de>

-----Ursprüngliche Nachricht-----

Von: bbemer@wf.net

An: Ulrich Hilger

Gesendet: Dienstag, 25. Januar 2000 00:18

Betreff: Re: AllDay

Is it a computer program? Commercial? Then sold or available where? For what platforms or operating systems? What are the inputs and outputs? Cost to users? Principles of operation? Why is it useful more than any others? Where would I find the documentation and description? Anywhere on the Web? If

'Father Time' Software Draws Corrections From Readers

To The Editor:

I found the article by Celko and McDonald in the Feb. 9 Software Design section to be both interesting and valid. Unfortunately, it is marred by several errors in the actual procedures.

The COMMENT following the Leap Year label on page 32 is correct, but the condition in the IF should be $(Year \text{ MOD } 4 = 0)$ AND $(Year \text{ MOD } 100 \neq 0)$ OR $(Year \text{ MOD } 400 = 0)$.

The FOR clause following the label Work on the same page should be for $i=1$ TO Month - 1, or actually, IF (Month > 1) THEN FOR $i=1$ TO Month - 1.

There are two errors in the block labeled Work on page 33: The second condition should be $(Month > 2)$ and the final assignment should be Julianize Two = $(Year * 1000) + Accum-month-table [Month] + Day + Julianize Two$; Mark Sapro

Systems & Operations Mgr.
Computer Services
City College of San Francisco
San Francisco, Calif.

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The statement that begins: IF $(Year \text{ MOD } 4 = 0)$ OR $(Year \text{ MOD } 100 \neq 0)$ AND $(Year \text{ MOD } 400 = 0)$ should read IF $(Year \text{ MOD } 4 = 0)$ OR $(Year \text{ MOD } 400 \neq 0)$ AND $(Year \text{ MOD } 100 \neq 0)$.

Also, the statement that

begins:
FOR $i=1$ TO month-table
[Month-1] should read FOR $i=1$
TO Month-1.

L.H. Wigdor
Director of Data Processing
Amarer Management Inc.
Philadelphia, Penn.

Joe Celko responds:

The Leap-year section should be:

Leapyear: IF $(Year \text{ MOD } 4 = 0)$
OR $(Year \text{ MOD } 400)$

AND $(Year \text{ MOD } 100 \neq 0)$
THEN month-table [2] = 29

END.

My thanks to Les Wigdor for pointing out the error of my ways. I sent Les a copy of the original ACM Julianizer. I promise to proof articles better in the future—honest.

—Joe Celko

Joe Celko is a senior consultant with General Information Services Company

SOFTWARE DESIGN

Information Systems News — Monday, April 20, 1981

Ways To Handle Periods Of Less Than

By Joe Celko

In a prior article, the subject of years as data items within a computer data base was discussed in some detail. This article deals with the units of time that are one year or less.

It is worth mentioning as a trivia item that there is only one unit of time, and that is the second. All of this other stuff you use every day, like year and day, are not regular units in the System Internationale (SI) or "metric system" as we call it in the United States. Computers are not bothered by the divi-

sions of a second and think in terms of "milliseconds" and "nanoseconds" without any trouble at all. Nobody on earth thinks in terms of "kiloseconds," in place of "days," as a unit.

For some reason, almost all of mankind agreed on days of 12 hours of light and 12 hours of dark. The French Revolution tried to put in decimal clocks and failed. The Canadian Metric Board experimented with a tenth of a day unit called a "chrona" and dropped it. Why change something that we all agree upon? Because these other units of time

are so popular, the SI has them as auxiliary units, and gives them each an official abbreviation. A good reference book on SI should have their abbreviations.

Did you ever notice that before digital watches there was no such time as "ten fifty seven"? It was always "about eleven o'clock" and everyone accepted the error. Now it is possible to get a digital watch that will keep better time than any mechanical watch ever could, which can be read easier than a mechanical watch and which will cost

IBM

Date: January 6, 1959
From: F. R. Helt, Jr.
Department: Applied Programming
Location: DPDHC

To: Miss C. M. Maar
Department: Commercial Systems Development
Location: WHQ

CC:

Subject and/or Reference:

Conversion of Calendar dates to days
of the Year

I saw a request in Sales Currents for information on the subject application, and I've worked out a formula which may be of some help. The formula is:

$$N = 30.6M + D - K$$

where:

N is the result of the computation. The integer portion of N, without rounding, is the day of the year.

M is the number of the month, from 1 to 12.

D is the day of the month

K is a constant whose value depends upon the month.

When M = 1 or 2; K = 30.

When M = 3 through 12; K = 32.3.

The above values of K are for a non-leap year. For a leap year, the value remains the same for M = 1 or 2, and is changed to 31.3 for M = 3 through 12.

frh/ep

F. R. Helt, Jr.

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less. This makes people of more and more aware.

As computers become more interactive, the rate of increase and more and more will need to have time entries.

In Europe, the periodic hours, minutes and display format, which States would use a comma what do you expect to use a comma for a day.

But the real difference use of 24-hour or "m" opposed to the a.m.-p.m. the United States. Central clocks are making more and more common.

ANSI standard X3.51 both the 12- and 24-

hours. Both representations, zeroes, "A" and "P" as meridian (not meridian, the right of the 12-hour 24-hour scheme, 00:00:00 the day and 24:00:00 is

This is amplified in X3.51-1975, where Greenwich Time (Universal Time) the right-hand side of representation. The uses the string "space" meridian designates universal Time.

It is useful to have a local time in relation to Time. The displacement shown as a four-digit signifying hours and minutes or minus sign in front differential factor (TDF) the right of the local time -1200 to +1300.

In ANSI standard time zones in the United States three letter codes, which associated with them with "ST," which means "Time." There is also a set of three-letter codes which means "Daylight" example, "EST" is "Eastern Standard Time" and it has a TDF equal to -0500; "EDT" "Eastern Daylight Time" and it has a TDF of -0400. This how daylight savings time handled.

The standard calendar is universal standard. We have universal agreement that there are seven days in a week, too. The day of the week can be calculated by taking the Julian date, and dividing by seven. The remainder would then map into a day of the week.

Another method of direct calculation is given in the following pseudo code.

```
STRING FUNCTION Day-of-week (INTEGER Year,
INTEGER Month, INTEGER Day);
```

```
COMMENT Year is given as four digits. The DIV operator is integer division. MOD is the remainder function. The Boolean function LeapYear explains itself. The function is valid from the 1700s through 2100s;
```

```
BEGIN EXTERNAL BOOLEAN FUNCTION LeapYear; STRING ARRAY DayName [0:6]
```

```
INIT ("SUN", "MON", "TUE", "WED", "THU", "FRI", "SAT");
```

```
INTEGER ARRAY Date-Table [1:12]
```

```
INIT (0, 3, 3, 6, 1, 4, 6, 2, 5, 0, 3, 5);
```

```
INTEGER ARRAY Century-Table [17:21]
```

```
INIT (1, 2, 0, 6, 4);
```

```
INTEGER Century, Year-in-Century, Result;
```

```
IF (LeapYear(Year)) THEN BEGIN Date-Table [1] := 6;
```

```
Date-Table [2] := 2; END;
```

```
Century := Year DIV 100;
```

```
Year-in-Century := Year - (Century * 100);
```

```
Result := Century-Table [Century]
```

```
+ Year-in-Century
+ (Year-in-Century DIV 4)
+ Date-Table [Month]
+ Day;
```

```
Day-of-Week := DayName [Result MOD 7];
END.
```

This algorithm was supplied by Gail Higgins, an Atlanta-based consultant, who found it years ago in a puzzle book. She first used it to save a client who had two possible methods of finding the day of the week: (1) Carry it in every record and rewrite the entire system to reflect the record format change (2) Julianize every day of the year and start counting from the front of the year with a table look-up scheme

The standard calendar has twelve months, but mankind never did agree on how to write a date. A computer needs to be able to convert the three-letter shorthand for a month name into the numeric value of the month. This is very handy for

an interactive program taking in data from untrained users.

Richard Cichelli developed a perfect hashing technique and gave this algorithm as an example of it in the January 1980 issue of *Communications of the ACM*. A perfect hashing

has two properties: (1) It always hits the desired value in the hash table. (2) There are no empty records in the hash table.

```
INTEGER FUNCTION Three-Letter (STRING Month-name);
```

```
COMMENT Month-name is the three letter month abbreviation;
```

```
BEGIN INTEGER ARRAY Numeric-Value [1:26]
```

```
INIT (4, 5, 2, 0, 0, 0, 3, 0, 0, 0, 0, 6, 0, 0, 5, 1, 0, 6, 0, 6, 0, 6, 0, 5, 0);
```

```
INTEGER ARRAY Numeric-Value [0:11]
```

```
INIT (6, 9, 12, 8, 1, 2, 7, 4, 10, 5, 3, 11);
```

```
INTEGER Second-Place, Third-Place;
```

```
COMMENT The ORD function returns the numeric position of a letter in the alphabet so that A=1, B=2, ..., Z=26. SUBSTRING (i, text) return the i-th character in the string named text;
```

```
Second-Place := Alpha-Value [ORD (SUBSTRING (2, Month-name))];
```

```
Third-Place := Alpha-Value [ORD (SUBSTRING (3, Month-name))];
```

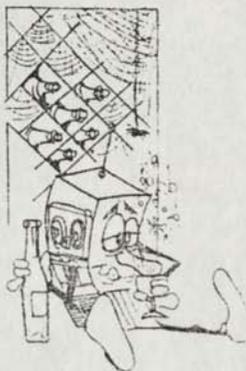
```
Three-Letter := Numeric-Value [Second-Place * Third-Place];
```

```
END;
```

This is a cute algorithm. In with such a short list of possible values, but unless it is written in assembly language, with a good optimizer, it probably is not worth the trouble.

The first man to think of putting the day of the year on the bottom of the pages of a calendar did a great favor. The only processing point

The following algorithm will take a month and a day as input and then return the day of the year. It operates by making a quick first hack at the answer and then tuning it to the actual months.



```
INTEGER FUNCTION Day-of-Year (INTEGER Year, INTEGER Month, INTEGER day);
```

```
BEGIN EXTERNAL BOOLEAN Valid-date (LeapYear, Valid-date Year, Month, day);
```

```
IF (Valid-date (Year, Month, day))
```

```
THEN
```

```
BEGIN
```

```
Day-of-Year := TRUNCATE ((30.4375 * (month + 1)) * day);
```

```
IF (Month = 2) THEN Day-of-Year := Days-of-Year (2, Year);
```

```
IF (Month = 5) THEN Day-of-Year := Day-of-Year (5, Year);
```

```
IF (Month = 6) THEN Day-of-Year := Day-of-Year (6, Year);
```

```
IF (Month = 7) THEN Day-of-Year := Day-of-Year (7, Year);
```

```
IF (Month = 8) THEN Day-of-Year := Day-of-Year (8, Year);
```

```
IF (Month = 9) THEN Day-of-Year := Day-of-Year (9, Year);
```

```
IF (Month = 10) THEN Day-of-Year := Day-of-Year (10, Year);
```

```
IF (Month = 11) THEN Day-of-Year := Day-of-Year (11, Year);
```

```
IF (Month = 12) THEN Day-of-Year := Day-of-Year (12, Year);
```

```
ELSE Day-of-Year := 0;
```

```
END.
```

Potential contributors to Software Design should contact James Lick, Information Systems News, East Shore Road, Marlborough, MA 01752.

PROPOSED AMERICAN NATIONAL STANDARD

Representation for Calendar Date for
Machine-to-Machine Data Interchange*

CACM EDITOR'S NOTE

A previous version of this proposed American National Standard was published for public comment in COMM. 11, 4 (Apr. 1968). It was subsequently sent out by American National Standards (formerly USASI) Committee X3, Computers and Information Processing, for letter ballot. A number of comments were received with the responses, and these were submitted for evaluation to the author of the proposed standard, Subcommittee X3.8, Data Elements, Codes, and Formats. As a result of their deliberations, X3.8 withdrew its support of the original version and drafted the current one. This version, published here, is substantively different from the original in that alternative representations for calendar date are provided to include century and ordinal type dates. The section of the original version entitled "Expository Remarks" (which is not part of the proposed standard) was not changed substantively, and is therefore not reprinted here.

This proposed American Standard has been accepted for publication by American National Standards Committee X3. In order that the final version of the proposed standard reflect the largest public consensus, X3 authorized publication of this document to elicit comment and general public reaction, with the understanding that such a working document is an intermediate result in the standardization process and is subject to change, modification, or withdrawal in part or in whole. Comments should be addressed to the X3 Secretary, Business Equipment Manufacturers Association, 235 East 42 Street, New York, NY 10017.—C.K.

Key Words and Phrases: calendar date, machine-to-machine interchange, month, year, day, representation coded

CR Categories: 3.70, 3.73, 3.74, 3.9

Foreword

(This foreword is not a part of the American National Standard Representation for Calendar Date for Machine-to-Machine Data Interchange.)

This proposed American National Standard presents a standard representation for a calendar date for use in the interchange of data from machine-to-machine among data systems.

1. Purpose and Scope

1.1 The purpose of this standard is to provide a standard means of representing a calendar date to facilitate interchange of data between the machines of data systems.

1.2 The scope of this standard is limited to such interchange of data between the machines of data systems.

2. Specifications

2.1 Calendar date is a representation composed of the time elements year, month of year, and day of month.

2.2 Year shall be represented by the two low order digits of the conventional numeric representation of the Gregorian calendar year.

2.3 Month of year shall be represented by the ordinal numbers 01, 02, ..., 12, representing the first through the twelfth months.

2.4 Day of month shall be represented by the ordinal numbers 01, 02, ..., 31, representing the first through the thirty-first days.

2.5 The sequence of the time elements shall be from high order to low order (left to right), year, month of year, and day of month.

2.6 No separators shall be used between the time elements.

* ANSI (USASI) Document X3.8/139, 1969 January 22; X3.8.2/122, 1969 January 21.

3. Example

3.1 1967 July 1, 1 July 1967, and July 1, 1967 would be expressed as 670701.

4. Qualifications

4.1 In certain applications it may be necessary to represent the year by its full four digits. In these instances the calendar date may be represented as an eight character string of digits wherein the high order four digit (left most) represent the year, e.g. 1967 July 1 would be represented as 19670701.

4.2 The ordinal representation of the day of the year in lieu of a month-day of month representation is commonly used in applications where frequent computation is employed to determine the number of elapsed days between two dates. In these instances the day of the year should be represented by a numeric string of three digits wherein January 1, the first day of the year would be represented as 001, through December 31, the last day of the year, which would be represented as 365 (366 in a leap year). This three digit representation of the day of the year may be used with a one, two, or four digit representation of the year to yield the identification of the date (Ordinal Date), e.g. 1967 January 1 would be represented as 7001, 67001, or 1967001 depending upon the requirements of the specific application.

4.3 The time elements, year, month of year, day of month, and day of year may be represented and used independently or collectively as required. When used collectively the high to low sequence must be maintained, i.e. year-month of year, month of year-day of month, year-month of year-day of month, or year-day of year.

4.4 In the interchange of data between data systems it is essential that the sender provide the recipient of the data a description of the format and contents of the data involved. When calendar dates are involved in interchange, the specific representations employed must be fully described.

4.5 This standard does not specify standard means of representing calendar dates for man-to-machine (or machine-to-man) or man-to-man interchange. The representations of calendar date in these environments will be the subject of future standards now under consideration.

APPENDIX

(This Appendix is not part of the foregoing standard, but is included to facilitate its use.)

A1. Intended Use of the Standard Representations

A1.1 The Standard Representation for Calendar Date is intended for use in interchange of data between the machines of data systems. This interchange is the counterpart of the present interchange of conventional business transaction documents: bid requests, purchase orders, invoices, shipping notices, payments, etc.

A2. Projected Standard Representations for Time Elements

A2.1 The Standard Representation for Calendar Date is intended to be a member of a family of representations for time elements to be developed for the full range of needs for representing time elements in the interchange of data.

A2.2 Additional members of the projected family of data codes for times include the following:

1. Year and week of year.
2. Julian Day number.
3. Year and quarter of year.
4. Time of day carried to hours, minutes, seconds, and time zone.
5. General time intervals. These are arbitrary intervals and intervals corresponding to established units of calendar and civil time.
6. Period-to-date intervals. These are—special cases of (5) above. The period for which the to-date interval is to be identified may be, for example, a year, half-year, quarter-year, month, or week.
7. Times of the type "This time period last year" where the time period may be, for example, a day, week, or month.

american national standards committees
X3-computers and information processing
X4-office machines and supplies
operating under the procedures of the
American National Standards Institute

doc. no. : X3L8/225
date: : 1980 May 2
project :
milestone :
reply to :

MEMORANDUM FOR Membership of X3L8,
Representations of Data Elements

Dear Members:

The attached document ISO/TC97/SC14/N215 - Revision of
ISO 2711, Representation of Ordinal Dates, is being provided
to the membership of X3L8 for review and comment. Comments
should be submitted by May 30 to:

Administrative Secretary, X3L8
C.B.E.M.A.
1828 L Street, N.W., Suite 1200
Washington, D.C. 20036

202/466-2298/99

Sincerely,


Catherine A. Kachurik

Attachment



american national standards institute, inc.
1430 broadway, new york, n.y. 10018
(212) 354-3300



american national standards institute, inc.
1430 broadway, new york, n.y. 10018
(212) 354-3300

1980 April 16

TO: P. O and L. Members
ISO/TC 97/SC 14
REPRESENTATION OF DATA ELEMENTS

Secretariat: USA (ANSI)

Dear Members:

Subject: ISO 2711 - Information Processing Interchange -
Representation of Ordinal Dates

In March 1978, SC 14 was issued a letter ballot on the question of the 5 year review of ISO 2711. The results of the balloting were circulated in 97/14 N 206. Next, TC 97 was advised of the results and asked to ballot on the same question. Switzerland submitted a proposal for revision (97/14 N 215) that was supported by France. When SC 14 was advised of Switzerland's proposal, Germany and Canada supported it. In October 1979, TC 97 reviewed the situation with ISO Central Secretariat: 3 "p" members of SC 14 supporting the revision submitted by Switzerland. Central Secretariat advises SC 14 to revise ISO 2711.

Enclosed is a 60 day letter ballot asking the members of TC 97/SC 14 if you approve the revision of ISO 2711 based on the Swiss proposal 97/14 N 215. If possible, please expedite the voting so that the voting may be discussed at the June meeting in Stockholm.

Sincerely,

Alice Broogan

Alice Broogan
Secretariat ISO/TC 97/SC 14

AD/HC
Encl.: 97/14 N 206, 215
Letter ballot

LETTER BALLOT

from the Member Body of
on the Revision to ISO 2711 - Information Processing Interchange - Representation of Ordinal Dates - based on the Swiss proposal 97/14 N 215.

This letter ballot is to be returned, by each "p" Member, to the ISO/TC97/SC14 Secretariat, by 1980-06-1.

* We approve the Revision to ISO 2711 based on 97/14 N 215.

or

* We approve the Revision to ISO 2711 based on 97/14 N 215, though making certain comments of an editorial nature.

or

* We disapprove the Revision to ISO 2711 based on 97/14 N 215 for the technical reasons attached to this letter ballot.

or

* We abstain from voting.
(The P Member Bodies have an obligation to vote.)

Place and date

Signature

* Delete whichever does not apply.

ISO/TC 97/SC 14 N
May 9, 1979

215

To: P. O. and L. Members

ISO/TC 97/SC 14
REPRESENTATION OF
DATA ELEMENTS

Secretariat: ANSI (USA)

Dear Members:

In March 1978 the Secretariat circulated a letter ballot on ISO 2711 to determine if it should be confirmed, revised or withdrawn. As a result of this ballot, it was the recommendation of SC 14 that ISO 2711 should be confirmed (Doc. 97/14 N 206).

These results were subsequently forwarded to TC 97 together with a letter ballot. The results of the TC 97 letter ballot were: 11 in favor of confirmation and 3 in favor of revision. Czechoslovakia had voted for revision but did not submit any proposed revision. Sweden and Yugoslavia had submitted the attached proposal for that revision. France and Yugoslavia had indicated their support for the Swiss document.

Based on the above results, the ISO Directives would indicate moving the document forward for confirmation. However, before that step is taken, the Secretariat requests member bodies of SC 14 to comment on the Swiss proposal.

Please submit comments to the Secretariat no later than July 15, 1979.

Sincerely,

Frances E. Schrotter

Frances E. Schrotter
Secretariat ISO/TC 97/SC 14

FES/hs

cc: H. White, Chmn 97/14

1. Title

It is proposed to change the title to read:

Representation of ordinal dates for data interchange between data processing systems.

2. Scope

It is proposed to change the Scope to read:

"This international Standard establishes a system of representing ordinal dates to facilitate the interchange of data among data processing systems. It does not apply to information interchange between humans or between machines and humans."

3. Field of Application

It is proposed to change the Field of Application to read:

"This International Standard shall be applied only where representations of ordinal dates are used in the interchange of data among data processing systems. The ordinal date is commonly used in cases where machines are frequently utilized to carry out a systematic sorting in the order of succession of dates or to determine the number of days elapsed between two dates."

This International Standard does not apply to any other application."

4. Reference

It is proposed to cancel the reference.

5. Justification

5.1 If considered as a specialized standard, i.e. as a standard to be used when data containing dates are exchanged between data processing systems or when such systems carry out sorting operations according to date, then maybe IS 2711 is a useful standard. However, this should be made perfectly clear by the title, the scope, the field of application and the reference.

5.2 The reference to ISO 2014 is undesirable because this standard addresses interchange of data containing dates between humans and between machines and humans. IS 2711 should in no way be related to any other data interchange than that between machines.

6.5 This is clearly perceived by the PTT administrations. The enclosed sheets show that numerous postal administrations have retained their usual way of indicating dates (either all-numeric arabic digits or mixed arabic-roman digits, or alpha-numeric form). We have found none having changed to IS 2014.

Also the European Communities in their letters or in the Official Journal or the European Patent Office use the European customary form. The acknowledge answer of the telex machine of ANSI uses the US customary all-numeric way, as well as some of the ANSI/X3 technical sub-committees and IEEE, or they use letters for the month (but the whole date in ascending order).

7. Conclusion
We believe that all this justifies amply our proposal to revise IS 2711 and at the same time to consider at least the revision of IS 2014, if not its withdrawal.

Encl.: ment.

5.3 We believe that the revision of IS 2711 should not be undertaken in isolation but should be performed together with that of IS 2014. To better understand this request, it is necessary to refer here to ISO 2014 in more detail, although we realize that IS 2014 is not the prime object of the letter ballot.

6. Reasons for revising IS 2014 when revising IS 2711
6.1 Whilst we have voted in favour of IS 2014 in 1975, we now find after about 3 years of existence that it has a number of very undesirable side effects due to a main weakness. In the introduction of IS 2014 it is stated:

"... it is considered that similar confusion does not arise when the month is spelled out, either in full or in abbreviated form."

This paragraph is followed by two paragraphs listing the alleged advantages of the so-called descending order. It is now more specified that as soon as the month is spelled out by means of letters no order is recommended by the standard.

6.2 We believe that the lack of such a clause has augmented the number of different ways of writing date, and led to such monstrosities as:

1978 December 25

which correspond to no common usage and is just an arbitrary creation unfortunately derived from IS 2014. We propose therefore to include in IS 2014, when revised, a statement like the following:

"As similar confusion cannot arise when the month is spelled out, either in full or in abbreviated form, this International Standard does not apply in this case. It is then recommended to use the method of writing date which is customary for the writer. Some advantages of the descending order may apply in the case of all-numeric form."

6.3 We have other editorial queries, which we will present later.

6.4 Finally, we wish to state that IS 2014 is presently not and is not likely to be a useful standard in future. The main reason is that it is going against the habits of people in Europe as well as in America or elsewhere. It has been drafted essentially for the benefit of machines, not of people, as the specific advantages listed presently in IS 2014 make it quite clear. This justification for a standard is more and more rejected by the public and standardization bodies should take this into account.

ANSI tolex customer for 22nd of December

12/22/78 0732 est
424236 ans1 ul

EUROPEAN PATENT OFFICE
Patenamt
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Office europoien d'bs brevets

Europoishes Patentamt Postfach 105520 D-6000 München 2

No. der Anmeldung - Appréciation n° - Domanda no. brevetti n°

Tag der Eingabe - Date of receipt - Date de réception

Zustimmungs- / Approbation / Approvazione - Approvazione / Approvazione

Ref. n° - Référence de classement ou de mandataire

12.12.1978

Datum/Date 12.12.1978

Attention: this card is not valid for the processing of applications for the registration of the names of the American National Civil Service Employees

no. X315/78-03K

date 10/31/78

subject

for M. J. Oulber

Jean G. Smith
Sperry Univac
P. O. Box 500-C2381
Blue Bell, Pa. 19424

22 10 78

USA ascending order!



SWITZERLAND

SUOMEN



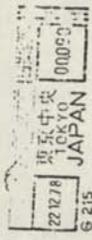
Scotland



JAPAN



FRANCE



GERMANY



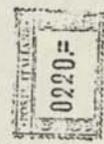
Brazil



England



ISRAEL



1120432

Niederlande

Doc. No.

Date 20 December 1978

Project DISY TG2

Milwaukee



THE INSTITUTE OF
ELECTRICAL AND
ELECTRONICS
ENGINEERS

382 EAST 47TH STREET, NEW YORK, N.Y. 10017
MEMBERSHIP
720 4704
GARDEN
N
12/31/79

SIGNATURE

Richard P. Fink
GENERAL DIRECTOR

for 31st of
December
for a copy
please

COMMISSION
OF THE
EUROPEAN COMMUNITIES

Directorate-General
for internal market and industrial affairs

Brussels, 30. XI. 1978

RE/E1

READER COMMENTARY/Robert L. LaFara

Programming Should Not Be Based on Tricks

I applaud R.A. Cornish's skill in developing the TGIF algorithms [CW, June 4] and enjoyed determining how they work in much the same manner that I enjoy working other puzzles.

However, a puzzle should not be suggested to be used as part of a program. This type of algorithm is a prime exam-

ple of the type of programming that we should try to avoid because it depends on "tricks."

Cornish has discovered some interesting "facts." For example, if we represent each month number by a 4-bit binary number, then those months where the first and last bits are different are the

months that have 31 days. It is incredible (maybe even diabolical) that anyone would use such a fact in a program.

Without extensive documentation, such a program is nearly impossible to understand.

It was implied that these algorithms are especially efficient in the use of computer

memory. I seriously question that implication. I suggest the following methods which do not require much space and will result in a less obscure program.

In place of Algorithms 1, 2 and 3, use a table lookup. Only 12 memory locations are required to store the day number of the first day of each

month for nonleap years. A test to see if the year is a leap year and a test to see if the month is March or later will determine if a day needs to be added. The same table can be used to convert from mo/day to day-of-year and also to convert from day-of-year to mo/day.

To find the day of the week may be a little more complex. If the program only needs to do this over a short span of years, then a table giving day-of-week for Jan. 1 of each year can be used in conjunction with day-of-year to find the day-of-week.

If a long span of years is involved, it may be more efficient to use Zeller's congruence. (See *Problems for Computer Solution*, Fred Gruenberger and George Jaffray, John Wiley & Sons, Inc. 1965, p. 255.) Although Zeller's congruence depends on certain "tricky" relations between the variables, it is a known method and can be documented with the simple statement: "THE FOLLOWING CODE IMPLEMENTS ZELLER'S CONGRUENCE FOR DETERMINING DAY-OF-WEEK."

For the interest of persons not familiar with Zeller's congruence, it is: $f = [(2.6m - 0.2) + k + D + (D/4) + (C/4) - 2C] \text{ mod } 7$, where m is month (March is 1, April is 2, and so on, and January and February are 11 and 12 of the previous year), k is the day of the month, D is the year of the century, and C is the century. Square brackets indicate "greatest integer in" and $\text{mod } 7$ means find the remainder after dividing by 7.

For example, on what day of the week will Jan. 1, 1980 occur?

$m=11$, $k=1$, $C=19$, $D=79$
 $f = [(28.4) + 1 + 79 + (19.75) + (4.75) - 38] \text{ mod } 7$
 $f = [28 + 1 + 79 + 19 + 4.75 - 38] \text{ mod } 7$
 $f = [93] \text{ mod } 7$
 $f = 2$

The days are numbered: Sunday=0, and so on. Therefore, 2 is Tuesday. If the computer being used allows only integer arithmetic, the expression $(2.6m - 0.2)$ can be implemented as $(26m - 2)/10$. LaFara is with the Naval Avionics Center in Indianapolis, Ind.

D water (!.VALID)

$i > 0$ OK

$i = 0$ NOT POSSIBLE

$i < 0$ ADJUST BY 1

$K = 0$

$K > 28/30/31$

JK COMBINATIONS

DOW FOR JAN 1 $i = i - 1$ 1979

$K = 1$

$\Delta = -28$

$$\text{DOW} = \left(\cancel{i}^2 + \cancel{i}/400 - (2 * \cancel{i}/100) + ((5 + \cancel{\Delta})/4) + 1 \right) / 7$$

1980 $D = 79$

$$4 - 38 + 98 + 1 \quad | \quad / 7$$

$$103 - 38 = 65 / 7 = \textcircled{2}$$

$\frac{1395}{78}$

FISCAL DAY

WITHOUT CONSIDERING
~~IF WE DON'T HAVE THE PARTITIONING OF THE FISCAL YEAR~~
~~TO WORRY ABOUT, THE DAY OF THE WEEK CAN BE OBTAINED~~
BY ZETTER'S CONVENTION [?], ~~REPORTED IN COMPUTER~~
WORLD, CAN BE IMPROVED, HOWEVER, WITH THE $(J-14)/12$
TECHNIQUE OF

THE SPECIFICATIONS

$$t = (J-14)/12 \quad (-1 \text{ FOR JAN \& FEB, } 0 \text{ OTHERWISE})$$

*RMDR

GR *RMDR

$$\left. \begin{array}{l} i = YR \\ j = MO \\ k = DR \end{array} \right\}$$

$$? = (*RMDR * 13 + 155) / 5$$

$$i = i + t$$

(ZETTER HAD J & F IN PREV. YR)

$$C = i'32 \quad (= i/100)$$

[?] ~~COMPUTATIONAL~~ GAWENBERG, ETC.

IF we don't have the fiscal year to worry about, $CPI_{t-10} - CPI_t$ covered by modified ZELMER'S CONJECTURE

J	1	2	3	4	5	6	7	8	9	10	11	12	
$(J-14)/12$	-1	-1	0	0	0	0	0	0	0	0	0	0	
*RNDR	-1	0	-1	-10	-9	-8	-7	-6	-5	-4	-3	-2	
+RNDR+12	11	12	1	2	3	4	5	6	7	8	9	10	
$[26m-2]/10$	28	31	2	5	7	10	12	15	18	20	23	25	28
$\Delta+28$	31	28	31	30	31	30	31	31	30	31	30	31	28

$t = (J-14)/12$ (INTEGER)

$M = *RNDR + 12$

$i = i + t$

$D = iJ^2$

$\Phi = iJ^2$

$26m-2 = 280 / 10 =$

K

$(5 \neq 0)/4$ (+1 per yr, +2 on LEADS)

$2c = 2 * (i/100)$

$(\epsilon/4)$ (YES ON X400)

$= i/400$

11	$\equiv (13m-1)/5$
1979	$\equiv (*RNDR * 13 + 155)/5$
79	
19	
28	+
1	+ 29
98	+ 127
38	- 89
4	+ 93/7 *RNDR = 2

BUT GIVES A SUNDAY OF 0, NOT 7



Olle Sturen, Secretary-General of ISO

our date
1979-02-08
your date
1979-01-25

our reference
ISO/2015
your reference
pak

Mr. R.W. Bemer
Honeywell Information Systems
P.O. Box 6 000
Phoenix, Arizona
U.S.A.

Dear Bob,

Thank you very much for your letter with attached copies of your perpetual calendar. I am very pleased to see this application of one of our standards and have kept for my personal use one copy of the calendar. It is not, however, in line with the ISO policy to add the application of a standard to the standard itself; we rather like to see the ISO standards keep dealing with the principles to be followed.

In spite of my negative response to your precise proposal, I am happy that there is no copyright and therefore that we may be free to use the material if we find other means.

With best regards,

Yours sincerely,

Olle Sturen

OS/ak

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION • МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ • ORGANISATION INTERNATIONALE DE NORMALISATION

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international +41 22 34 12 40

Telex 23 887 ISO CH
Telegrams ISORGANIZ

$$\begin{aligned}
 jd1 &= 1461 * (i + 4799) / 4 - 31738 - 3 * ((i + 4899) / 100) / 4 & (8) \\
 jd &= jd1 + ord - 1 & (9a) \\
 ord &= jd - jd1 + 1 & (9b) \\
 jdord &= 1461 * (i + 4799) / 4 + ord - 31739 - 3 * ((i + 4899) / 100) / 4 & (10)
 \end{aligned}$$

As a curiosity, Julian Day 0 is found for Nov 24 of the year -4713 (yes, minus!), but that's not what the calendar said then. And if you go into more detail with Julian days, remember that they start at noon Greenwich Time.

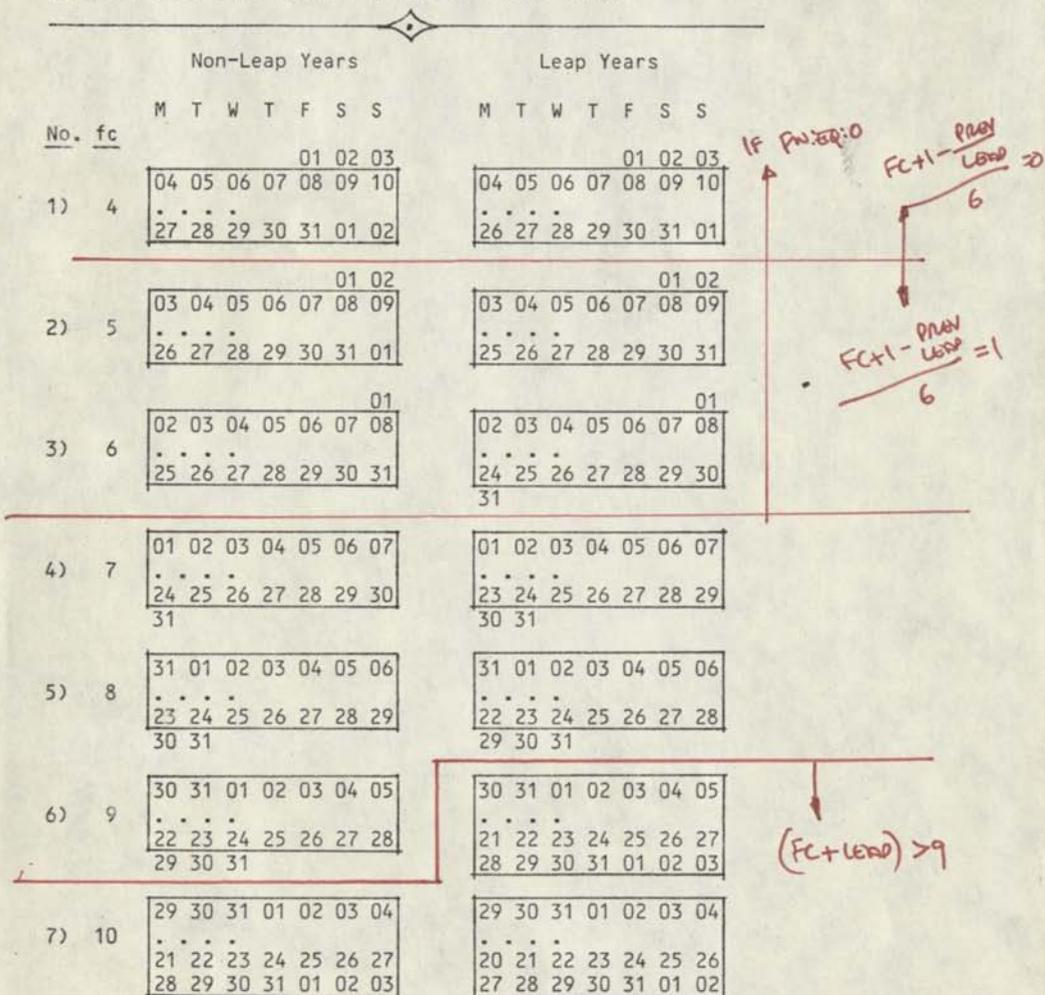


Figure 1. Possible F-Year Patterns

Fiscal Year 1												Fiscal Year 2												Fiscal Year 3												Fiscal Year 4												Fiscal Year 5												Fiscal Year 6												Fiscal Year 7											
FM	M	T	W	T	F	S	S	S	S	S	S	FM	M	T	W	T	F	S	S	S	S	S	S	FM	M	T	W	T	F	S	S	S	S	S	S	FM	M	T	W	T	F	S	S	S	S	S	S	FM	M	T	W	T	F	S	S	S	S	S	S	FM	M	T	W	T	F	S	S	S	S	S	S	FM	M	T	W	T	F	S	S	S	S	S	S
1	4	5	6	7	8	9	10	11	12	13	14	1	3	4	5	6	7	8	9	10	11	12	13	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12

Find calendar number in table at left.
 To: Single digits mean not a leap year;
 Use: use the FY calendar of that digit.
 Close the gap to leap year.
 Two digits signify a leap year. Use the FY calendar of the first digit through February 28; then the FY calendar of the second digit for the balance of the year.
 Use the left-hand Fiscal Week number for FY calendar 1 only for case 7,1.

Chercher le numéro du calendrier dans la table de gauche. Un chiffre simple indique une année non bissextile. Utiliser le calendrier AF (année fiscale) correspondant à ce chiffre.
 Reformer l'espace pour supprimer la 29 Février. 2 chiffres indiquent une année bissextile. Utiliser le calendrier AF correspondant au premier chiffre jusqu'au 28 Février; puis le calendrier du deuxième chiffre pour la reste de l'année. Utiliser le chiffre de gauche de la semaine fiscale du calendrier de l'AF 1 pour le cas 7,1 seulement.

Honeywell
 LARGE INFORMATION SYSTEMS DIVISION

Year of decade

190	0	1	2	3	4	5	6	7	8	9
191	4	5	6	7	8	9	0	1	2	3
192	7	1	2	3	4	5	6	7	8	9
193	0	1	2	3	4	5	6	7	8	9
194	3	4	5	6	7	8	9	0	1	2
195	6	7	8	9	0	1	2	3	4	5
196	9	0	1	2	3	4	5	6	7	8
197	2	3	4	5	6	7	8	9	0	1
198	5	6	7	8	9	0	1	2	3	4
199	8	9	0	1	2	3	4	5	6	7
200	1	2	3	4	5	6	7	8	9	0
201	4	5	6	7	8	9	0	1	2	3
202	7	8	9	0	1	2	3	4	5	6
203	0	1	2	3	4	5	6	7	8	9
204	3	4	5	6	7	8	9	0	1	2
205	6	7	8	9	0	1	2	3	4	5
206	9	0	1	2	3	4	5	6	7	8
207	2	3	4	5	6	7	8	9	0	1
208	5	6	7	8	9	0	1	2	3	4
209	8	9	0	1	2	3	4	5	6	7
210	1	2	3	4	5	6	7	8	9	0

1982

1983

1979

1980

1981

Fiscal Year 1												Fiscal Year 2												Fiscal Year 3												Fiscal Year 4												Fiscal Year 5												Fiscal Year 6												Fiscal Year 7																	
PM	M	T	W	T	F	S	S	S	S	S	S	PM	M	T	W	T	F	S	S	S	S	S	S	PM	M	T	W	T	F	S	S	S	S	S	S	PM	M	T	W	T	F	S	S	S	S	S	S	PM	M	T	W	T	F	S	S	S	S	S	S	PM	M	T	W	T	F	S	S	S	S	S	S	PM	M	T	W	T	F	S	S	S	S	S	S						
1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12						
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25	26	27	28	29	30	31						25	26	27	28	29	30	31							25	26	27	28	29	30	31							25	26	27	28	29	30	31							25	26	27	28	29	30	31							25	26	27	28	29	30	31							25	26	27	28	29	30	31						
JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC						

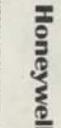
Fiscal Year 1												Fiscal Year 2												Fiscal Year 3												Fiscal Year 4												Fiscal Year 5												Fiscal Year 6												Fiscal Year 7																	
PM	M	T	W	T	F	S	S	S	S	S	S	PM	M	T	W	T	F	S	S	S	S	S	S	PM	M	T	W	T	F	S	S	S	S	S	S	PM	M	T	W	T	F	S	S	S	S	S	S	PM	M	T	W	T	F	S	S	S	S	S	S	PM	M	T	W	T	F	S	S	S	S	S	S	PM	M	T	W	T	F	S	S	S	S	S	S						
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13	14	15	16	17	18	19	20	21	22	23	24	13	14	15	16	17	18	19	20	21	22	23	24	13	14	15	16	17	18	19	20	21	22	23	24	13	14	15	16	17	18	19	20	21	22	23	24	13	14	15	16	17	18	19	20	21	22	23	24	13	14	15	16	17	18	19	20	21	22	23	24	13	14	15	16	17	18	19	20	21	22	23	24						
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JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC						

Find calendar number in table at left. Single digits mean not a leap year. Use the FY calendar of that digit. Close the gap to remove February 29. Two digits signify a leap year. Use the FY calendar of the first digit through February 28; then the FY calendar of the second digit for the balance of the year. Use the letrhand Fiscal Week number for FY calendar 1 only for case 7,1.

Chercher le numéro du calendrier dans la table de gauche. Un chiffre simple indique une année non bissextile. Utilisez le calendrier AF (année fiscale) correspondant à ce chiffre. Référez l'espace pour supprimer la 29 Février. 2 chiffres indiquent une année bissextile. Utilisez le calendrier AF correspondant au premier chiffre jusqu'au 28 Février puis le calendrier du deuxième chiffre pour la reste de l'année. Utilisez le chiffre de gauche de la semaine fiscale du calendrier de l'AF 1 pour le cas 7,1 seulement.

Chercher le numéro du calendrier dans la table de gauche. Un chiffre simple indique une année non bissextile. Utilisez le calendrier AF (année fiscale) correspondant à ce chiffre. Référez l'espace pour supprimer la 29 Février. 2 chiffres indiquent une année bissextile. Utilisez le calendrier AF correspondant au premier chiffre jusqu'au 28 Février puis le calendrier du deuxième chiffre pour la reste de l'année. Utilisez le chiffre de gauche de la semaine fiscale du calendrier de l'AF 1 pour le cas 7,1 seulement.

Chercher le numéro du calendrier dans la table de gauche. Un chiffre simple indique une année non bissextile. Utilisez le calendrier AF (année fiscale) correspondant à ce chiffre. Référez l'espace pour supprimer la 29 Février. 2 chiffres indiquent une année bissextile. Utilisez le calendrier AF correspondant au premier chiffre jusqu'au 28 Février puis le calendrier du deuxième chiffre pour la reste de l'année. Utilisez le chiffre de gauche de la semaine fiscale du calendrier de l'AF 1 pour le cas 7,1 seulement.



1982

Year	1	2	3	4	5	6	7	8	9	10	11	12
Fiscal Year 1	1	2	3	4	5	6	7	8	9	10	11	12
Fiscal Year 2	1	2	3	4	5	6	7	8	9	10	11	12
Fiscal Year 3	1	2	3	4	5	6	7	8	9	10	11	12
Fiscal Year 4	1	2	3	4	5	6	7	8	9	10	11	12
Fiscal Year 5	1	2	3	4	5	6	7	8	9	10	11	12
Fiscal Year 6	1	2	3	4	5	6	7	8	9	10	11	12
Fiscal Year 7	1	2	3	4	5	6	7	8	9	10	11	12

1983

Year	1	2	3	4	5	6	7	8	9	10	11	12
Fiscal Year 1	1	2	3	4	5	6	7	8	9	10	11	12
Fiscal Year 2	1	2	3	4	5	6	7	8	9	10	11	12
Fiscal Year 3	1	2	3	4	5	6	7	8	9	10	11	12
Fiscal Year 4	1	2	3	4	5	6	7	8	9	10	11	12
Fiscal Year 5	1	2	3	4	5	6	7	8	9	10	11	12
Fiscal Year 6	1	2	3	4	5	6	7	8	9	10	11	12
Fiscal Year 7	1	2	3	4	5	6	7	8	9	10	11	12

1979

Year	1	2	3	4	5	6	7	8	9	10	11	12
Fiscal Year 1	1	2	3	4	5	6	7	8	9	10	11	12
Fiscal Year 2	1	2	3	4	5	6	7	8	9	10	11	12
Fiscal Year 3	1	2	3	4	5	6	7	8	9	10	11	12
Fiscal Year 4	1	2	3	4	5	6	7	8	9	10	11	12
Fiscal Year 5	1	2	3	4	5	6	7	8	9	10	11	12
Fiscal Year 6	1	2	3	4	5	6	7	8	9	10	11	12
Fiscal Year 7	1	2	3	4	5	6	7	8	9	10	11	12

1980

Year	1	2	3	4	5	6	7	8	9	10	11	12
Fiscal Year 1	1	2	3	4	5	6	7	8	9	10	11	12
Fiscal Year 2	1	2	3	4	5	6	7	8	9	10	11	12
Fiscal Year 3	1	2	3	4	5	6	7	8	9	10	11	12
Fiscal Year 4	1	2	3	4	5	6	7	8	9	10	11	12
Fiscal Year 5	1	2	3	4	5	6	7	8	9	10	11	12
Fiscal Year 6	1	2	3	4	5	6	7	8	9	10	11	12
Fiscal Year 7	1	2	3	4	5	6	7	8	9	10	11	12

1981

Year	1	2	3	4	5	6	7	8	9	10	11	12
Fiscal Year 1	1	2	3	4	5	6	7	8	9	10	11	12
Fiscal Year 2	1	2	3	4	5	6	7	8	9	10	11	12
Fiscal Year 3	1	2	3	4	5	6	7	8	9	10	11	12
Fiscal Year 4	1	2	3	4	5	6	7	8	9	10	11	12
Fiscal Year 5	1	2	3	4	5	6	7	8	9	10	11	12
Fiscal Year 6	1	2	3	4	5	6	7	8	9	10	11	12
Fiscal Year 7	1	2	3	4	5	6	7	8	9	10	11	12

Find calendar number in table at left. Single digits mean not a leap year. Use the FY calendar of that digit. Close the gap to remove February 29. Two digits signify a leap year-- Use the FY calendar of the first digit through February 28; then the FY calendar of the second digit for the balance of the year. Use the lefthand Fiscal Week number for FY calendar 1 only for case 7,1.

Honeywell

Chercher le numéro du calendrier dans la table de gauche. Un chiffre simple indique une année non bissextile. Utiliser le calendrier AF (année fiscale) correspondant à ce chiffre. Refermer l'espace pour supprimer la 29 Février. 2 chiffres indiquent une année bissextile. Utiliser le calendrier AF correspondant au premier chiffre jusqu'au 28 Février; puis le calendrier du deuxième chiffre pour la reste de l'année. Utiliser le chiffre de gauche de la semaine fiscale du calendrier de l'AF 1 pour le cas 7,1 seulement.

LARGE INFORMATION SYSTEMS DIVISION

PERPETUAL FISCAL CALENDAR

(Custom by Honeywell)

Year	1	2	3	4	5	6	7	8	9	10	11	12
1990	0	1	2	3	4	5	6	7	8	9	10	11
1991	0	1	2	3	4	5	6	7	8	9	10	11
1992	0	1	2	3	4	5	6	7	8	9	10	11
1993	0	1	2	3	4	5	6	7	8	9	10	11
1994	0	1	2	3	4	5	6	7	8	9	10	11
1995	0	1	2	3	4	5	6	7	8	9	10	11
1996	0	1	2	3	4	5	6	7	8	9	10	11
1997	0	1	2	3	4	5	6	7	8	9	10	11
1998	0	1	2	3	4	5	6	7	8	9	10	11
1999	0	1	2	3	4	5	6	7	8	9	10	11
2000	0	1	2	3	4	5	6	7	8	9	10	11
2001	0	1	2	3	4	5	6	7	8	9	10	11
2002	0	1	2	3	4	5	6	7	8	9	10	11
2003	0	1	2	3	4	5	6	7	8	9	10	11
2004	0	1	2	3	4	5	6	7	8	9	10	11
2005	0	1	2	3	4	5	6	7	8	9	10	11
2006	0	1	2	3	4	5	6	7	8	9	10	11
2007	0	1	2	3	4	5	6	7	8	9	10	11
2008	0	1	2	3	4	5	6	7	8	9	10	11
2009	0	1	2	3	4	5	6	7	8	9	10	11
2010	0	1	2	3	4	5	6	7	8	9	10	11

1982

1983

1979

1980

1981

1981

Fiscal Year 1												Fiscal Year 2												Fiscal Year 3												Fiscal Year 4												Fiscal Year 5												Fiscal Year 6												Fiscal Year 7											
M	T	W	T	F	S	S	S	S	S	S	S	M	T	W	T	F	S	S	S	S	S	S	S	M	T	W	T	F	S	S	S	S	S	S	S	M	T	W	T	F	S	S	S	S	S	S	S	M	T	W	T	F	S	S	S	S	S	S	S	M	T	W	T	F	S	S	S	S	S	S	S	M	T	W	T	F	S	S	S	S	S	S	S
1	4	5	6	7	8	9	10	11	12	13	14	1	4	5	6	7	8	9	10	11	12	13	14	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12

PERPETUAL FISCAL CALENDAR
(Continued on Reverse)

LARGE INFORMATION SYSTEMS DIVISION

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Find calendar number in table at left.
 Single digits mean not a leap year;
 To use the FY calendar of that digit.
 Use the gap to remove February 29.
 Two digits signify a leap year. Use the
 FY calendar of the first digit through
 February 28; then the FY calendar of the
 second digit for the balance of the year.
 Use the lethead Fiscal Week number for
 FY calendar 1 only for case 7,1.

Chercher le numéro du calendrier dans la table
 de gauche. Un chiffre simple indique une année
 non bissextile. Utiliser le calendrier AF
 (année fiscale) correspondant à ce chiffre.
 Refaire l'espace pour supprimer la 29 février.
 2 chiffres indiquent une année bissextile. Utiliser le
 calendrier AF correspondant au premier chiffre jusqu'au
 28 février; puis le calendrier du deuxième chiffre pour
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 7,1 seulement.

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INTERFACING FUNDAMENTALS: AN INTRODUCTION TO REALTIME CLOCKS

Christopher A. Titus and Jonathan A. Titus
Tychon, Inc

David G. Larsen and Peter R. Rony
Virginia Polytechnic Institute and State University

In many microcomputer applications the computer must perform actions at accurately timed intervals. This allows the computer to make accurate measurements of an analog signal at specific intervals, for example, at 100 ms. This 100-ms period may be "timed" through the use of a time-delay loop in which software commands are used, or through the use of an external clock of some sort.

At this point, it may be realized that while a time-delay software routine may generate a delay of the required accuracy, the computer can do nothing else while it is performing the timing software steps. This is a serious limitation. Although probably less obvious, the time-delay software steps may be interrupted by some external device that requires immediate servicing by the computer. The overall effect is to "lengthen" the time required for the time-delay software steps. The actual time delay would be the sum of the time spent in the software steps and the time spent servicing the external interrupt.

In most instances in which accurate periods are required, an external circuit is used to time the necessary periods with as little interaction between the computer and external clock as possible. Such clocks are immune to external interrupts and to changes in the normal flow of a program. Once started, they continue to time a period until it is completed and the time is up. In this way, the clock runs in parallel with the computer; the computer then can perform other tasks and service interrupts while the clock is running. This type of external clock is often called a realtime clock, since its time is real, in that it cannot be altered or delayed by events that would normally affect a program.

There are several types of realtime clocks, indicated by the following listing.

Programmable Realtime Clock—The actual required period is preprogrammed within the clock through either hardware or software. Once the clock has been started, it continues timing until the period has ended. At the end of the period, the clock signals the computer that the timing task has been completed.

Free-Running Realtime Clock—Running continuously, the clock signals the computer at the end of each period. The periods generally are of equal length, for instance 10 ms.

Time-of-Day Clock—This type of clock will provide the computer with the actual time, eg, 16:20 hours; however, it is not frequently used in small computer systems.

The concept of realtime has been introduced subtly in previous columns. Operation of an 8085 based computer system, use of the 14-bit timer contained within the 8155 read/write memory, and a description of an interface chip in terms of its realtime operation have all been covered. An excellent example of a programmable realtime clock is the 14-bit counter used in the 8085 based computer. It obtained its time base from the crystal clock that controlled the microprocessor chip; an interrupt was used to signal the end of the timing period. Assuming that a frequency of 1 MHz was used to control the clock, a 14-bit counter could provide a total count of 16,384 μ s, or just over 16 ms. This might be somewhat limiting if periods of several seconds are required, but the scheme is fairly flexible. If longer periods are required, the 14-bit counter could be programmed to time

some integer fraction of the period and the computer could be used to total the number of shorter periods that are required for the entire period to have elapsed. The computer would only have to increment and test a count each time the clock interrupted it. One drawback to this is that additional software is required, something that the use of realtime clocks was intended to avoid in the first place; however, the additional program steps are quite minimal.

In many cases, it would be valuable if the realtime clock could be preset for the clock's basic frequency, eg, 1 MHz, 10 kHz, etc, as well as for the actual count. If these various intervals were available, the timing of longer periods would be relatively easy and no additional software steps would be required. A simple series of divide-by-10 counters such as the sn7490 or sn74390 could be used to divide a high frequency clock signal into lower frequencies for use by the realtime clock's counters. Various frequencies could be selected readily through the use of jumper wires on the computer board. A more sophisticated realtime clock scheme could use an electronic switching circuit that would allow the computer itself to select the frequency required. Thus, a programmer could select the basic period and the actual count through software commands to the realtime clock.

Freerunning realtime clocks are preset to time a period of predetermined length, perhaps 10 ms. This period is timed over and over again, interrupting the computer each time that a period has been completed. In many computer systems, the line power frequency, 60 or 50 Hz, is used to provide a very stable, fixed-length period that may be used equally as well. The freerunning type of realtime clock is not as independent of the computer (eg, software control) as is the programmable realtime clock. Software steps to accumulate the number of periods are still required, and the total timing period may have an error of up to two of the basic frequency periods.

Since freerunning realtime clocks have a regular period, they are often used to signal the processor that it is time to start a software routine that will check various input/output devices to determine whether or not they require some computer service. Through the use of a software table, the computer can check to see what devices are enabled or disabled, and it can also determine the frequency at which they must be checked. It is useless to check a 10-char/s teletypewriter every 10 ms; instead, it would be checked every 80 or 90 ms, while a faster device is checked at the end of each 10-ms period. Such a scheme allows computer and programmer flexibility in the way that realtime operations are handled, particularly for situations in which the computer must perform many realtime operations simultaneously.

In almost all cases, the computer and realtime clock are connected by an interrupt signal. In this way, the clock can immediately signal the computer that the current period has been completed or "timed out." Since interrupts can be quite complex, as has been described previously in these columns, only one realtime clock should be used with a microcomputer. It will be up to the user to determine the priority, and thus the importance, of the realtime clock. Often it is assigned the highest priority.

Unfortunately, there are few, if any, realtime clock interfaces available for the Intel/National Semiconductor 8080 based microcomputer boards, or for the S-100 microcomputer systems. A future column will deal with the hardware interface for a programmable realtime clock, in addition to the software.

This article is based, with permission, on a column appearing in *American Laboratory* magazine.



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DIVISION

SUBJECT

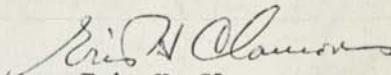
As per our telephone conversation, enclosed is ISO Recommendation R2015, Numbering of Weeks, and a marked up ISO Fiscal Calendar as it would appear if Honeywell had adopted it.

You will notice the only difference between our calendar and this one is that the weeks are numbered by a different week number in 1972. Beginning with 1973, we would be in phase with the ISO calendar and continue from then on with that method of numbering the weeks. Therefore, our accounting procedures would not be affected by adopting the standard. Note, only the numbering of weeks in a year are standard.

We are trying to issue a standard to our operations because the ISO numbering is different from that of Honeywell. Since many of our Engineering Directors and managers come in contact with both the Honeywell fiscal calendar and the ISO fiscal calendar, we foresee a possible area of confusion. We would like to avoid that.

Mr. Robert W. Bemer of Phoenix is trying to write a feature article on the subject and will be communicating with you separately about establishing a calendar five years in advance.

May we have your earliest consideration on this matter.


Eric H. Clamons

EHC/ms
Enclosure

CHB ↑

1972

ISO FISCAL CALENDAR

1972

MO	M	T	W	T	F	S	S	Wk	MO	M	T	W	T	F	S	S	Wk
FIRST QUARTER									THIRD QUARTER								
JAN	3	4	5	6	7	8	9	1	JUL	3	4	5	6	7	8	9	27
	10	11	12	13	14	15	16	2		10	11	12	13	14	15	16	28
4	17	18	19	20	21	22	23	3	4	17	18	19	20	21	22	23	29
WKS	24	25	26	27	28	29	30	4	WKS	24	25	26	27	28	29	30	30
FEB	31	1	2	3	4	5	6	5	AUG	31	1	2	3	4	5	6	31
	7	8	9	10	11	12	13	6		7	8	9	10	11	12	13	32
4	14	15	16	17	18	19	20	7	5	14	15	16	17	18	19	20	33
WKS	21	22	23	24	25	26	27	8	WKS	21	22	23	24	25	26	27	34
MAR	28	29	1	2	3	4	5	9		28	29	30	31	1	2	3	35
	6	7	8	9	10	11	12	10	SEP	4	5	6	7	8	9	10	36
5	13	14	15	16	17	18	19	11	4	11	12	13	14	15	16	17	37
WKS	20	21	22	23	24	25	26	12	WKS	18	19	20	21	22	23	24	38
	27	28	29	30	31	1	2	13		25	26	27	28	29	30	1	39
SECOND QUARTER									FOURTH QUARTER								
APR	3	4	5	6	7	8	9	14	OCT	2	3	4	5	6	7	8	40
	10	11	12	13	14	15	16	15		9	10	11	12	13	14	15	41
4	17	18	19	20	21	22	23	16	4	16	17	18	19	20	21	22	42
WKS	24	25	26	27	28	29	30	17	WKS	23	24	25	26	27	28	29	43
MAY	1	2	3	4	5	6	7	18	NOV	30	31	1	2	3	4	5	44
	8	9	10	11	12	13	14	19		6	7	8	9	10	11	12	45
4	15	16	17	18	19	20	21	20	5	13	14	15	16	17	18	19	46
WKS	22	23	24	25	26	27	28	21	WKS	20	21	22	23	24	25	26	47
JUN	29	30	31	1	2	3	4	22		27	28	29	30	1	2	3	48
	5	6	7	8	9	10	11	23	DEC	4	5	6	7	8	9	10	49
5	12	13	14	15	16	17	18	24	4	11	12	13	14	15	16	17	50
WKS	19	20	21	22	23	24	25	25	WKS	18	19	20	21	22	23	24	51
	26	27	28	29	30	1	2	26		25	26	27	28	29	30	31	52
MO	M	T	W	T	F	S	S	Wk	MO	M	T	W	T	F	S	S	Wk

Eric - for your checking. 1 copy is to return with any errors indicated. Jim Wilde says that a Finance Dept might be sold easier if the line was moved up between Aug-Sep and Nov-Dec, giving 4-4-5 all the way thru, but I applied the turn of the year rule on the premise that they weren't about to buy it anyway. What do you think? I sent a copy to Sturen for verification.

Yup, agreed but see footnote.

RECEIVED

1972 JAN 11

ERIC H. CLAMONS

INTER-OFFICE AND INTER-DEPARTMENT MEMORANDUM

COPIES TO:

TO R.W.B. DATE 72-01-10
 FROM E.H.C.
 SUBJECT Fiscal Calendar

The people are { Joe Timpe Data Processing
 Lowell Forster Std's
 Mpls { Ray Spratt Controller
 4th fl { * 2396 Key man

ris

REVERSE SIDE MAY BE USED FOR YOUR REPLY

1972

ISO FISCAL CALENDAR

1972

MO	M	T	W	T	F	S	S	Wk	MO	M	T	W	T	F	S	S	Wk
FIRST QUARTER									THIRD QUARTER								
JAN	3	4	5	6	7	8	9	1	JUL	3	4	5	6	7	8	9	27
	10	11	12	13	14	15	16	2		10	11	12	13	14	15	16	28
4	17	18	19	20	21	22	23	3	4	17	18	19	20	21	22	23	29
WKS	24	25	26	27	28	29	30	4	WKS	24	25	26	27	28	29	30	30
FEB	31	1	2	3	4	5	6	5	AUG	31	1	2	3	4	5	6	31
	7	8	9	10	11	12	13	6		7	8	9	10	11	12	13	32
4	14	15	16	17	18	19	20	7	5	14	15	16	17	18	19	20	33
WKS	21	22	23	24	25	26	27	8	WKS	21	22	23	24	25	26	27	34
MAR	28	29	1	2	3	4	5	9		28	29	30	31	1	2	3	35
	6	7	8	9	10	11	12	10	SEP	4	5	6	7	8	9	10	36
5	13	14	15	16	17	18	19	11	4	11	12	13	14	15	16	17	37
WKS	20	21	22	23	24	25	26	12	WKS	18	19	20	21	22	23	24	38
	27	28	29	30	31	1	2	13		25	26	27	28	29	30	1	39
SECOND QUARTER									FOURTH QUARTER								
APR	3	4	5	6	7	8	9	14	OCT	2	3	4	5	6	7	8	40
	10	11	12	13	14	15	16	15		9	10	11	12	13	14	15	41
4	17	18	19	20	21	22	23	16	4	16	17	18	19	20	21	22	42
WKS	24	25	26	27	28	29	30	17	WKS	23	24	25	26	27	28	29	43
MAY	1	2	3	4	5	6	7	18	NOV	30	31	1	2	3	4	5	44
	8	9	10	11	12	13	14	19		6	7	8	9	10	11	12	45
4	15	16	17	18	19	20	21	20	5	13	14	15	16	17	18	19	46
WKS	22	23	24	25	26	27	28	21	WKS	20	21	22	23	24	25	26	47
JUN	29	30	31	1	2	3	4	22		27	28	29	30	1	2	3	48
	5	6	7	8	9	10	11	23	DEC	4	5	6	7	8	9	10	49
5	12	13	14	15	16	17	18	24	4	11	12	13	14	15	16	17	50
WKS	19	20	21	22	23	24	25	25	WKS	18	19	20	21	22	23	24	51
	26	27	28	29	30	1	2	26		25	26	27	28	29	30	31	52
MO	M	T	W	T	F	S	S	Wk	MO	M	T	W	T	F	S	S	Wk

NOTE: ~~The ISO Day~~ The weeks are numbered to coincide with the 150 Standard. The division of quarters into standard months of each contain two months of 4 weeks and the third ~~last~~ 5 weeks duration is an accounting practice which permits the processing of quarterly data during the full week; it is

Honeywell

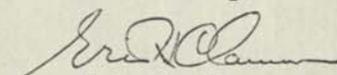
September 2, 1971

Mr. Olle Sturen
Secretary General
International Standards Organization
1, rue de Varembe
1211 Geneva 20
Switzerland

Dear Mr. Sturen:

Mr. Bemer recently wrote you concerning fiscal calendars. Attached please find a marked-up copy of how one might lay out the calendars. Also, for your purposes, it may be better to number the weeks properly but to show the months separately rather than run together since the standard does not refer to standard fiscal months, only to years. I have also marked up the Appendix to R2015 to show that there is a mistake in print which you can verify from the first attachment.

Yours truly,



Eric H. Clamons

EHC/ms
Attachment

cc: R. W. Bemer

A piecemeal approach to calendar reform may be more promising than a general wide-ranging effort—especially for accounting purposes.

ONE EIGHT-DAY WEEK WOULD IMPROVE THE CALENDAR

BY HOWARD C. GREER

REMEMBER Pa and Ma Kettle? They were those bucolic bumbler first introduced in Betty MacDonald's sometime best-seller, *The Egg and I*, and later immortalized in a television series bearing their name.

Pa Kettle, you may recall, had a disastrous experience with his back-yard water tank, which was perched on a wooden framework, out near the barn. Needing a foot-long piece of 2x4 lumber for some odd job, he cut a hunk out of one of the tank's supporting columns, whereupon the entire structure quite naturally collapsed.

"I can't understand why it all fell down," Pa Kettle complained, mournfully contemplating the wreckage. "That was only a little bit of a piece I took out of it."

What Pa Kettle overlooked was a governing principle which seems absurdly simple to most of us, running something like this:

An integrated structure, requiring balance and stability, must be composed of exactly the right number of pieces, each exactly the right length, placed in exactly the right spot.

The pieces must be all of the *right* length, but not necessarily all of the *same* length. If, for example, the structure stands on uneven ground, one or more of its supports *must* be somewhat longer than the others, or a rickety edifice will result.

"Elementary, my dear Watson," Sherlock Holmes might have observed. And so it is. In designing something as mundane as a water tank, few of us would be so stupid as to miss the point. Yet in designing something as transcendentally important as

the calendar, the entire Western World seems to have missed the point completely.

CALENDAR DEFECTS AND ACCOUNTING

Our basic time unit (the year) has been broken down into a considerable number of pieces (months, weeks and days). The solar year is celestially ordained and immutable, and the same applies to the solar day; the month and the week, however, are strictly human inventions. In the infinite wisdom derived from more than twenty centuries of allegedly civilized existence we have developed a calendar in which the days fit into the weeks, and the months fit into the year, but neither set fits into the other. This does us little credit, and our hit-and-miss month-length progression even less.

"Sure, sure," you may be saying to yourself impatiently. "We all know all about that, but what has it got to do with accounting?"

This much. Calendar defects are about the biggest nuisances and work-wasters with which the accountant must contend, and even a minor calendar improvement (such as this article proposes) would be about the greatest convenience and time-saver the profession could ever secure for itself.

This argues to me that, being unavoidably concerned with the problem, we would do well to concern ourselves with its solution. If we don't—if we fail to press successfully for the first elemental, indispensable modification of our present clumsy time-measurement devices—we may wake up some morning confronting a solution imposed by higher

authority that suits us even less than what we're stuck with now.

The one indispensable modification is the lengthening of a single week (two in leap year) from seven days to eight. With this change, our present year of 52 weeks and one day would become a year of exactly 52 weeks. The ensuing emergence of neatly balanced 13-week quarters (in the accounting records if nowhere else) can be confidently expected (how easy it would be is made explicit in a later section). Just give us that one eight-day week, and the rest we can manage for ourselves.

A year of exactly 52 weeks could always begin on Sunday, and every subsequent date would invariably fall on an identical day of the week. The aid which this would lend to planning our activities and measuring our accomplishments is almost beyond reckoning, and quite readily attainable.

Impossible to achieve even that much calendar reform? Well, it shouldn't be. If we, the great American public, will muster all our resources and bring them to bear on the issue, we should be able to resolve it in less than another generation. If we can put men on the moon, immunize against polio and defoliate forests in Vietnam, we should be able to make that trivial calendar correction.

There is a lot of cheerful talk these days about adopting a decimal system of weights and measures, which it is said would take maybe ten years and cost maybe \$10 billion. Why not first adopt an orderly week-into-year calendar arrangement? Something that could be accomplished in not over ten days and would cost practically nothing?

The answer probably runs something like this. Most of those willing to devote time and effort to the project will see little excuse for not expanding the campaign to embrace a more comprehensive and elaborate program, which would get all the needed changes made at one time (reordering the interim monthly subdivisions of the year to produce balanced halves, quarters, and so on). And a task of that magnitude is a lot more formidable. It probably isn't going to get done—at least not soon enough to matter to most of us now living.

Why not? Because there are a dozen or more dif-

ferent ways in which that second part of the task can be accomplished, and each will have enough embattled, raucous, and determined champions to create delay and controversy without end. One can easily visualize the hours of Congressional committee hearings, the volumes of testimony, and the reams of news-media comment, which the conflicting notions will evoke, to say naught of ultimate interminable lawsuits and dissident clamorings which could well result. That's the way we go at things nowadays, and major calendar reform might prove no exception.

There is something in this sort of issue which inevitably brings out a maximum of opposition to any proposed improvement in our established and habitual life patterns. It comes from advantage-seekers, traditionalists, religious fanatics, hobby-riders, and just plain kooks, and it's tough for an elected political body to deal with. Witness the persistence of our present calendar pattern, the result of an egregious blunder by a conceited Roman emperor, who died nearly 2,000 years ago, leaving a legacy of inconvenience and expense of which no succeeding generation has been able to rid itself.

THE ROLES OF JULIUS CAESAR . . .

The record may be worth re-examining,¹ as an indicator of the disabilities of mankind in general and democracies in particular, when confronting a problem of this type. If an excursion into calendar history seems a needless digression, I excuse it on the grounds which seemed persuasive to the judge in a fabled legal proceeding. To a protesting counsel, he is said to have observed sagely: "Yes, yes; this testimony, to which you object, may well be, as you claim, incompetent, irrelevant and immaterial, but it's awfully interesting; let the witness proceed."

Our mixed-up calendar pattern goes back to the late days of the Roman Republic. Prior to the advent of Julius Caesar, those in authority, presumably yielding to pressures, influences, and mere whimsies, had managed to let the Roman calendar drift off base by some 45 days. Wise old Julius, exercising the useful (and sometimes beneficent) powers of a dictator, took matters in hand. After due deliberation, he ordered insertion in the calendar of an extra 45-day month, and then established the sound, orderly progression shown in Exhibit 1 on page 47.

If he had stopped at that, we might still be in

HOWARD C. GREER, CPA, is a retired business executive and teacher, and a continuing writer. He is a member of the American Institute of Certified Public Accountants, the National Association of Accountants, and a former president of the American Accounting Association. Before his retirement, Mr. Greer was a vice president of the Chemstrand Corporation and of the Monon Railroad. He received his bachelor's degree from Northwestern University.



¹Doris Cook covered much the same ground in her excellent article, "Why an Ancient Calendar in the Jet Age?" published in *Management Services*, September-October 1966.

EXHIBIT 1

Month Arrangement in Roman Calendars
(using current Anglo-Saxon month names)

<u>Month</u>	<u>Julian</u>		<u>Augustan</u>	
1st	March	31 days	March	31 days
2nd	April	30 days	April	30 days
3rd	May	31 days	May	31 days
4th	June	30 days	June	30 days
5th	July	31 days	July	31 days
6th	August	30 days	August	31 days
7th	September	31 days	September	30 days
8th	October	30 days	October	31 days
9th	November	31 days	November	30 days
10th	December	30 days	December	31 days
11th	January	31 days	January	31 days
12th	February	30 days*	February	29 days*

*Leap year only; other years one day less.

Note

The progression of month-lengths in the Julian calendar was orderly enough to be easily remembered, but the messed-up revision imposed by his successor made so little sense that an Englishman, back in the middle 1500's, devised a rhyme to help schoolchildren memorize the aberration. We quote the doggerel today as beginning "Thirty Days Hath September," but this itself is an erratic variant of the original version, which ran, in more appropriate sequence: "Thirty Days Hath November, April, June, and September" and so on.

fairly good shape in this regard. Unhappily, he yielded to the conceit which seems an inescapable attribute of dictatorial power, and ordered the re-naming of the (then) fifth month of the Roman year to perpetuate his memory. Seemed an innocent enough piece of ostentation, no doubt, but it had one disastrous consequence, which has afflicted all of us ever since.

... AUGUSTUS CAESAR ...

Caesar's grandnephew, Octavian, succeeding to his great uncle's dictatorial power, and no less conceited than his predecessor, concluded that if Julius could have a month of his own (now July), he, the Emperor Augustus, should properly have one also; hence the (then) sixth month was appropriately renamed (now August).

So, all right, that didn't matter. Except for one fatal flaw in the setup. July had 31 days; August would have only 30, making it look less important. "Not while I'm boss around here!" the new emperor told his calendar-makers, "Give August 31 days also."

This made things awkward. To keep on with a 31-30 progression, the day-count for the four following months had to be altered (as the table in-

dicates). Why they left January with 31 days and lopped another day off poor old February,² my encyclopedia does not disclose, and it really doesn't matter. What does matter is that the world got a messed-up month-length pattern out of it, and has *remained stuck with it ever since* (dictatorial power is not always beneficent).

Amazing! The calendar affects every human being every day of his life. It is the single most significant and all-pervasive measuring device with which everyone in the civilized world must continually contend. Yet a crude and clumsy one, born of an emperor's whim, has gone virtually unchanged through twenty centuries. We may be civilized and intellectual, but smart in solving simple problems we plainly aren't.

... VENERABLE BEDE AND POPE GREGORY

True, western civilization did get one important calendar correction accomplished, though not without an incredible amount of controversy and delay.

Seems the astronomer advising Julius Caesar

²February was considered unlucky, one authority says; hence, the shorter the better.

goofed slightly in telling him that the solar year was 365 $\frac{1}{4}$ days long; it is actually a bit less than that, with the result that a leap-year increment of one day every four years eventually throws things out of kilter to a significant extent.

An Anglo-Saxon monk, known as the Venerable Bede, pointed out the error, around 730 A.D., but, in characteristic human fashion, the peoples of Europe neglected the issue for some eight centuries thereafter. By the middle 1500's, the cumulative error had reached a total of ten days and called loudly for correction.

If the necessary adjustment had awaited the outcome of democratic process, the nations would doubtless still be arguing about it. Happily, there was a dictator in authority in religious matters (of which the calendar has often been deemed one). This was Pope Gregory XIII, who found the problem worthy of papal attention. After appropriate study, he ordained, in forthright fashion, that ten days should be dropped out of the year 1582, and that thereafter years ending in *hundreds* should be leap years only when their numerical designation is divisible by 400. This established the so-called Gregorian Calendar, which persists to this day.³

The papal decree solved the problem for the Roman-Catholic-dominated countries, in a quick, simple, and wholly practical manner. Did the non-Catholic nations thereafter promptly accept the new order of things? Indeed they did not. With true independence of spirit, they ignored the Papal Decree. It was, incredibly, *one hundred and seventy years* more before England got around to adopting the Gregorian Calendar, making it also official for her colonies, including those in America.

This delay explains the sometimes confusing fact that Washington's birthday is variously recorded as February 11 (O.S.) and February 22 (N.S.), according to which calendar you consult. Poor George has had a still different anniversary foisted on him now (the third Monday in February, at least for the time being), but that's a minor indignity compared to others he has suffered.

THE DAYLIGHT-SAVING TIME DEBATE

If anyone thinks we Americans do any better nowadays with time-division problems, he will find it instructive to trace the history of our struggles with the fairly simple problem of a summer "daylight-saving" time adjustment.

Back during World War I it was recognized that

³The eminent prelate, having his name attached to the revised calendar, is now sometimes rather unfairly blamed for all its defects, though most he merely inherited and allowed to go unremedied (cf. "Thirty Days Hath September," by L. P. Jennings, *NACA Bulletin*, March 1951).

advancing clocks one hour in the summer months would allow more work to be done in daylight hours, and the whole nation adopted this wholesome, salutary, and largely popular program.

The farmers, however, disliked daylight saving, some saying it was tampering with "God's time," some that the cows couldn't be milked an hour early, and some just that if city folks were for it, country folks had to be against it. At the war's end, the "agricultural bloc" in Congress got the law repealed. President Wilson vetoed the repealer, and it was then re-passed over his veto—a legislative aberration as regrettable as some others we can all call readily and unhappily to mind.

That didn't end the debate, of course—far from it. Cities liked daylight-saving time, and many adopted it on their own account, eventually creating a truly chaotic situation for the transportation agencies and the traveling public. The nuisance grew so intolerable that Congress finally felt compelled to get back into the act.

After a brief and clumsy reimposition of a general "daylight-saving" regimen during World War II, we finally achieved a new dispensation, under which a six-month period of summer daylight-saving time became the basic program, but with individual states retaining autonomy as to its adoption within their boundaries.

Satisfy everyone? Not at all. There has been clamor for further modifications, which Congress has again been reluctantly considering. Fifty years of battle to no final decision! Page Julius Caesar—we could surely use him now and then.

THE EIGHT-DAY WEEK

Okay. That's the end of the historical detour, which had the purpose of explaining the writer's gloomy conviction that a piecemeal approach to the problem may well be more promising than any efforts at general wide-ranging reform. For accountants this is particularly true, since attainment of the initial objective is the only thing that seriously matters (balancing out the months, quarters, and half years can be achieved within the internal accounting practice framework, as noted later).

How go about it to stretch one week from seven days into eight? It doesn't much matter how, or when, the extra day is inserted. Most proposals assume that the long week will be the last one in the year, and such an arrangement certainly seems logical. For balance, the additional long week in leap years presumably should be the last week in June (don't let anyone suggest an alternative, or the argument can easily rage for years).

What to call the extra day? Well, if it is to be a "not-part-of-a-week" day, it can be called almost

anything. Some proposals designate it as "Year Day" (and its June counterpart as "Leap Day"), but that's not very imaginative.⁴ A change might be most easily assimilated by the public at large if the extra day were made a part of an established week, and given a name hallowed by familiarity.

The odd day could, for example, be tacked onto the final week in December as a "Second Saturday" (Sec-Sat for short). Those feeling bound by the Fourth Commandment could consider the added day a sort of Extra Sabbath (Pre-Sab, maybe?). This shouldn't offend the religiously inclined; it may be guessed that Moses wouldn't have objected to a doubleheader Sunday once or twice a year (he might even have talked the Almighty into a stone-tablet footnote to that effect if either of them had realized how helpful it would be).

HOW TO DO IT

The greater stumbling block, unhappily, is not in obtaining acceptance of the principle involved but in selecting the time and manner of its adoption. There are several considerations.

First, the initial week of each new year plainly should start with a Sunday, so that each year will be composed of whole weeks, with no overlapping fractions. Second, the stage should be properly set for a subsequent adjustment of month-lengths, to bring about whatever sort of period-to-period balance is then deemed most desirable, with a minimum of dislocation in year-to-year date comparisons.

To reach these objectives, the ideal time for a full change-over would be in a *Leap Year beginning with a Sunday* (exposition provided a bit later). Such a year unhappily now occurs only once every 28 years (the last one was in 1956, there won't be another until 1984, and the next one after that will be 2012). Even those years now scheduled to begin on Sunday aren't too numerous; the next one now on the books is 1978, and the next ones after that are 1989, 1995 and 2006.

With a little minor surgery, year-after-next, 1973, could be transformed into a year beginning on Sunday. If December 31, 1972, were considered as a Second-Saturday, or a Pre-Sabbath say, January 1, 1973, would become a Sunday, and we'd be off and running on the right track at last. Perhaps such alacrity in embracing the new order is too much to expect, and we should shoot for a change-over in 1978, or even wait patiently for 1984. After all,

⁴An entertaining, if perhaps frivolous suggestion, is that one might be named Nixon-Day and the other Nader-Day, conditional on a promise from the individuals thus immortalized that they will thereupon promptly and permanently withdraw from public life. Other selections may occur to the reader.

we've delayed nearly 2,000 years in taking this simple step—why be hasty now?

Once this change-over has occurred, the remaining adjustments necessary to produce orderly and comparable interim-period accounting become almost laughably simple. An accountant who wanted each quarter year to have characteristics like those of each other quarter year could accomplish this by a couple of minor internal adjustments, of which no one outside his department would be more than vaguely aware.

During 1972, for example, two interperiod transfers of one day each would serve practical purposes. Treating Saturday, April 1, as part of the March accounting period and Saturday, July 1, as part of the June accounting period would create four accounting quarter years of 13 full weeks each with one extra day (a Sunday) at the beginning of the first quarter, and another (hopefully a Second-Saturday or Pre-Sabbath) at the end of the fourth quarter. Similar adjustments would correct any disturbing imbalances in subsequent years, provided only that each year was made to begin on a Sunday, as earlier noted.

One might reasonably hope that before too many years this sort of quarter-balancing adjustment would work its way into general acceptance. It could well be accompanied by some minor month-balancing adjustments (no need to continue forever in bondage to Augustus Caesar, and his arbitrary truncation of February to make his own month a longer one). As a practical approach, the change-over, whenever occurring, would need to include no more than the following steps (taken preferably in a leap year, to minimize dislocation of year-to-year date comparisons, as noted later):

1. February to be lengthened one day (to a revised total of 30), and March shortened one day (to 30).
2. April to be lengthened one day (to 31), and May shortened one day (to 30).
3. June to be lengthened one day (to 31), providing the extra leap day needed to balance out a 366-day year; August to be shortened one day (reducing its length to 30 days, and to hell with Octavian).

With the final day of December squeezed into the last week of the year (a Second-Saturday), the following year would start clean with Sunday, January 1, and nothing more would really need to be done. The world might some day get around to considering whether a six-day or a five-day week wouldn't serve its needs better than the one Moses handed us, but that's another story altogether.

An annotated comparison of old-style and re-

vised calendars for whatever may be the selected year appears as Exhibit 2 on page 50. Emphasis is placed on the very limited amount of date-dislocation involved, since this would be a significant factor with many calendar users in the transition year.

THE "WORLD CALENDAR"

Note that under the revised calendar,⁵ no new date would be more than one day away from its former position, and that even that much of a shift would occur at only brief and infrequent intervals (March, May, July and August). Easy, huh? A change-over in something other than a leap year would involve some date-dislocations of as much as two days, and for longer periods, making that choice a less attractive one.

Those enterprises having a need for, and now regularly using, monthly periods consisting of a collection of full weeks (meat packers, department stores and others) would find the revised calendar readily adaptable to their needs. In the first quarter, for example, the January period could be four weeks ending Saturday, January 28, the February period four weeks ending Saturday, February 25, the March period five weeks ending Saturday March 31, and so on. All years, incidentally, would be composed of an even 52 weeks, thus avoiding

⁵This is the so-called "World Calendar," actively promoted in the 1950's, and from time to time since then.

the awkward 53-week year which such enterprises now have to employ every five years or so.

That's about all there is to it, folks, and why in the name of John Carey don't the public accounting practitioners get to work and do something about it! Surely such an effort would be more salutary than interminable debate over what size relationship between two merging companies makes it appropriate to state their past results on a "pooling-of-interests" vs. a "separate entity" basis. We can do better than that with our time and talent, and we certainly should.

Unless, that is, we can accept the fatalistic view that such problems, along with our many others, are beyond the possibility of solution through democratic processes. In long gray wakeful dawns, I sometimes yield to the presentiment that it will take some modern Julius Caesar to bring order out of our existing social, economic, and fiscal chaos.

Trouble is, he may not like my simple little calendar-modification program. He may not even be an American, when it comes to that. Some of our Oriental brethren, for example, may ultimately tire of our intolerable meddling in Asian affairs, and decide to update Pearl Harbor, on a grand scale, with a flock of the ICBMs they are known to be readying. In that event it may be Chairman Mao who will prescribe a new and improved calendar for any of us who chances to be still around. Starting out with the "Year of the Pfft," maybe?


```

fiscalwk _ Adapted from TODAY 78-01-27 by RWBener
_ Modified by GE Blondeau and RL Brandt 1978-10-04 (602)-866-3619
_ Calculates the nth day of the fiscal week, and the fiscal year.
yr=*date'J2 x=*date'J3 mo=x'J2 da=x'J3 goto !cont
!date _ Entry-point when 'date' is previously defined as YR-MO-DA.
yr=date'J2 leap=(yr/4)*4 x=date'J3 mo=x'J2 da=x'J3 goto !cont
!yrmoda _ Entry-point when YR, MO, and DA are previously defined.
!cont yr=((yr'>" ")<'*n) mo=((mo'>" ")<'*n) da=((da'>" ")<'*n) subs 1
fw=*null fy=fw fd=fw fweek=fw fail="f" failmrk="fail='t' |*svmd| return"
if yr:eq:0 lfailmrk|
if mo:le:0 lfailmrk|
if mo:gt:12 lfailmrk|
if da:le:0 lfailmrk|
if da:gt:31 lfailmrk|
f3J="if da:gt:30 fail='t' return"
if mo:eq:2 if da:gt:28 if ((yr/4)+4):eq:yr if da:gt:29 fail='t' |*svmd| return
if mo:eq:4 lf30|
if mo:eq:6 lf30|
if mo:eq:9 lf30|
if mo:eq:11 lf30|
del="000031059090120151181212243273304334"
suf="stndrdthththth"
ord=(del'J(mo*3))E'3+da _ ordinal day-of-the-year
ord=ord+(((yr/4)+4)/yr)*(1/(1+(2/no)))
remainder="a=year+11 b=a/4 c=(b+a)/7" subs 1
year=yr lremainder| r=*rmdr
r1=(ord+6-(7-r)*(r/4)+r*(1/(1+(r/4))))/7 fd=*rmdr+1
year=yr-1 lremainder| r1=*rmdr _ offset for previous year
year=yr+1 lremainder| r2=*rmdr _ offset for next year
ra=(r+1)/3 _ when this integer is 2, ord values 1,2, or 3 lie in FW3.
fw=fw1+(52+(1/(1+(ra/3)))+(ra/2))+1/(fw1+1)-(fw1/53)*(52)*(1/(1+(r2/4)))
fy=yr-(1/(1+fw1))+((fw1/53)*(1/(1+(fw/2)))+(fw)) fw2=("00",fw)E'2
fd=fd,(suf'J)(fd+2)E'2
d=("0",ord)E'2 I=d'1 X=d'J1 suffix="th"
_ msg=" Fiscal Year 19",fy if fy:eq:yr msg=*null
_ out:" - the lfd| day of Fiscal Week lfw|",msg
fweek="FW ",(fyE'1, fw2, ". ",(fd'>'*n)) |*svmd| return

```

```

!explain out:*lf,"Calculates today's location in the fiscal calendar."
out:"Variable 'fd' contains the nth day of 'fw', the fiscal week."
out:"Variable 'fy' contains the fiscal year; 'ord', the ordinal day of the year."
out:"Variable 'fweek' contains the format 'FW 822.3', fyfw.fd."
out:*lf,"If variable 'DATE' is already defined as YR-MO-DA, call fiscalwk"
out:" at entry-point !DATE. (call fiscalwk!date)."
out:*lf,"If variables 'YR', 'MO', and 'DA' are predefined, call fiscalwk at"
out:" entry-point !YRMODA. (call: fiscalwk!yrmoda)."
!end_explain return

```

/xp/today 10/26/78 08.844 MEDIA CODE 6

```
!today _ 1978-01-27 author:RWBemer, 602-942-1360
_ Modified by GE Blondeau and RL Brandt 1978-10-04 (602)-866-3619
clear * yr=*date][2 leap=(yr/4)*4 x=*cate][3 mo=x][2 da=x][3
del="000031059090120151181212243273304334"
dy=" Mon Tues Wednes Thurs Fri Satur Sun"
suf="stndrdthththth"
m1=" January February March April May June"
m2=" July August September October November December"
if mo:lt:7 M=(m1][mo*10)<" "
if mo:gt:6 M=(m2][((mo-6)*10))<" "
ord=(del')[mo*3)][3+da _ ordinal day-of-the-year
ord=ord+(((yr/4)*4)/yr)*(1/(1+(2/mo)))
remainder="a=year+11 b=a/4 c=(b+a)/7" subs 1
year=yr lremainderl r=*rmdr
fw1=(ord+6-(7-r)*(r/4)+r*(1/(1+(r/4))))/7 fd=*rmdr+1
year=yr-1 lremainderl r1=*rmdr _ offset for previous year
year=yr+1 lremainderl r2=*rmdr _ offset for next year
ra=(r+r1)/3 _ when this integer is 2, ord values 1,2,or 3 lie in FW53.
fw=fw1+(52+(1/(1+(ra/3)))+(ra/2))*(1/(fw1+1))-(fw1/53)*(52)*(1/(1+(r2/4)))
fy=yr-(1/(1+fw1))+((fw1/53)*(1/(1+(fw/2)))*(fw))
day=(dy')[fd*7]<" ","day"
fd=fd,(suf')[fd*2)][2
d=("0",ord)[2 I=d[1 X=d][1 suffix="th"
if I:eq:1 if X:ne:1 suffix="st"
if I:eq:2 if X:ne:1 suffix="nd"
if I:eq:3 if X:ne:1 suffix="rd"
ord=ord,suffix subs 1
out:"@Today is ldayl, 19lyr l lml ldal"
mesg=" Fiscal Year 19",fy if fy:eq:yr mesg=*null
out:" - the lfdl day of Fiscal Week lfwl,"mesg
out:" - the lordl day of the year, and"
time=0 sec=*time[2 hm=*time][5
if sec:lt:25 time=hm goto !end
min=hm[2 hr=hm][2
min=("0",min+1)[2
if min:eq:60 min="00" hr=hr+1
if hr:eq:24 hr="00"
time=hr,":",min

!end out:"it is now ltimel@" nosubs return

!explain out:" "
out:"TODAY will give you the characteristics of the moment,"
out:"including date, day of the week, ordinal day, fiscal"
out:"year, week and day, and time."
!end_explain return
```

```
!now 1979-06-20 author:RWBemer, 602-942-1360"
filename="telbook$trebor,q" call texlib/f/old
d:"222";*
!again b out:" " call !familiar
out:"What language do you speak? " call texlib/l/today return
```

```
!explain_again out:" " out:"Once NOW has been called (getting the telephone book),
out:"one calls NOW!AGAIN, and it runs faster because it"
out:"already has the telephone book." return
```

```
!familiar b t=*time']2 period="morning, "
if t:ge:12 period="afternoon, " if t:ge:18 period="evening, "
in:"Your last name is? " surname=*in case
b f:surname if *eof call !notel return
```

```
!one call !getfirst last=*cl'>","
if last:nes:surname out:"Good ",period,name clear * nocase return
pre="Are you ",name
```

```
!more call !getfirst pre=pre," or ",name
last=*cl'>"," if last:nes:surname call !which nocase return
goto !more
```

```
!getfirst name=(*cl'>#"")>"," " n=name," ½" countf=n>". middle=n>"" "
f;1 if middle:eqs:"½" case="1 - first name only" return
countm=middle>". total=countf+countm
if total:eq:2 case="2 - two initials" return
if countf:eq:1 case="3 - initial & middle" name=middle'>"" return
if countm:eq:1 case="4 - first & initial" name=name'>"" return
case="5 - two names" return
```

```
!which pre=pre,"? " in:pre reply=*in
no=reply']1 if no:eqs:"N" no="n"
if no:nes:"n" out:"Good ",period,reply nocase return
if no:eqs:"n" call !notel return
```

```
!notel in:"Are you a visitor to Phoenix Ops? " ans=*in']1
if ans:nes:"y" out:"Then why aren't you in the phone book? "
if ans:eqs:"y" out:"Good ",period,"friend ",surname
clear * nocase return
```

```
!explain_familiar out:" " out:"When given a last name,"
out:"FAMILIAR searches the telephone book, extracting"
out:"the familiar form of the first name." return
```

```
!explain out:± ±
out:"NOW will ask for your surname, and then give you"
out:"all the characteristics of the moment in time."
out:"NOW is also callable at labels AGAIN and FAMILIAR"
out:"For any explanation, °call now!explain_(label)""
!end_explain out:" " return
```

A general DATE program written by R. W. Bemer
in 1980. It converts between the three major
date forms and Julian Day in both directions.

Note that most of the program is for I/O and
exhaustive explanations (with references).

Also note what a very small space is required
for the actual calculations.

....

[Faint handwritten notes: "R.W. Bemer", "DATE", "1980"]

R. WMS.

A FORGOTTEN ITEM.

R. Bertram



HISTORICAL

```

!date _ 1980-07-30 author:RWBemer, 602-942-1360
scan:date:"-" !="19",x1 scan:yr:"-" j=*l k=*r count=0 case subs \
out:"For today's date, do you want Ordinal, Fiscal, or Julian form?"
!again count=count+1 in:%Respond "ORD", "FIS", or "JUL" %
if count:lt:3 ergo !again call !cal_to_\*in\ \*svmd\ return
out:"No action taken." nocase return

```

```

!cal_to_cal
!ord_to_ord
!fis_to_fis
!jul_to_jul out: "---No action---" n=1 call !explain2 return
!cal_to_ord call !co call !msg im=mc om=mo goto !reply
!cal_to_fis call !cf call !msg im=mc om=mf goto !reply
!cal_to_jul call !cj call !msg im=mc om=mj goto !reply
!ord_to_cal call !oc call !msg im=mo om=mc goto !reply
!ord_to_fis call !of call !msg im=mo om=mf goto !reply
!ord_to_jul call !oj call !msg im=mo om=mj goto !reply
!fis_to_cal call !fc call !msg im=mf om=mc goto !reply
!fis_to_ord call !fo call !msg im=mf om=mo goto !reply
!fis_to_jul call !fj call !msg im=mf om=mj goto !reply
!jul_to_cal call !jc call !msg im=mj om=mc goto !reply
!jul_to_ord call !jo call !msg im=mj om=mo goto !reply
!jul_to_fis call !jf call !msg im=mj om=mf goto !reply
!reply out: " out:\im\," is ",\om\
\*svmd\ out: " " return

```

```

!msg subs \ mc=%i,"-",("0",j)[':2,"-",("0",k)[':2% mo=%"Day ",lday," of ",i%
mf=%"Day ",fd," of FW ",fw," of FY ",fy% mj=%"Julian Day ",jd% return

```

```

!julien1 call !jd1 out:"The first day of ",i," is Julian Day ",jd1 return
!fiscal1 call !fd1 out:"The first day of ",i," falls on Fiscal Day ",fd1
if fd1:gt:4 out:"But it's in Fiscal Year ",(i-1)
return

```

```

!fd1 call !jd1 !fd1=jd1/7 !fd1=xmldr+1 return
!calc_fc call !jd1 !t=jd1-jd1/7*7 !fc=t+7-(t+3)/7*7 return _ fc<7 means FW 0
!jd1 !jd1=1461*(i+4799)/4-31738-3*(i+4899)/100/4 return

```

```

!leap _ An easier way in TEX (* as substitute char) is: !="if *rmdr:eq:0 leap"
call !lp _ leap=0 q=1/4 *l=1 q=q/25 *l=0 q=q/4 *l=1 q=q/10 *l=0
l=" !sn't" !l![(3*leap) out:l,l,% a leap year. "leap"=%,leap return
!lp !leap=1-(i-1/4*3)/4+(i-1/100*100+99)/100-(i-1/400*400+399)/400
t=1/4000 if *rmdr:eq:0 leap=0
return

```

```

!caldiff form="MM-DD" r="c" li=8 call !ask return
!orddiff form="!!!" r="o" li=7 call !ask return
!fisdiff form="WW-D" r="f" li=7 call !ask return

```

```

!ask out:"Separators may be omitted."
!d1 in:"First date (YYYY-",form")? " date1=*in !t !lin:lt:li goto !d1
!d2 in:"Second date? " subs \if *lin:lt:li goto !d2
date2=*in call !\r\d out:"Difference is ",diff," days \*svmd\ return

```

```

!cd do=%split:arg:4 i=x1 splitr:yr:2 k=*r j=(x1)'*n)'<*n call !cj%
call !diff return
!od do=%i=arg'j4 lday=arg'3 call !oj%
call !diff return
!fd do=%split:arg:4 fy=x1 splitr:yr:1 fd=*r fw=(x1)'*n)'<*n call !fj%
call !diff return

```

```

!diff arg=date1 subs
\do\ firstj=jd arg=date2 \do\ diff=firstj-jd
\svmd\ return

!co call !lp iday=3055*(j+2)/100-(j+10)/13*2-91+leap*(j+10)/13+k return
!cf call !co call !of return
!cj jd=k-32075+1461*(1+4800+(j-14)/12)/4
jd=jd+367*(j-2-(j-14)/12*12)/12-3*((1+4900+(j-14)/12)/100)/4 return
!oc call !lp id=iday+(305+iday-leap)/365*(2-leap)
j=((jd+91)*100)/3055-2 k=i+30-(j*3056)/100 return
!of call !calc_fc fw=(iday+fc-1)/7 fd=xrmdr+1 fy=i
if fw:eq:53 if (fc+leap):lt:10 fy=i+1 fw=1
if fw:eq:0 i=i-1 fy=i call !lp i=i+1 fw=53-(fc+1-leap)/6
return
!oj call !jd1 jd=jd1+iday-1 return
!fo call !fo call !oc return
!fo i=fy call !calc_fc iday=7*fw+fd-fc call !lp
if iday:gt:(365+leap) i=i+1 iday=iday-365-leap
if iday:lt:1 i=i-1 call !lp iday=365+leap+iday
return
!fj call !fo call !oj return
!jd i=jd+68569 n=4x1/146097 l=1-(146097*n+3)/4 i=4000*(1+i)/1461001
i=1-1461*i/4+31 j=80*1/2447 k=1-2447*j/80 l=j/11 j=j+2-12*x
i=100*(n-49)+i+1 return
!jo call !jc call !co return
!jf call !jc call !cf return

```

WIKIDE 910 1685 K?

```

!explain_cal_to_ord out:"CAL_to_ORD" call !setup
\calin\ \oo\,viday \ov\,vleap
out:"Ref: CACM 1972-10, p. 918, JDRobertson" \svmd\ out:" " return
!explain_cal_to_fis out:"CAL_to_FIS" call !setup
\calin\ \fisout\
\ov\,viday \ov\,vfc \ov\,vleap
\svmd\ out:" " return
!explain_cal_to_jul out:"CAL_to_JUL" call !setup
\calin\ \oo\,vjd
out:"Ref: CACM 1968-10, p.657, HFFliegel, TCVanFlandern"
\svmd\ out:" " return
!explain_ord_to_cal out:"ORD_to_CAL" call !setup
\ordin\
\oo\,vj \ov\,vk \ov\,vleap \svmd\
out:"Ref: CACM 1970-10, p. 621, Stone (modified)" out:" " return
!explain_ord_to_fis out:"ORD_to_FIS" call !setup
\ordin\ \fisout\
\ov\,vfc \svmd\ out:" " return
!explain_ord_to_jul out:"ORD_to_JUL" call !setup
\ordin\ \oo\,vjd \svmd\ out:" " return
!explain_fis_to_cal out:"FIS_to_CAL" call !setup
\fisin\ \calout\
\ov\,vleap \ov\,vfc \ov\,viday \svmd\ out:" " return
!explain_fis_to_ord out:"FIS_to_ORD" call !setup
\fisin\ \ordout\
\ov\,vleap \ov\,vfc \svmd\ out:" " return
!explain_fis_to_jul out:"FIS_to_JUL" call !setup
\fisin\ \ordout\
\ov\,vjd \ov\,vleap \svmd\ out:" " return
!explain_jul_to_cal out:"JUL_to_CAL" call !setup
\oi\,vjd \calout\
out:"Ref: CACM 1968-10, p.657, HFFliegel, TCVanFlandern"

```

```

\*svmd\ out:" " return
!explain_jul_to_ord out:"JUL_to_ORD" call !setup
\oi\,vjd \ordout\ \*svmd\ out:" " return
!explain_jul_to_fis out:"JUL_to_FIS" call !setup
\oi\,vjd \fisout\ \*svmd\ out:" " return
!explain_caldiff out:"CALDIFF" call !setup
\oi\,vc1 \ov\,vc2 \oo\,vdiff \*svmd\ out:" " return
!explain_orddiff out:"ORDDIFF" call !setup
\oi\,vo1 \ov\,vo2 \oo\,vdiff \*svmd\ out:" " return
!explain_fisdiff out:"FISDIFF" call !setup
\oi\,vf1 \ov\,vf2 \oo\,vdiff \*svmd\ out:" " return
!explain_julian1 out:"JULIAN1" call !setup
\oi\,vi \oo\,jd1 ",vj1," of Jan 01)" \*svmd\ out:" " return
!explain_fiscal1 out:"FISCAL1" call !setup
\oi\,vi \oo\,fd1 (D -- Fiscal Day for Jan 01)" \*svmd\ out:" " return
!explain_leap out:"LEAP" call !setup
\oi\,vi \oo\,vleap \*svmd\ out:" " return

```

```

!setup subs \ ergo !go_on if vleap:eqs:vleap return
!go_on out:" " oi="out:%Inputs: %" oo="out:%Outputs: %"
vfc="fc (fiscal constant -- year offset)" ov="out:% %"
vfd="fd (D -- Fiscal Day)" vfw="fw (WW -- Fiscal Week)"
vi="i (YYYY- year)" vj="j (M or MM -- calendar month)"
vk="k (D or DD -- calendar day)" vfy="fy (FFFF -- Fiscal Year)"
viday="iday (X) -- ordinal day of the year)"
vj1="(XXXXXX -- Julian Day" vjd="jd ",vj1,)"
vleap="leap (1 -- leap year, 0 if not)." vdiff="diff (in days)"
vc1="(YYYY-MM-DD or YYYYMMDD)" vc2="date2",vc1 vc1="date1",vc1
vo1="(YYYY-1) or YYYY111)" vo2="date2",vo1 vo1="date1",vo1
vf1="(FFFF-WW-D or FFFFWWD)" vf2="date2",vf1 vf1="date1",vf1
calin="vi \ov\,vj \ov\,vk" calout=oo,calin calin=oi,calin
ordin="vi \ov\,viday" ordout=oo,ordin ordin=oi,ordin
fisin="vfy \ov\,vfw \ov\,vfd" fisout=oo,fisin fisin=oi,fisin return

```

```

!explain out:" " out:"DATE is a collection of calendar algorithms"
out:"that use TEX or FORTRAN integer arithmetic" n=0
out:"but little logic to calculate." out:" " g=" "
!explain2 out:"TEXLIB/U/DATE converts in every way between"
out:"four forms of the date -- Calendar (CAL or C),"
out:"Ordinal (ORD or O), Fiscal (FIS or F), or"
out:"Julian (JUL or J), but not to the same." out:" " if n:ne:0 return
out:"These are the entry points; the 2-letter form"
out:"is for noninteractive subroutines:" out:" "
out:" CAL_to_ORD CO",g," FIS_to_CAL FC"
out:" CAL_to_FIS CF",g," FIS_to_ORD FO"
out:" CAL_to_JUL CJ",g," FIS_to_JUL FJ"
out:" ORD_to_CAL OC",g," JUL_to_CAL JC"
out:" ORD_to_FIS OF",g," JUL_to_ORD JO"
out:" ORD_to_JUL OJ",g," JUL_to_FIS JF" out:" "
out:" CALDIFF",g,"CD",g," JULIAN1",g,"JD1"
out:" ORDDIFF",g,"OD",g," FISCAL1",g,"FD1"
out:" FISDIFF",g,"FD",g," LEAP ",g,"LP" out:g,g,"VC VQ VF"
out:" " out:"Explanations and input-output specifications are"
out:"found by calling entry !EXPLAIN_(long form). E.g.,"
out:" " out:" CALL TEXLIB/U/DATE!EXPLAIN_CAL_to_JUL (or)"
out:" CALL TEXLIB/U/DATE!EXPLAIN_ALL" out:" "
out:"...DIFF (or .D) give the number of days between two"
out:"dates given in calendar, ordinal, or fiscal form."
out:"!f,"Input to this program may be validated prior to"

```

```
out:"actual call by calling at VC, V0, or VF -- for"  
out:"Calendar, Ordinal, or Fiscal form respectively."  
out:"A variable VALID is returned as either T or F." out:" "  
!end_explain out:" " return
```

```
!explain_all subs \ call !explain e="call !explain_"  
\e\cal_to_ord \e\cal_to_fis \e\cal_to_jul \e\ord_to_cal \e\ord_to_fis  
\e\ord_to_jul \e\fis_to_cal \e\fis_to_ord \e\fis_to_jul \e\jul_to_cal  
\e\jul_to_ord \e\jul_to_fis \e\caldiff \e\orddiff \e\fisdiff  
\e\julian1 \e\fiscale1 \e\leap \*svmd\ return
```

```
!vc valid="f" ergo !bad_input z=i+j+k t1=i t2=j tk=k  
call !co call !oc if j:le:12 if j:eq:t2 if k:eq:tk valid="t"  
return
```

```
!vo valid="f" ergo !bad_input z=i+iday tiday=iday t1=i  
call !ip if iday:le:(365+leap) if iday:ge:1 valid="t"  
return
```

```
!vf valid="f" ergo !bad_input z=fy+fw+fd tfy=fy tfw=fw tfd=fd  
call !fj call !jf if fy:eq:tfy if fw:eq:tfw if fd:eq:tfd valid="t"  
!bad_input return
```

```
!test in:"Date? (YYYYMMDD) " t=*in split:*in:4 i=*1  
split:*r:2 j=*1 k=*r jd="?" iday=jd fy=jd fw=jd fd=jd
```

```
!testloop i=i+1 date=i,("0",j)[1'2,("0",k)[1'2  
fd=fy,("0",fw)[1'2,fd out:t," ",iday," ",jd," ",fd  
call !co call !oj call !jf call !fc  
t=i,("0",j)[1'2,("0",k)[1'2 if t:nes:date out:"...",t  
call !cj call !jf call !fo call !oc  
t=i,("0",j)[1'2,("0",k)[1'2 if t:nes:date out:"...",t  
call !cf call !fo call !oj call !jc  
t=i,("0",j)[1'2,("0",k)[1'2 if t:nes:date out:"...",t  
call !co call !of call !fj call !jo call !oc  
t=i,("0",j)[1'2,("0",k)[1'2 if t:nes:date out:"...",t  
goto !testloop
```

-call textlib/u/date/explain_all

DATE is a collection of calendar algorithms that use TEX or FORTRAN integer arithmetic but little logic to calculate.

TEXTLIB/U/DATE converts in every way between four forms of the date -- Calendar (CAL or C), Ordinal (ORD or O), Fiscal (FIS or F), or Julian (JUL or J), but not to the same.

These are the entry points; the 2-letter form is for noninteractive subroutines:

```
CAL_to_ORD  CO
CAL_to_FIS CF
CAL_to_JUL CJ
ORD_to_CAL OC
ORD_to_FIS OF
ORD_to_JUL OJ
CALDIFF  CD
ORDDIFF OD
FISDIFF FD
JULIAN1 JD1
LEAP LP
```

Explanations and input-output specifications are found by calling entry: EXPLAIN (Long form), E-g.

```
CALL TEXTLIB/U/DATE/EXPLAIN_CAL_to_JUL (or)
CALL TEXTLIB/U/DATE/EXPLAIN_ALL
```

...DIFF (or .D) give the number of days between two dates given in calendar, ordinal, or fiscal form. Number of working days is in process.

Input to this program may be validated prior to actual call by calling at VC, VO, or VF -- for Calendar, Ordinal, or Fiscal form respectively. A variable VALID is returned as either T or F.

CAL_to_ORD

```
Inputs: i (YYYY -- year)
         j (M or MM -- calendar month)
         k (D or DD -- calendar day)
Outputs: iday (XXX -- ordinal day of the year)
         leap (1 if leap year, 0 if not).
Ref: CACN 1972-10, p. 916, JMOberstion
```

CAL_to_FIS

```
Inputs: i (YYYY -- year)
         j (M or MM -- calendar month)
         k (D or DD -- calendar day)
Outputs: fy (GMW -- Fiscal Year)
         fd (GMW -- Fiscal Week)
         iday (XXX -- ordinal day of the year)
         leap (1 if leap year, 0 if not).
```

CAL_to_CAL

```
Inputs: i (YYYY -- year)
         j (M or MM -- calendar month)
         k (D or DD -- calendar day)
Outputs: jd (CXXXXXX -- Julian Day)
Ref: CACN 1968-10, p.657, HFFlegal, TCVanFlandern
```

ORD_to_CAL

```
Inputs: iday (YYYY -- year)
         j (M or MM -- calendar month)
         k (D or DD -- calendar day)
         leap (1 if leap year, 0 if not).
Ref: CACN 1970-10, p. 621, Stone (modified)
```

ORD_to_FIS

```
Inputs: i (YYYY -- year)
         iday (XXX -- ordinal day of the year)
Outputs: fy (GMW -- Fiscal Year)
         fd (GMW -- Fiscal Week)
         fc (fiscal constant -- year offset)
```

ORD_to_JUL

```
Inputs: i (YYYY -- year)
         iday (XXX -- ordinal day of the year)
Outputs: jd (CXXXXXX -- Julian Day)
```

FIS_to_CAL

```
Inputs: fy (FFFF -- Fiscal Year)
         fw (GMW -- Fiscal Week)
         fd (GMW -- Fiscal Day)
Outputs: j (YYYY -- year)
         j (M or MM -- calendar month)
         k (D or DD -- calendar day)
         leap (1 if leap year, 0 if not).
         fc (fiscal constant -- year offset)
         iday (XXX -- ordinal day of the year)
```

FIS_to_ORD

```
Inputs: fy (FFFF -- Fiscal Year)
         fw (GMW -- Fiscal Week)
         fd (GMW -- Fiscal Day)
Outputs: iday (XXX -- year)
         leap (1 if leap year, 0 if not).
         fc (fiscal constant -- year offset)
```

FIS_to_JUL

```
Inputs: fy (FFFF -- Fiscal Year)
         fw (GMW -- Fiscal Week)
         fd (GMW -- Fiscal Day)
Outputs: iday (XXX -- ordinal day of the year)
         jd (CXXXXXX -- Julian Day)
         leap (1 if leap year, 0 if not).
```

JUL_to_CAL

```
Inputs: jd (CXXXXXX -- Julian Day)
Outputs: i (YYYY -- year)
         j (M or MM -- calendar month)
         k (D or DD -- calendar day)
Ref: CACN 1968-10, p.657, HFFlegal, TCVanFlandern
```

JUL_to_ORD

```
Inputs: jd (CXXXXXX -- Julian Day)
Outputs: iday (XXX -- ordinal day of the year)
```

JUL_to_FIS

```
Inputs: jd (CXXXXXX -- Julian Day)
Outputs: fy (GMW -- Fiscal Year)
         fw (GMW -- Fiscal Week)
         fd (GMW -- Fiscal Day)
```

CALDIFF

```
Inputs: date1 (YYYY-MM-DD or YYYYMMDD)
        date2 (YYYY-MM-DD or YYYYMMDD)
Outputs: diff (in days)
```

ORDDIFF

```
Inputs: date1 (YYYY-III or YYYYIII)
        date2 (YYYY-III or YYYYIII)
Outputs: diff (in days)
```

FISDIFF

```
Inputs: date1 (FFFF-MM-D or FFFFMMDD)
        date2 (FFFF-MM-D or FFFFMMDD)
Outputs: diff (in days)
```

JULIAN1

```
Inputs: i (YYYY -- year)
Outputs: jd1 (CXXXXXX -- Julian Day of Jan 01)
```

FD1

```
Inputs: i (YYYY -- year)
Outputs: fd1 (D -- Fiscal Day for Jan 01)
```

LEAP

```
Inputs: i (YYYY -- year)
Outputs: leap (1 if leap year, 0 if not).
```

his/pgm/datevar 06/20/83 20.055 MEDIA CODE 6

his/pgm/datevar 1983-06-16 P G Skelly HVN:357-6568

```
date=*date
!start case subs 1 date="19",date
!loop if (date!>*n):nes:date date=(date!>*n),(date!>*n)]! goto !loop
date=date['8
CY=date['4
```

```
FY=CY
CM=(date['4]['2
CD=(date['4]['2 clear date
call !leap
OD=3055*(CM+2)/100-(CM+10)/13+2-91+leap_adj*(CM+10)/13+CD
JD=1461*(CY+4799)/4-31738-3*((CY+4899)/100)/4
fw00_adj=JD-((JD/7)*7)
fw00_adj=fw00_adj+7-(((fw00_adj+3)/7)*7)
JD=JD+OD-1
FW="(0", (OD+fw00_adj-1)/7)['2
FD=*rmdr+1
if FW:eqn:53 if (fw00_adj+leap_adj):lt:10 FW="01" FY=FY+1
if FW:eqn:0 FY=CY-1 call !leap FY=CY+1
if FW:eqn:0 FW=53-(fw00_adj+1-leap_adj)/6
clear fw00_adj clear leap_adj
FQ=((FW+12)/13)-(FW/53)
FM="(0", (((3*FW)+10)/13)-(FW/53))['2
FYCY['2
FYD=FYCY['1
```

```
limit=31
if CM:eqn:01 EM="January" RM="I"
if CM:eqn:02 EM="February" RM="II" limit=28 if leap limit=29
if CM:eqn:03 EM="March" RM="III"
if CM:eqn:04 EM="April" RM="IV" limit=30
if CM:eqn:05 EM="May" RM="V"
if CM:eqn:06 EM="June" RM="VI" limit=30
if CM:eqn:07 EM="July" RM="VII"
if CM:eqn:08 EM="August" RM="VIII"
if CM:eqn:09 EM="September" RM="IX" limit=30
if CM:eqn:10 EM="October" RM="X"
if CM:eqn:11 EM="November" RM="XI" limit=30
if CM:eqn:12 EM="December" RM="XII"
if FD:eqn:1 ED="Monday"
if FD:eqn:2 ED="Tuesday"
if FD:eqn:3 ED="Wednesday"
if FD:eqn:4 ED="Thursday"
if FD:eqn:5 ED="Friday"
if FD:eqn:6 ED="Saturday"
if FD:eqn:7 ED="Sunday"
```

```
nd="(0", CD+1)['2 if nd:gt:limit nd="01"
nm if nd:eqn:1 nm="(0", CM+1)['2 if nm:eqn:13 nm="01"
nyCY['2 if nm:eqn:1 if nd:eqn:1 ny=(CY+1)['2
next=ny,"-",nm,"-",nd clear ny clear nm clear nd clear limit
!svmdl return
```

```
!leap leap_adj=0 leap="F" q=CY/4 if *rmdr:eqn:0 leap_adj=1 leap="T"
q=q/25 if *rmdr:eqn:0 leap_adj=0 leap="F"
q=q/4 if *rmdr:eqn:0 leap_adj=1 leap="T"
```

```

q=q/10      if *rmdr:eqn:0 leap_adj=0 leap="F"
r q return

!date ercall !enter date=date
goto !start
!enter in:"Date : " date=*in return

!explain
!expl out:" "
out:"This program returns the following variables for the current date :-"
out:"- CY : calendar year, four digits"
out:"- FY : fiscal year, four digits"
out:"- FYC : fiscal year of century, two digits"
out:"- FYD : fiscal year of decade, one digit"
out:"- FQ : fiscal quarter of year, one digit"
out:"- CM : calendar month of year, two digits"
out:"- EM : calendar month of year, English language word"
out:"- FM : fiscal month of year, two digits"
out:"- RM : calendar month of year, Roman numerals"
out:"- FW : fiscal week of year, two digits"
out:"- CD : calendar day of month, two digits"
out:"- ED : calendar day of week, English language word"
out:"- FD : fiscal day of week, one digit"
out:"- JD : Julian Day, seven digits"
out:"- OD : ordinal day of year, three digits"
out:"- leap : True (T) if a leap year, false (F) otherwise"
out:"- next : Tomorrow, in TEX *date format ( yy-mm-dd)"
out:" "
out:"It also works for any A.D. date through year 9999 by a call to !date ."
out:"If a variable 'date' (of the form 'yyyy-mm-dd') is not found, then it"
out:"is requested as an input from the terminal."
out:" " return

```

```
rele sihn@angle
FILE RELEASED-SINGLE
-list his/pgm/dateanal,r
```

```
his/pgm/dateanal 1980-03-06 P G Skelly 866-2260
```

```
-
case subs i
scan:("19",*date):="--" i=*1 year=*1 month=*r'12 day=*r1'2
fyc=i1'2 fyd=fycl'1 call !is_leap_year
ord_day=("00", (305*(month+2)/100-(month+10)/13*2-91+lp*(month+10)/13+day))1'3
jd=1461*(year+4799)/4-31738-3*((year+4899)/100)/4
t=jd-jd/7*7 fc=t+7-(t+3)/7*7 jul_day=jd+ord_day-1
fw=("0", (ord_day+fc-1)/7)1'2 fd=*rmdr+1 i=i-1 call !is_leap_year
if fw:eq:53 if (fc+lp):lt:10 fw="01" fyc=(i+2)1'2 fyd=fycl'1
if fw:eq:0 fw=("0", (53-(fc+1-lp)/6))1'2 fyc=i1'2 fyd=fycl'1
!*svmd: clear fc clear i clear jd clear lp clear q clear t return
```

```
!is_leap_year lp=0 q=i/4
if *rmdr:eq:0 lp=1 q=q/25
if *rmdr:eq:0 lp=0 q=q/4
if *rmdr:eq:0 lp=1 q=q/10
if *rmdr:eq:0 lp=0
return
```

```
-
!explain
!expl out:" "
out:"This program returns the following variables for the current date :-"
out:"- year : year, four digits"
out:"- fyc : (fiscal) year of century, two digits"
out:"- fyd : (fiscal) year of decade, one digit"
out:"- month : month of year, two digits"
out:"- fw : (fiscal) week of year, two digits"
out:"- jul_day : Julian Day, seven digits"
out:"- ord_day : (ordinal) day of year, three digits"
out:"- day : day of month, two digits"
out:"- fd : (fiscal) day of week, one digit"
out:" " return
```

```
-_ said to be interactive, fill a specific need, and a short form of "date"
-_ that does need to be told current date.
```

comment R1 is trapezoidal rule, R2 is Simpson's rule;

go to compute;

R3: cf[1] := cf[1] := 1.0/8.0;
cf[2] := cf[3] := 3.0/8.0; go to compute;

R4: cf[1] := cf[5] := 7.0/90.0;
cf[2] := cf[4] := 32.0/90.0;
cf[3] := 12.0/90.0; go to compute;

R5: cf[1] := cf[6] := 19.0/288.0;
cf[2] := cf[5] := 75.0/288.0;
cf[3] := cf[4] := 50.0/288.0; go to compute;

R6: cf[1] := cf[7] := 41.0/840.0;
cf[2] := cf[6] := 216.0/840.0;
cf[3] := cf[5] := 27.0/840.0;
cf[4] := 272.0/840.0; go to compute;

R7: cf[1] := cf[8] := 75.1/1728.0;
cf[2] := cf[7] := 357.7/1728.0;
cf[3] := cf[6] := 134.3/1728.0;
cf[4] := cf[5] := 208.9/1728.0;

compute: da := b - a;

for k := 0 step 1 until rule do

begin

x := a + k × da/rule;

fn[k+1] := F × cf[k+1];

end;

ab := 1.0;

Integral := NC(F, x, a, da, fn[k], k, cf, rule, eps, 1.0, ab, 0);

end of Integral;

comment Now evaluate the integral of 1.0/sqrt(abs(x+y))
on the unit disk in the x,y-plane;

real x, y, answer;

answer := Integral(Integral(1.0/sqrt(abs(x+y)), x,
-sqrt(1.0-y²), sqrt(1.0-y²), 7, 0.001), y, -1.0, 1.0, 3.0, 0.01);

end of program;

ALGORITHM 199 CONVERSIONS BETWEEN CALENDAR DATE AND JULIAN DAY NUMBER

ROBERT G. TANTZEN

Air Force Missile Development Center, Holloman AFB,
New Mex.

procedure JDAY (d,m,y,j);

integer d,m,y,j;

comment JDAY converts a calendar date, Gregorian calendar,
to the corresponding Julian day number j. From the given day
d, month m, and year y, the Julian day number j is computed
without using tables. The procedure is valid for any valid
Gregorian calendar date. When transcribing JDAY for other
compilers, be sure that integers of size 3 × 10⁶ can be handled;

begin integer c, ya;

if m > 2 then m := m - 3

else begin m := m + 9; y := y - 1 end;

c := y ÷ 100; ya := y - 100 × c;

j := (146097 × c) ÷ 4 + (1461 × ya) ÷ 4 + (153 × m + 2) ÷ 5 + d + 1721119

end JDAY

procedure JDATE (j,d,m,y);

integer j,d,m,y;

comment JDATE converts a Julian day number j to the corre-
sponding calendar date, Gregorian calendar. Since j is an integer
for this procedure, it is correct astronomically for noon of the
day. JDATE computes the day d, month m, and year y, without
using tables. The procedure is valid for any valid Gregorian
calendar date. When transcribing JDATE for other compilers,
be sure that integers of size 3 × 10⁶ can be handled;

begin j := j - 1721119;

y := (4 × j - 1) ÷ 146097; j := 4 × j - 1 - 146097 × y;

d := j ÷ 4;

j := (4 × d + 3) ÷ 1461; d := 4 × d + 3 - 1461 × j;

d := (d + 4) ÷ 4;

m := (5 × d - 3) ÷ 153; d := 5 × d - 3 - 153 × m;

d := (d + 5) ÷ 5;

y := 100 × y + j; if m < 10 then m := m + 3

else begin m := m - 9; y := y + 1 end;

end JDATE

procedure KDAY (d,m,ya,k);

integer d,m,ya,k;

comment KDAY converts a calendar date, Gregorian calendar,
to the corresponding serial day number k. From the given day
d, month m, and the last two decimals of the year, ya, the serial
day number k is computed without using tables. The procedure
is valid from 1 March 1900 (k=1) to 31 December 1999
(k = 36465). To obtain the Julian day number j (valid at noon)
use j = k + 2415079;

begin if m > 2 then m := m - 3

else begin m := m + 9; ya := ya - 1 end;

k := (1461 × ya) ÷ 4 + (153 × m + 2) ÷ 5 + d

end

procedure KDATE (k,d,m,ya);

integer k,d,m,ya;

comment KDATE converts a serial day number k to the corre-
sponding calendar date, Gregorian calendar. It computes day d,
month m, and the last two decimals of the year, ya, without
using tables. The procedure is valid from k = 1 (1 March 00) to
k = 36465 (31 December 99) for any one century. For the 20th
Century the relation between k and the Julian day number j
(at noon) is j = k + 2415079;

begin ya := (4 × k - 1) ÷ 1461; d := 4 × k - 1 - 1461 × ya;

d := (d + 4) ÷ 4; m := (5 × d - 3) ÷ 153;

d := 5 × d - 3 - 153 × m;

d := (d + 5) ÷ 5;

if m < 10 then m := m + 3

else begin m := m - 9; ya := ya + 1 end;

end KDATE

ALGORITHM 200 NORMAL RANDOM RICHARD GEORGE*

Argonne National Laboratory, Argonne, Ill.

* Work supported by United States Atomic Energy Commission.

real procedure NORMAL RANDOM (Mean, Sigma n);

procedure Random;

real Mean, Sigma;

integer n;

comment Random is assumed to be a real procedure which
generates a random number uniform on the interval (-1,+1).
The value of n should be greater than 10, in order to approxi-
mate the normal distribution with accuracy. However, very
large values of n will increase the running time. The use of
Mean and Sigma should be obvious. Reference: R. W. Ham-
ming, *Numerical Methods for Scientists and Engineers*;

begin

integer i; real sum;

sum := 0;

for i := step 1 until n do

sum := sum + Random;

NORMAL RANDOM := Mean + Sigma × sum × sqrt(3.0/n)

end NORMAL RANDOM

Letters to the Editor

A Machine Algorithm for Processing Calendar Dates

Key Words and Phrases: calendars, calendar date, Julian date, Gregorian date, Gregorian calendar, Julian calendar, time interval, continuous day count, Fortran statement function, arithmetic statement function, function

CR Categories: 3.1, 3.10, 3.11, 3.15, 3.2, 4.9

EDITOR:

The need to determine the elapsed number of days between any two given calendar dates seems to be a common problem in writing computer programs. Generally speaking, rather elaborate logic is needed to take into account the varying number of days in each month, plus the occurrence of leap years, and perhaps also the omission of a February 29 in years divisible evenly by 100 but not by 400. The following algorithm takes advantage of the truncation feature of integer arithmetic in the FORTRAN programming language to solve this problem in a very compact way. It converts any given calendar date (I = year; J = month, a number from 1 to 12; K = day of month) to a Julian Date (JD)—a continuous count of days from an epoch in the very distant past. For example, noon at Greenwich, England, on January 1, 1970, is the beginning of Julian Date 2,440,588. So if $I = 1970$, $J = 1$, and $K = 1$, then the algorithm gives $JD = 2440588$. Clearly, the interval between any two calendar dates (on the Gregorian Calendar) can be found by obtaining the Julian Date for each, and finding the difference.

The algorithm is given below (presented as a FORTRAN arithmetic statement function). It is valid for any Gregorian Date producing a Julian Date greater than zero.

$$JD(I, J, K) = K - 32075 + 1461 \cdot (I + 4800 + (J - 14)/12)/4 \\ + 367 \cdot (J - 2 - (J - 14)/12 \cdot 12)/12 - 3 \\ + ((I + 4900 + (J - 14)/12)/100)/4$$

The authors have yet to discover the algorithm of comparable compactness for converting a Julian Date back to a calendar date. But in preference to leaving the problem undiscussed, the following is offered (presented as a FORTRAN subroutine):

SUBROUTINE DATE (JD, I, J, K)

```
L = JD + 68569
N = 4 * L / 146097
L = L - (146097 * N + 3) / 4
I = 4000 * (L + 1) / 1461001
L = L - 1461 * I / 4 + 31
J = 80 * L / 2447
K = L - 2447 * J / 80
I = J / 11
J = J + 2 - 12 * L
I = 100 * (N - 49) + I + L
RETURN
END
```

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On "Prime Phrase" in Feldman and Gries Paper

Key Words and Phrases: compilers, operator precedence, translator writing systems

CR Categories: 4.12

EDITOR:

The article by Feldman and Gries on Translator Writing Systems (*Comm. ACM* 11, 2 (Feb. 1968), 77-113) is an excellent one, but one error in it ought to be corrected. In their description of operator precedence parsing on page 82, they give a definition of a prime phrase as "a phrase which contains no phrase other than itself but at least one terminal character." In Floyd's original article on the subject [*J. ACM* 10 (Jul. 1963), 316-333], a prime phrase was defined to be a phrase which contains no *prime* phrase other than itself but at least one terminal character. It may not be obvious that the two definitions are not equivalent. The difference shows up when the grammar in question has a production whose right side consists of one nonterminal symbol.

Consider the grammar:

$$S \rightarrow aU_1b \\ U_1 \rightarrow U_2 \\ U_2 \rightarrow b$$

Then in the sentence " aU_2b ", " U_2 " is a phrase but not a prime phrase by either definition. Hence " aU_2b " is a prime phrase by Floyd but not by Feldman and Gries.

If Feldman and Gries's definition is used, a parse may reach a state where there are no prime phrases and hence the parse cannot be continued.

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Do You Use Microfiche?

Key Words and Phrases: microfiche, user study, document surrogates

CR Categories: 3.7, 3.72, 3.79

EDITOR:

There has been a growing tendency for Federal agencies to encourage, usually through differential pricing, the distribution of microfiche instead of full size copies of reports. The economic advantages of microfiche are obvious to the issuing agencies (and to the General Accounting Office); agency distribution lists show that some libraries actually prefer to receive microfiche. We have little information, however, on the acceptance and use of microfiche by individual scientists and engineers.

I have been asked by COSATI (the Committee on Scientific and Technical Information of the Federal Council for Science and Technology) to look into this matter. Those of your readers who have actually been offered the opportunity of using microfiche and have strong opinions on such subjects as legibility, convenience, availability, and quality of readers and reader-printers and kindred topics are encouraged to write to me. I am especially interested in hearing from those who have found it possible, or even preferable, to use microfiche in maintaining their personal

Letters to the Editor

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The algorithm is given below (presented as a FORTRAN arithmetic statement function). It is valid for any Gregorian Date preceding a Julian Date greater than zero.

$$J(I, J, K) = K - 32075 + 1461 \cdot (I + 4800 + (J - 14)/12)/4 \\ + 307 \cdot (J - 2 - (J - 14)/12 \cdot 12/12) - 3 \\ + (I + 4900 + (J - 14)/12)/100/4$$

The authors have yet to discover the algorithm of comparable compactness for converting a Julian Date back to a calendar date. We prefer to leaving the problem undiscussed, the following is offered (presented as a FORTRAN subroutine):

```
SUBROUTINE DATE (JD, I, J, K)
  L = JD + 68509
  N = 4 * L / 146097
  L = L - (146097 * N + 3) / 4
  I = 4000 * (L + 1) / 1461001
  L = L - 1461 * I / 4 + 31
  K = 80 * L / 2147
  J = L - 2447 * J / 80
  J = J / 11
  J = J + 2 - 12 * L
  I = 100 * (N - 49) + I + L
RETURN
END
```

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Consider the grammar:

$$S \rightarrow aU_1b \\ U_1 \rightarrow U_2 \\ U_2 \rightarrow b$$

Then in the sentence "aU₁b", "U₁" is a phrase but not a prime phrase by either definition. Hence "aU₁b" is a prime phrase by Floyd but not by Feldman and Gries.

If Feldman and Gries's definition is used, a parse may reach a state where there are no prime phrases and hence the parse cannot be continued.

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EDITOR:

There has been a growing tendency for Federal agencies to encourage, usually through differential pricing, the distribution of microfiche instead of full size copies of reports. The economic advantages of microfiche are obvious to the issuing agencies (and to the General Accounting Office); agency distribution lists show that some libraries actually prefer to receive microfiche. We have little information, however, on the acceptance and use of microfiche by individual scientists and engineers.

I have been asked by COSATI (the Committee on Scientific and Technical Information of the Federal Council for Science and Technology) to look into this matter. Those of your readers who have actually been offered the opportunity of using microfiche and have strong opinions on such subjects as legibility, convenience, availability, and quality of readers and reader-printers and kindred topics are encouraged to write to me. I am especially interested in hearing from those who have found it possible, or even preferable, to use microfiche in maintaining their personal

```

40 XB=X3
   Y2=Y3
   X3=X4
   Y3=Y4
   X4=X5
   Y4=Y5
   A1=A2
   B1=B2
   A2=A3
   B2=B3
   A3=A4
   B3=B4
   IF(1-GE,LM1) GO TO 42
41 X5=X5+M0
   Y5=Y5+K5
   A4=X5-X4
   B4=Y5-Y4
   IF(MD1-EG,0) X4=R4/A4
   GO TO 43
42 IF(MD1-NE,0) A4=A3+53-A2
   B4=B3+B3-B2
43 IF(1-EG,1) GO TO 31
   GO TO (50,55), MUD

```

```

44 WRITE (10,2096)
   GO TO 98
47 WRITE (10,2097)
48 WRITE (10,2098) T,X(1),Y(1)
49 WRITE (10,2099) M0,L0,M0,N0
   RETURN

```

C FORMAL STATEMENTS

```

2090 FORMAL(1X/31H *** MD OUT OF PROPER RANGE.**)
2091 FORMAL(1X/20H *** L = 1 OR LESS.**)
2092 FORMAL(1X/22H *** M = 1 OR LESS.**)
2093 FORMAL(1X/23H *** IMPROPER X VALUES.**)
2094 FORMAL(1X/27H *** IDENTICAL X VALUES.**)
2095 FORMAL(1X/23H *** A VALUES OUT OF SEQUENCE.**)
2096 FORMAL(1X/33H *** IDENTICAL X AND Y VALUES.**)
2097 FORMAL(7H 1 *10,10X,6H(1) *E12,3)
2098 FORMAL(7H 1 *10,10X,6H(1) *E12,3)
   1
2099 FORMAL(7H M0 *10,8X,3H *15,8X,
   1 3HM *15,8X,3HN *15/
   2 36H ERROR DETECTED IN ROUTINE CRVFTT)
   END

```

G NUMERICAL DIFFERENTIATION

```

50 T2=T3
   W2=ABS(M4-M3)
   W3=ABS(M2-M1)
   SW=W2+3
   IF(SW-NE,0,0) GO TO 52
   W2=0.5
   W3=0.5
   SW=1.0
52 T3=(W2*M2+W3*M3)/SW
   IF(1-1) 80,80,60

```

```

55 COS2=COS3
   SIN2=SIN3
   W2=ABS(A3+B4-A4+B3)
   W3=ABS(A1+B2-A2+B1)
   IF(W2+3-NE,0,0) GO TO 57
   W2=SQR(T(A3+A3+B3+B3))
   W3=SQR(T(A2+A2+B2+B2))
57 COS3=W2+A2+W3+B3
   SIN3=W2+B2+W3+B3
   R=COS3+COS3+SIN3+SIN3
   IF(1-EG,0,0) GO TO 58
   R=SQR(R)
   COS3=COS3/R
   SIN3=SIN3/R
58 IF(1-1) 80,80,65

```

D DETERMINATION OF THE COEFFICIENTS

```

65 Q2=(2.0*(M2-T2)+M2-T3)/A2
   Q3=(-M2-M2+T2+T3)/(A2+A2)
   GO TO 70
   R=SQR(T(A2+A2+B2+B2))
   P1=R+COS2
   P2=3.0*A2-R*(COS2+COS2+COS3)
   P3=A2-P1-P2
   Q1=R*SIN2
   Q2=3.0*B2-R*(SIN2+SIN2+SIN3)
   Q3=B2-Q1-Q2
   GO TO 75

```

C COMPUTATION OF THE POLYNOMIALS

```

70 Z=A2+RM
   Z=0.0
   DO 71 J=1,MM1
     K=K+1
     Z=Z+Z
     U(K)=P0+Z
     V(K)=Q0+Z*(Q1+Z*(Q2+Z*Q3))
   GO TO 79
75 Z=0.0
   DO 76 J=1,MM1
     K=K+1
     Z=Z+RM
     U(K)=P0+Z*(P1+Z*(P2+Z*P3))
     V(K)=Q0+Z*(Q1+Z*(Q2+Z*Q3))
76 V(K)=Q0+Z*(Q1+Z*(Q2+Z*Q3))
79 K=K+1
80 CONTINUE
   RETURN

```

C ERROR EXIT

```

90 WRITE (10,2090)
   GO TO 99
91 WRITE (10,2091)
   GO TO 99
92 WRITE (10,2092)
   GO TO 99
93 WRITE (10,2093)
   GO TO 99
94 WRITE (10,2095)
   GO TO 98

```

Remark on Algorithm 398 [Z]

Tableless Date Conversion [Richard A. Stone, *Comm. ACM* 13 (Oct. 1970), 621]

J. Douglas Robertson [Recd. 16 Dec. 1970 and 30 Mar. 1971]
200 Oakcrest Drive F-161, Lafayette, LA 70501

Key Words and Phrases: date, calendar, Fortran statement function, arithmetic statement function
CR Categories: 3.15, 4.9, 5.9

As a companion to Algorithm 398, I offer a relatively compact algorithm for calculating the day of the year on which a particular date falls given the year, month, and day of the month. The algorithm is written below as a Fortran arithmetic statement function, where *I* is the year; *J* is the month, (1 = Jan, ..., 12 = Dec); and *K* is the day of the month.

$$\begin{aligned}
 IDAY(I,J,K) = & 3055*(J+2)/100 - (J+10)/13 + 2 - 91 \\
 & + (1 - (I-1/4 + 3)/4 + (I-1/100 + 100 + 99)/100 \\
 & - (I-1/400 + 400 + 399)/400) * (J+10)/13 + K
 \end{aligned}$$

The above, along with Stone's Algorithm 398, Robert G. Tantzen's Algorithm 199 [2], and the two algorithms by H.F. Fliegel and T.C. Van Flandern [1] constitute a comprehensive set of algorithms for processing calendar dates. A useful addition to this set would be an algorithm for Zeller's Congruence (calculates the day of the week on which a particular date falls) as described in [3]. It appears below as a Fortran arithmetic statement function, where *I* is the year; *J* is the month, (1 = Jan, ..., 12 = Dec); and *K* is the day of the month.

$$\begin{aligned}
 IZLR(I,J,K) = & MOD((13*(J+10 - (J+10)/13 + 12) - 1)/5 + K + 77 \\
 & + 5*(J + (J-14)/12 - (J+(J-14)/12)/100 + 100)/4 \\
 & + (J+(J-14)/12)/400 - (J+(J-14)/12)/100 + 2, 7)
 \end{aligned}$$

References

- Fliegel, H.F., and Van Flandern, T.C. A machine algorithm for processing calendar dates. *Comm. ACM* 11 (Oct. 1968), 657.
- Tantzen, Robert G. Conversions between calendar date and Julian day number, Algorithm 199. *Comm. ACM* 6 (Aug. 1963), 444.
- Uspensky, J.V., and Heaslet, M.A. *Elementary Number Theory*. McGraw-Hill, New York, 1939, p. 206.

For any nonnegative integer c (representing cost), an m -distribution of c relative to w is an m -tuple (a_1, a_2, \dots, a_m) such that the a_i are nonnegative integers, and such that $\sum_{i=1}^m a_i w_i = c$. The m -distribution (a_1, a_2, \dots, a_m) is minimal if, for any m -distribution (b_1, b_2, \dots, b_m) of c relative to w , we have $\sum_{i=1}^m a_i \leq \sum_{i=1}^m b_i$. The m -distribution (a_1, a_2, \dots, a_m) is standard if it is obtainable as follows:

$$c_m = c$$

$$c_i = c_{i+1} - a_{i+1} \times w_{i+1} \quad (i = m-1, m-2, \dots, 1)$$

$$a_i = c_i / w_i \quad (i = m, m-1, \dots, 1)$$

where all divisions are integer divisions).

If **MINDIST**($C, M, SENSE, W, RESULT$) is called with a nonnegative integer C , a positive integer M , and an array $W = (W[1], W[2], \dots, W[M])$, then the resulting array $RESULT = (RESULT[1], RESULT[2], \dots, RESULT[M])$ is a minimal M -distribution of C relative to W . If, before calling **MINDIST**, $SENSE$ is set to true, then **MINDIST** retains $SENSE$ as true if and only if $RESULT$ is also a standard M -distribution of C relative to W .

REFERENCE:

CHANG, S. K., AND GILL, A. Algorithmic solution of the change-making problem. *J. ACM* 17 (Jan. 1970) 113-122;

begin

integer $I, J, R, Q, SUM, SUN;$

integer array $A[1:M], B[1:M];$

$M = 1$ then

begin

$RESULT[1] := C;$

$I := 1;$

go to EXIT

end

$V := C/W[M];$

if $(Q \times W[M]) > C$ then $Q := Q - 1;$

$S := C - W[M] \times Q;$

$M := 2$ then

begin

$RESULT[1] := R; RESULT[2] := Q;$

$I := 1;$

go to EXIT

end;

$J := 0;$

LOOP:

MINDIST ($R+J \times W[M], M-1, SENSE, W, B$);

if $J \neq 0$ then go to NOT ZERO;

ETA:

for $I := 1$ step 1 until $M-1$ do $A[I] := B[I];$

$SUM := 0;$

GAMMA:

$WJ := Q$ then

begin

for $I := 1$ step 1 until M do $RESULT[I] := A[I];$

EXIT3:

go to EXIT

end;

$SUM := 0;$

for $I := 1$ step 1 until M do $SUM := SUM + A[I];$

if $(W[M] \times SUM - R - J \times W[M]) / (W[M] - W[M-1]) \leq 0$ then

begin

for $I := 1$ step 1 until $M-1$ do $RESULT[I] := A[I];$

$RESULT[M] := A[M] + Q - J;$

EXIT4:

go to EXIT

end;

$J := J + 1;$

go to LOOP;

NOT ZERO:

$SUM := 0; SUN := 0;$

for $I := 1$ step 1 until M do $SUM := SUM + A[I];$

for $I := 1$ step 1 until $M-1$ do $SUN := SUN + B[I];$

if $SUM \leq SUN$ then

begin $A[M] := A[M] + 1;$ go to GAMMA end;

$SENSE := false;$

go to BETA;

EXIT:

end PROCEDURE MINDIST

ALGORITHM 398

TABLELESS DATE CONVERSION* [Z]

RICHARD A. STONE (Recd. 2 Jan. 1970 and 6 April 1970)

Western Electric Company, P.O. Box 900,

Princeton, NJ 08540

* Patent applied for.

KEY WORDS AND PHRASES: date, calendar

CR CATEGORIES: 5.9

procedure calendar(y, n, m, d);

value y, n ; integer y, n, m, d, t ;

comment calendar is called with the year in y and the day of the year in n . The month number is returned in m , and the day of the month is returned in d . The first section of the procedure changes the dates so that February has 30 days. The second section uses the fact that $30.55(m+2) - 91$ passes through the number of days preceding each month.

Error detection: m will be in the range 1-12 if and only if n is in the correct range;

begin

$t :=$ if $(y+4) \div 4 = y$ then 1 else 0;

comment The following statement is unnecessary

if it is known that $1900 < y < 2100$;

$t :=$ if $(y+400) \div 400 = y \vee (y+100) \div 100 \neq y$ then t else 0;

$d := n +$ (if $n > (30+5)$ then $2 - t$ else 0);

$m := ((d+91) \div 100) \div 3055;$

$d := (d+91) - (m \div 3055) \div 100;$

$m := m - 2$

end calendar

ALGORITHM 399

SPANNING TREE [H]

JOUKO J. SEPPÄNEN (Recd. 6 Jan. 1970 and 8 May 1970)

Computing Center, Helsinki University of Technology,

Otaniemi, Finland

KEY WORDS AND PHRASES: graph, tree, spanning tree

CR CATEGORIES: 5.32

procedure spanning tree(v, e, I, J, P, T);

value v, e ; integer v, e, p ; integer array I, J, T ;

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TGIF Algorithms

By R. A. Cornish

The pace of most large operations winds down on certain days such as Saturday or Sunday, and some processing control programs need calendar routines for stopping or modifying control functions on those days.

The following algorithms, for example, were originally developed for a power management system used to limit peak demand. A requirement of this system was to shut down air conditioning and heating units over the weekend. Because of economic factors, a limitation in core size precluded the use of a high-level language requiring a compiler or interpreter, or large software routines such as floating point arithmetic.

Because of these limitations, the only requirements for these algorithms are a standard instruction set, arithmetic logic capability and multiply/divide routines, either hardware or software.

All the algorithms in this article will be outlined step by step, followed by a table to illustrate the algorithm. The following labels will be used to denote either registers or memory locations. All ranges in parentheses are in base 10.

MO—Month (01-12); input to computer, stored in binary.

DY—Day (01-31); input to computer, stored in binary.

YR—Year (00-99); input to computer, stored in binary.

DM—Maximum days in a month (01-31); calculated.

DAYS—Elapsed days in a year (000-366); calculated.

DW—Day of the week (0-6); calculated.

FD—First day of the year (0-6); calculated.

The intent of these algorithms may be simply stated as follows: When an operator enters the MO/DY/YR as 10/02/78, the computer stores the entry as 78; 273 (YR; DAYS) and responds with Monday, October 2, 1978. In this example, the labels defined previously would be:

MO—10 DM—31
DY—02 DAYS—273
YR—78 DW—1
FD—0

The first algorithm is used to ensure that an operator entry does not exceed the maximum days in a month such as 02/30/78.

Since all of the algorithms calculate leap years, it should be pointed out that in the Gregorian calendar, the beginning of a century is not necessarily a leap year even though the year is evenly divisible by four. If the first two digits are divisible by four with no remainder, it is a leap year. Thus 1900

and 2100 are not leap years, whereas 2000 is.

This may be important if you are using an extended cash flow analysis on your project. In these algorithms, however, the current century (1900) is always added to the YR entry to determine (Continued on In Depth/29)

**IN DEPTH
IN DEPTH
IN DEPTH**

When the primary purpose of the computer is process control, the software is invariably written in assembly language. In some processes, it may be necessary for the computer to ascertain when the weekend occurs (and tell the operator). The four algorithms in this article have been developed by the author toward this end.

	MO	1A	1B	1C	1D	1E
JAN	0001	1	31			
FEB	0010	0				28, 29
MAR	0011	1	31			
APR	0100	0			30	
MAY	0101	1	31			
JUN	0110	0			30	
JUL	0111	1	31			
AUG	1000	1	31			
SEP	1001	0		30		
OCT	1010	1	31			
NOV	1011	0		30		
DEC	1100	1	31			

Table 1

tion.

(Continued from In Depth/27)
 mine leap years.

Algorithm 1: Given the MO and YR, find the maximum days in the month (DM).

This algorithm is based on the relationship between the most significant bit (MSB) and the least significant bit (LSB) of the number of the month expressed in binary.

1A. Exclusive OR the MSB with the LSB of MO.

1B. If the result is 1, the number of days (DM) is 2L. Exit.

1C. If the result is 0, and the MSB is 1, the number of days (DM) is 30. Exit.

1D. If the result is 0, the MSB is 0, and the second MSB is 1, the number of days (DM) is 30. Exit.

1E. If the result is 0, and the MSB is 0, and the second MSB is 0, the number of days (DM) is 29, if $(1900 + YR)$ is divisible by 4 with no remainder, 28 if not.

Table 1 (on In Depth/27) illustrates the steps.

Algorithm 2: Given the MO, DY and YR, find the elapsed days (DAYS).

This algorithm depends on finding the number of days up to the month given to which DY can be added.

2A. Subtract 1 from MO, multiply the result by 30 and store the product P.

2B. Subtract 1 from MO, divide the result by 2 and store the quotient Q and the remainder R.

2C. Add Q + R + P and store the result in B.

2D. If Q is greater than 3, and R is equal to 0, add 1 to B and store the result in B.

2E. If Q is equal to 0, the elapsed days (DAYS) is equal to B + DY. Exit.

2F. If C is not equal to 0, and $(1900 + YR)$ is divisible by 4 with no remainder, the elapsed days (DAYS) is equal to B - 1 + DY. Exit.

2G. If Q is not equal to 0, and $(1900 + YR)$ is not evenly divisible by 4, the elapsed days (DAYS) is equal to B - 3 + DY. Exit.

These steps are shown in Table 2.

Algorithm 3: Given the YR and DAYS, find the MO and DY.

This algorithm takes advantage of the symmetry in the number of days in the month of the periods March through July and August through December.

3A. Divide $(1900 + YR)$ by 4. If the remainder is 0, subtract 61 from DAYS. If the remainder is not 0, subtract 60 from DAYS.

3B. If the result of the subtraction is negative, set MO equal to 0, subtract 1 from DAYS and store the result in DAYS.

3C. If the result of the subtraction in 3A is not negative, store the result in DAYS and subtract 133 from DAYS.

3D. If the result of the subtraction is

Elapsed Days (DAYS) From MO, DY, and YR								
	2A P	2B Q	2B R	2C B	2D B	2E DAYS	2F DAYS	2G DAYS
JAN	0	0	0	0		0+DY		
FEB	30	0	1	31		31+DY		
MAR	60	1	0	61			60+DY	59+DY
APR	90	1	1	92			91+DY	90+DY
MAY	120	2	0	122			121+DY	120+DY
JUN	150	2	1	153			152+DY	151+DY
JUL	180	3	0	183			182+DY	181+DY
AUG	210	3	1	214			213+DY	212+DY
SEP	240	4	0	244	245		244+DY	243+DY
OCT	270	4	1	275			274+DY	273+DY
NOV	300	5	0	305	306		305+DY	304+DY
DEC	330	5	1	336			335+DY	334+DY

Table 2

negative, set MO equal to 2

3E. If the result of the subtraction in 3C is not negative, store the result in DAYS and set MO equal

to 7

3F. Divide DAYS by 61 and store the quotient Q₁ and remainder R₁

3G. Divide the remainder R₁ by 31

and store the quotient Q₂ and remainder R₂

3H. DY is equal to R₂ + 1

(Continued on In Depth/30)

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IN DEPTH

(Continued from In Depth/29)

3I. MO is equal to $MO + 2Q_1 + Q_2 + 1$.

This algorithm for a nonleap year is illustrated in tables 3A and 3B.

Algorithm 4: Given the YR and DAYS, find the day of the week (DW).

This algorithm is based on the fact that the same day of the week occurs on the same date every 28 years. In order to determine the day of the week (DW), the first day of the year must be determined. Although the Gregorian calendar was not instituted until 1582, this algorithm would compute January 1, 0001 as Sunday.

Create a file of literal strings with address DYFL as follows:

DYFL + 0 - Sunday

+ 1 - Monday

+ 2 - Tuesday

+ 3 - Wednesday

+ 4 - Thursday

+ 5 - Friday

+ 6 - Saturday

This algorithm computes the relative file address (DW = 0-6). A similar file for months can be created with (MO-1)

relative file address.

3A. Divide $(1900 + YR)$ by 28 and store the remainder R_1 . If R_1 is equal to 0, set R_1 equal to 28.

4B. Subtract 1 from R_1 and divide the result by 2. Store the quotient Q_1 and the remainder R_2 .

4C. Multiply the quotient Q_1 by 5 and divide the product by 7. Store the remainder R_3 .

4D. Add $R_2 + R_3$ and subtract 7. If the result is not negative, store the result in FD (First Day). If the result is negative, store $R_2 + 7$.

(Continued on In Depth/32)

	DAYS	3A -60	3B DAYS	3C DAYS	3D -153	3E DAYS	MO
JAN	1- 31	-	0-30				0
FEB	32- 59	-	31-58				0
MAR	60- 90	+		0- 30	-		2
APR	91-120	+		31- 60	-		2
MAY	121-151	+		61- 91	-		2
JUN	152-181	+		92-121	-		2
JUL	182-212	+		122-152	-		2
AUG	213-243	+		153-183	+	0- 30	7
SEP	244-273	+		184-213	+	31- 60	7
OCT	274-304	+		214-244	+	61- 91	7
NOV	305-334	+		245-274	+	92-121	7
DEC	335-365	+		275-305	+	122-152	7

Table 3A

	3A-3E DAYS	MO	3F Q ₁	R ₁	3G Q ₂	R ₂	3H DY	3I MO
JAN	0- 30	0	0	0-30	0	0-30	1-31	1
FEB	31- 58	0	0	31-58	1	0-27	1-28	2
MAR	0- 30	2	0	0-30	0	0-30	1-31	3
APR	31- 60	2	0	31-60	1	0-29	1-30	4
MAY	61- 91	2	1	0-30	0	0-30	1-31	5
JUN	92-121	2	1	31-60	1	0-29	1-30	6
JUL	122-152	2	2	0-30	0	0-30	1-31	7
AUG	0- 30	7	0	0-30	0	0-30	1-31	8
SEP	31- 60	7	0	31-60	1	0-29	1-30	9
OCT	61- 91	7	1	0-30	0	0-30	1-31	10
NOV	92-121	7	1	31-60	1	0-29	1-30	11
DEC	122-152	7	2	0-30	0	0-30	1-31	12

Table 3B

Account for project time and cost.



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IN DEPTH

(Continued from In Depth/30)

R₁ in FD.

4E. Divide the elapsed days (DAYS) by 7 and store the remainder R₂. If R₂ is equal to 0, set R₄ equal to 7.

4F. Subtract 1 from R₄ and store the result in R₃.

4G. Add FD + R₃ and subtract 7. If the result is not negative, store the result in DW. If the result is negative, store FD + R₃ in DW.

Table 4 illustrates this algorithm for the years 1961 through 1988. Table 4A shows the conversion from FD to DW.



R.A. Cornish is a senior engineer at Western Electric's Mountain-Northwestern Regional Headquarters. He is presently engaged in the design of hardware and software for process control and test set computer systems.

He has a B.S.E.E. from Manhattan College, N.Y. (1959) and an M.S.E.E. from the Polytechnic Institute of N.Y. (1965).

YEAR	FD (First Day of Year)					
	4A R ₁	4B Q ₂	4B R ₂	4C R ₃	4D FD	
1961	1	0	0	0	0	SUN
1962	2	0	1	0	1	MON
1963	3	0	2	0	2	TUE
1964	4	0	3	0	3	WED
1965	5	1	0	5	5	FRI
1966	6	1	1	5	6	SAT
1967	7	1	2	5	0(7)	SUN
1968	8	1	3	5	1(8)	MON
1969	9	2	0	3	3	WED
1970	10	2	1	3	4	THU
1971	11	2	2	3	5	FRI
1972	12	2	3	3	6	SAT
1973	13	3	0	1	1	MON
1974	14	3	1	1	2	TUE
1975	15	3	2	1	3	WED
1976	16	3	3	1	4	THU
1977	17	4	0	6	6	SAT
1978	18	4	1	6	0(7)	SUN
1979	19	4	2	6	1(8)	MON
1980	20	4	3	6	2(9)	TUE
1981	21	5	0	4	4	THU
1982	22	5	1	4	5	FRI
1983	23	5	2	4	6	SAT
1984	24	5	3	4	0(7)	SUN
1985	25	6	0	2	2	TUE
1986	26	6	1	2	3	WED
1987	27	6	2	2	4	THU
1988	28(0)	6	3	2	5	FRI

Table 4

Sum of FD + R ₄								
4E	R ₄	1	2	3	4	5	6	7(0)
4G	R ₄	0	1	2	3	4	5	6
FD		0	1	2	3	4	5	6
0	SUN	0	1	2	3	4	5	6
1	MON	1	2	3	4	5	6	0
2	TUE	2	3	4	5	6	0	1
3	WED	3	4	5	6	0	1	2
4	THU	4	5	6	0	1	2	3
5	FRI	5	6	0	1	2	3	4
6	SAT	6	0	1	2	3	4	5

Table 4A

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On Photographic Patent Grant

By Howard A. Karten

CW Staff
PALO ALTO, Calif. — A patent for reading and writing data on silver halide photographic plates using lasers was recently granted to Drexler Technology Corp. here. The patent could signal a whole new era of data storage in which one billion bytes could be stored on a disk 32 cm. in diameter by 1/16th in. thick.

Although no working devices based on the patent have yet been constructed, a prototype could be built within six months, and practical, working versions could be available within two years, according to Jerome Drexler.

Amdahl Oper For East Coast

By a CW Staff Writer
COLUMBIA, Md. — Amdahl Corp. has taken steps to expand services for its East Coast customers with the opening of a systems support center here.

The eastern systems support center will house classrooms for user education, a parts depot and the company's around-the-clock remote trouble-shooting system, the Amdahl Diagnostic Assistance Center (Amdac).

A spokesman for the Sunnyvale, Calif., firm, which currently divides the eastern and southeastern regions of the U.S. into six support regions, said the center will augment the services of the hardware and software specialists available within each region.

In addition, the eastern support center will benefit both customers and the company, he claimed. "We have grown to the point where it's not practical to try to run the whole world out of Sunnyvale, so we are decentralizing some functions out to the field. We are putting these func-

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LETTERS

for a five-day session on the subject of our choice in our own city; attend the Caravan for hardware; or read *Computerworld* to gather an awareness of what is happening.

E.R. Tauber

Franklin Park, Ill.

Chill in the Air

Here are two items which may also have contributed to the poor attendance of the National Computer Conference technical sessions:

- Coldness in the ballrooms. I spent three days in the technical sessions. Most of these were held in the ballrooms. For example, I spent an entire day in the Regent Ballroom at the New York Hilton. By the time I got out, I was shivering while wearing a long-sleeve dress and a lined raincoat.

I have mentioned this situation to the hotel people. They think only conference officials should make requests for higher temperature. Evidently, no one observed this or requested adjustment.

- Paper listings in the proceedings and technical session program. The papers in the proceedings were listed according to subject. There were no cross-listings of authors and sessions. But in many instances, a single session covered three papers, all listed under different subjects.

Only a handful of attendees obtained the detailed lists of papers and authors in the session program booklet. I was preregistered, but I was not given this booklet. It becomes hard to preview the contents of the paper and determine which session is of most interest.

Dr. Elizabeth H. Yen

On TGIF Algorithms

Useful additions to the TGIF Algorithms in R.A. Cornish's article [CW, June 4] are the four parts of the Association for Computing Machinery Algorithm #199. These four computation-only algorithms convert dates to and from Julian day integers. The long version handles the 10 century span from 1582 to 2582. The short version handles the 20th century.

Carrying the Julian day integer instead of the date internally makes such

```

FORTRAN IV G LEVEL 21                                YKD1                                DATE = 79165
0001
C-----SUBROUTINE YMD1(IYR,IMU,|DYCT,|IDYR,|IDYMO,|IDYWK)
C-----INPUTS IYR - YEAR (1 TO 99)
C-----IMU - MONTH (1 TO 12)
C-----IDYMO - DAY OF MONTH (1 TO 31)
C-----IDYCT - DAY OF CENTURY (FROM JAN 1, 1901)
C-----IDYR - DAY OF YEAR (1 TO 366)
C-----IDYWK - DAY OF WEEK (1 TO 7, MON IS 1)
0002 LEAPYR = 2
0003 IF ((IYR/4)*.E..IYR) LEAPYR=1
0004 IDYR = 1MU*275/9+IDYMO-30
0005 IF (IMU.GT.2) IDYR=IDYR-LEAPYR
0006 IDYCT = (IYR-1)*1461/4+IDYR
0007 IDYWK = IDYCT-IDYCT/7*7+1
0008 RETURN
0009 END
C-----SUBROUTINE YMD2(IYR,IMU,|DYCT,|IDYR,|IDYMO,|IDYWK)
C-----INPUTS IYR - YEAR (1 TO 99)
C-----IMU - MONTH (1 TO 12)
C-----IDYMO - DAY OF MONTH (1 TO 31)
C-----IDYCT - DAY OF CENTURY (FROM JAN 1, 1901)
C-----IDYR - DAY OF YEAR (1 TO 366)
C-----IDYWK - DAY OF WEEK (1 TO 7, MON IS 1)
0002 LEAPYR = 2
0003 IF ((IYR/4)*.E..IYR) LEAPYR=1
0004 ITEMP = IDYR
0005 IF (ITEMP.GT.(61-LEAPYR)) ITEMP=ITEMP+LEAPYR
0006 IMU = (ITEMP*9+269)/275
0007 IDYMO = ITEMP-IMU*275/9+30
0008 IDYCT = (IYR-1)*1461/4+IDYR
0009 IDYWK = IDYCT-IDYCT/7*7+1
0010 RETURN
0011 END
C-----SUBROUTINE YMD3(IYR,IMU,|DYCT,|IDYR,|IDYMO,|IDYWK)
C-----INPUTS IYR - YEAR (1 TO 99)
C-----IMU - MONTH (1 TO 12)
C-----IDYMO - DAY OF MONTH (1 TO 31)
C-----IDYCT - DAY OF CENTURY (FROM JAN 1, 1901)
C-----IDYR - DAY OF YEAR (1 TO 366)
C-----IDYWK - DAY OF WEEK (1 TO 7, MON IS 1)
0002 IYR = IDYCT-IDYCT/1461+364/365
0003 IDYR = IDYCT-(IYR-1)*1461/4
0004 LEAPYR = 2
0005 IF ((IYR/4)*.E..IYR) LEAPYR=1
0006 ITEMP = IDYR
0007 IF (ITEMP.GT.(61-LEAPYR)) ITEMP=ITEMP+LEAPYR
0008 IMU = (ITEMP*9+269)/275
0009 IDYMO = ITEMP-IMU*275/9+30
0010 IDYWK = IDYCT-IDYCT/7*7+1
0011 RETURN
0012 END

```

Figure 1. Three Subroutines for Data Conversion

Old Steps	New Step	Procedure
4A,4B	4A'	Divide (YR+1899) by 4 and store the quotient in Q_1 and the remainder in R_1 .
4C	4B'	Multiply Q_1 by 5 and store the product in R_2 .
4D,4E,4F	4C'	Add R_1 , R_2 and DAYS, subtract 1 and store the result in R_3 .
4C	4D'	Divide R_3 by 7 and the remainder is DW.

Figure 2. Compact Version of TGIF Algorithm

Simplifying Algorithm

The article "TGIF Algorithms" in the June 4 issue caught my eye, since I had hunted (successfully) for a day-of-the-week algorithm some time ago. Algorithm 4 in the article has an error in step 4B (the division should be by four, not two), but otherwise seems to work, at least for the dozen or so dates I tried.

will recognize that the algorithm can be simplified considerably by the recognition that "modulo n" arithmetic gets heavy usage in this algorithm and that for the modulo 7 arithmetic, considerable compaction of the algorithm can occur.

Without resorting to a complete dissection of the algorithm, here is an equivalent [See Figure 2 above].

The following algorithms are reprinted from *The Computer Bulletin* (see *The Computer Journal*, Vol. 21 no. 3, p. 276).

Algorithm 2. FIBONACCI SEARCH M. C. Pike, J. Pixner
Medical Research Council Statistical Research Unit.

```

begin
real procedure Fibonacci search (a, b, eps, fval, f);
value a, b, eps; real a, b, eps, fval; real procedure f;
comment this procedure finds within plus or minus eps the
position of the minimum of the function f(x) in the range
a < x < b by the optimum minimax method (J. Kiefer, Proc.
Am. Math. Soc. 4 (1953), p. 502). f(x) must be monotonic
decreasing from x = a to the minimum position and then
monotonic increasing to x = b.
On exit fval contains the minimum value of the function;
begin real e, ff1, ff2, p1, p2;
integer n, nn, f1, f2, c;
Boolean equal;
equal := false;
f1 := n := 1; f2 := 2; e := (b - a)eps;
AGAIN: if f2 < e then
begin n := n + 1; c := f1; f1 := f2; f2 := c + f2;
go to
AGAIN end;
p2 := (f1/ff2) * (b - a) + a; p1 := a + b - p2;
ff1 := f(p1); ff2 := f(p2); nn := 2;
begin integer array fibno[1:n];
fibno[1] := 1; fibno[2] := 2;
for c := 3 step 1 until n do fibno[c] := fibno[c - 1]
+ fibno[c - 2];
REPEAT: if ff2 > ff1 then
begin b := p2; p2 := p1;
p1 := b - (fibno[n - nn + 1] / fibno[n - nn + 2]) * (b - a);
comment this instruction may be replaced by
p1 := b - p2 + a but rounding error trouble may
become so
evident if p1 is calculated in this way that
it leads to a collapse of the procedure;
ff2 := ff1; ff1 := f(p1)
end
else
begin a := p1; p1 := p2; p2 :=
a + (fibno[n - nn + 1] / fibno[n - nn + 2]) * (b - a);
ff1 := ff2; ff2 := f(p2)
end;
if equal & ff1 = ff2 then go to EXIT;
equal := if ff1 = ff2 then true else false;
nn := 1 + nn; if nn < n then go to REPEAT;
EXIT: end;
if ff2 < ff1 then
begin fval := ff2; Fibonacci search := p2 end
else
begin fval := ff1; Fibonacci search := p1 end
end
end;

```

has 30 bits. On other computers with more bits in the mantissa these results will undoubtedly be different. In general the better the real number representation the better the chances are that Algorithm 2 will meet its stated

sion.
The principles of the Fibonacci Search may be found in Bellman "Dynamic Programming" Chapter I or Bellman "Applied Dynamic Programming" Chapter IV, two references

which are more recent and readily available than the one cited by the authors of the Algorithm. The process of locating the minimum of a unimodal function may be accomplished by trisection, as shown in the procedure MINX, above. In view of the relative simplicity of MINX, it would be informative to learn from the authors of Algorithm 2 the circumstances under which its apparent complexity is justified.

Certification of Algorithm 2. FIBONACCI SEARCH

J. Boothroyd
University of Tasmania Computing Centre

Algorithm 2 was transcribed into Elliott 503 ALGOL (after making minor changes to accommodate certain 503 ALGOL restrictions) and tested using the functions $abs(x)$ and $7x^2 + 2x + 4$, for several values of a , b and eps . As indicated in the commentary of the procedure, the FIBONACCI SEARCH algorithm should locate the position of the minimum of a function within an interval of length eps . The results for $abs(x)$, with a well-defined minimum, were all within specification. For the quadratic, however, the procedure failed to meet the specified precision in the following four cases out of fourteen tried.

a	b	eps	Fibonacci(xmin)	fval(f(x)min)
-1	1	10 ⁻⁵	-0.14288052	3.85714286
-1	1	10 ⁻⁶	-0.14288010	3.85714286
-15	1	10 ⁻⁶	-0.14288868	3.85714286
-2	-0.1	10 ⁻⁶	-0.14287128	3.85714286

The mantissa of the 503 floating-point number representation See also *The Computer Journal*, Vol. 9 no. 4, pp. 414, 416, 417.

Algorithm 3. EASTER

I. D. Hill
Medical Research Council
Statistical Research Unit.

```

procedure easter (d, m, y);
value y; integer d, m, y;
comment y is the year. At exit, d and m are the day and
month, respectively, of Easter Sunday in that year.
The result is valid only for the Gregorian calendar,
introduced in 1582 (1752 in Britain).
The method is that given by O'Beirne (New Scientist,
1961, 9, 828);

```

```

begin
procedure divide (x, z, q, r);
value x, z; integer x, z, q, r;
begin
q := x ÷ z;
r := x - z × q
end divide;
integer a, b, c, h;
divide (y, 19, m, a);
divide (y, 100, b, c);
divide (b, 4, d, y);
divide (19 × a + b - d + 15 - ((8 × b + 13) ÷ 25), 30, m, h);
divide (c, 4, b, d);
divide (2 × (y + b) - h - d + 32, 7, m, c);
h := h + c - 7 × ((a + 11 × h + 19 × c) ÷ 433);
m := (h + 90) ÷ 25;
divide (33 × m + h + 19, 32, b, d)
end easter;

```

Algorithm 3 has been tested using Elliott 503 ALGOL and yielded results in agreement with those obtained from D. E. Knuth's procedure EASTER [Comm. ACM 5 (April 1962), 209 and (Nov. 1962), 556], for the years 1752 through 2000.

Certification of Algorithm 3 EASTER

J. Randle

Bradford Institute of Technology

This algorithm provides a welcome off-beat example in integer arithmetic without the use of arrays with which to test our compiler on the Stantec Computing Systems which is still in the debugging stage.

With the single change of reversing the integer and procedure declarations within the procedure body of EASTER, required by a restriction of our compiler, the procedure produced correct results for those years tested.

Algorithm 4. TWOBYTWO I. D. Hill and M. C. Pike,
Medical Research Council
Statistical Research Unit.

real procedure two by two (a, b, c, d, method);
value a, b, c, d, method; integer a, b, c, d, method;

comment evaluates the tail area probabilities in a 2 by 2 table by the exact method for fixed marginal totals (R. A. Fisher (1935), J. R. statist. Soc. 98, 39-54; F. Yates (1934), J. R. statist. Soc. Suppl. 1, 217-235; J. O. Irwin (1935), Metron. 12, Pt. 2, 84-94). The table considered is

a	b	a + b
c	d	c + d
a + c	b + d	N

If method = 0 the single-tail probability is found by summing the individual probabilities of a, a - 1, a - 2, ... 1, 0 in the top left-hand cell.

If method = 1 or 2 a two-tail probability is found. The expected value, on the null hypothesis, of the observation in the top left-hand cell is $E = (a + b)(a + c)/N$. If $E > a$ then the two-tail probability is the sum of the above single-tail probability and a probability calculated in similar fashion from the other tail.

If method = 1, then the terms included in the second tail are all those which give an inverse odds ratio at least as great as the observed odds ratio.

If method = 2, then the terms included are as many as possible subject to the second-tail probability being not greater than the probability calculated for the first tail.

If $E < a$, then a similar procedure is adopted using the top right-hand corner.

If $E = a$, then the two-tail probability = 1.0;

```
begin integer r1, r2, c1, c2, N, count; Boolean change;
real E, z, t, sum, old sum, d1, d2, AA, BB;
procedure swap (a, b); integer a, b;
begin integer s;
s := a; a := b; b := s
end swap;
real procedure logfac (a); integer a;
comment evaluates ln (factorial a);
begin real aa, k, b;
aa := a;
if aa > 7.5 then begin
k := 1/aa;
logfac := (aa + 0.5) × ln(aa) +
```

$$0.9189385333 = \ln(\sqrt{2 \times \pi})$$

```
else begin
aa := aa + 0.5; b := 1;
for k := 2.0 step 1.0 until aa do
b := b × k;
logfac := ln (b)
end
```

```
end logfac;
real procedure sumterms (a, b, c, d, term, first, count);
value a, b, c, d, first; integer count; real a, b, c, d;
real array term; Boolean first;
begin integer i, j; real sum, nusum, t;
j := a + 1;
t := sum := term [1];
if j = 1 then count := 1;
for i := 2 step 1 until j do
begin
b := b + 1.0; c := c + 1.0;
t := t × a × d / (b × c);
nusum := sum + t;
if ¬ first then begin
term [i] := t;
count := i
end;
if nusum = sum then go to OUT;
sum := nusum;
a := a - 1.0; d := d - 1.0
end;
```

OUT:

```
sumterms := sum
end sumterms;
r1 := a + b; r2 := c + d;
c1 := a + c; c2 := b + d;
if r1 = 0 ∨ r2 = 0 ∨ c1 = 0 ∨ c2 = 0
then begin
twobytwo := 1.0;
go to EXIT 4
end
if any row or column total is zero, result is 1.0;
N := r1 + r2;
change := false;
E := r1 × c1 / N;
t := a - E;
if abs(t) < 0.5 ∧ method ≠ 0 then begin
twobytwo := 1.0;
go to EXIT 4
end;
```

```
if t > 0 then begin
change := true;
swap (a, b); swap (c, d); swap (c1, c2)
end;
if a > d then begin
swap (a, d); swap (r1, c2); swap (r2, c1)
end;
z := logfac (c1) + logfac (c2) + logfac (r1) + logfac
(r2) - logfac (N);
sum := t := exp (z - logfac (a) - logfac (b) - logfac
(c) - logfac (d));
if a = 0 then goto if method ≠ 0 then SECOND else
EXIT 2;
begin real array term [1: 1];
term [1] := sum;
sum := sumterms (a, b, c, d, term, true, count);
if method = 0 then go to EXIT 2
end;
```

SECOND:

```
if a < 0.5 then begin
```

less. This makes people of more and more at time.

As computers become more attractive, the rate of increase and more and more will need to have time entries.

In Europe, the periodate hours, minutes and display format, which States would use a comma what do you expect to use a comma for a day.

But the real difference use of 24-hour or "in" opposed to the a.m.-p.m. the United States. Central clocks are making more and more common.

ANSI standard X3.51-1975, which both the 12- and 24-

hours. Both representations zeroes. "A" and "P" a meridian (not meridian, the right of the 12-hour 24-hour scheme, 00:00:00 the day and 24:00:00 is

This is amplified in X3.51-1975, where Greenwich Time (Universal Time) the right-hand side a representation. The 12 uses the string "space" meridian designate Universal Time.

It is useful to have a local time in relation Time. The displacement shown as a four-digit senting hours and minutes or minus sign in front differential factor (TDF the right of the local time -1200 to +1300.

In ANSI standard time zones in the United three letter codes, which associated with them with "ST," which means Time." There is also a set of three-letter codes which means "Daylight

example, "EST" is "Eastern Standard Time" and it has TDF equal to -0500, "EDT" "Eastern Daylight Time" and it has a TDF of -0400. This how daylight savings time handled.

The standard calendar is universal standard. We have universal agreement that there are seven days in week, too. The day of the week can be calculated by taking the Julian date, and dividing by seven. The remainder would then map into a day of the week.

another method of direct calculation is given in the following pseudo code.

```
STRING FUNCTION Day-of-week (INTEGER Year, INTEGER Month, INTEGER Day);
```

```
COMMENT Year is given as four digits. The DIV operator is integer division. MOD is the remainder function. The Boolean function LeapYear explains itself. The function is valid from the 1700s through 2100s;
```

```
BEGIN EXTERNAL BOOLEAN FUNCTION LeapYear; STRING ARRAY DayName [0:6]
```

```
INIT ("SUN", "MON", "TUE", "WED", "THU", "FRI", "SAT");
```

```
INTEGER ARRAY Date-Table [1:12]
```

```
INIT (0, 3, 3, 6, 1, 4, 6, 2, 5, 0, 3, 5);
```

```
INTEGER ARRAY Century-Table
```

```
[17:21]
```

```
INIT (1, 2, 0, 6, 4);
```

```
INTEGER Century, Year-in-Century, Result;
```

```
IF (LeapYear(Year)) THEN BEGIN Date-Table [1] := 6;
```

```
Date-Table [2] := 2; END;
```

```
Century := Year DIV 100;
```

```
Year-in-Century := Year - (Century * 100);
```

```
Result := Century-Table [Century]
```

```
+ Year-in-Century + (Year-in-Century DIV 4)
```

```
+ Date-Table [Month] + Day;
```

```
Day-of-Week := DayName [Result MOD 7];
```

```
END.
```

This algorithm was supplied by Gail Higgins, an Atlanta-based consultant, who found it years ago in a puzzle book. She first used it to save a client who had two possible methods of finding the day of the week: (1) Carry it in every record and rewrite the entire system to reflect the record format change (2) Julianize every day of the year and start counting from the front of the year with a table look-up scheme.

The standard calendar has twelve months, but mankind never did agree on how to write a date. A computer needs to be able to convert the three-letter shorthand for a month name into the numeric value of the month. This is very handy for an interactive program taking in data from untrained users.

Richard Cichelli developed a perfect hashing technique and gave this algorithm as an example of it in the January 1980 issue of *Communications of the ACM*. A perfect hashing

has two properties: (1) It always hits the desired value in the hash table. (2) There are no empty records in the hash table.

```
INTEGER FUNCTION Three-Letter (STRING Month-name);
```

```
COMMENT Month-name is the three letter month abbreviation;
```

```
BEGIN INTEGER ARRAY Numeric-Value [1:26]
```

```
INIT (4, 5, 2, 0, 0, 0, 3, 0, 0, 0, 0, 6, 0, 0, 5, 1, 0, 6, 0, 6, 0, 6, 0, 0, 5, 0);
```

```
INTEGER ARRAY Numeric-Value [0:11]
```

```
INIT (6, 9, 12, 8, 1, 2, 7, 4, 10, 5, 3, 11);
```

```
INTEGER Second-Place, Third-Place;
```

```
COMMENT The ORD function returns the numeric position of a letter in the alphabet so that A=1, B=2, ..., Z=26. SUBSTRING (i, text) return the i-th character in the string named text;
```

```
Second-Place := Alpha-Value [ORD (SUBSTRING (2, Month-name))];
```

```
Third-Place := Alpha-Value [ORD (SUBSTRING (3, Month-name))];
```

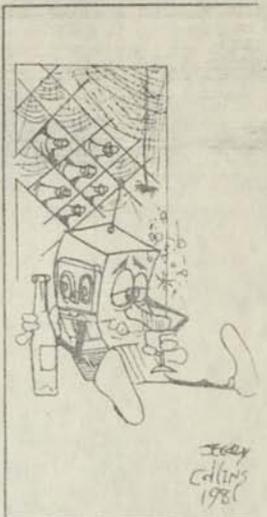
```
Three-Letter := Numeric-Value [Second-Place + Third-Place];
```

```
END.
```

This is a cute algorithm, but with such a short list of possible values, but unless it is written in assembly language, it probably is not worth the trouble.

The first man to think of putting the day of the year on the bottom of the pages of a calendar did a great favor to the data processing community.

The following algorithm will take a month and a day as input and then return the day of the year. It operates by making a quick first hack at the answer and then tuning it to the actual months.



```
INTEGER FUNCTION Day-of-Year (INTEGER Year, INTEGER Month, INTEGER day);
```

```
COMMENT Year is the year; Month is the month; day is the day;
```

```
BEGIN EXTERNAL BOOLEAN Valid-date, LeapYear;
```

```
IF (Valid-date (Year, Month, day)) THEN
```

```
RETURN (Day-of-Year (Year, Month, day));
```

```
IF (LeapYear (Year)) AND (Month = 1)
```

```
THEN Day-of-Year := Day-of-Year + 1;
```

```
IF (Month = 2) THEN Day-of-Year := Day-of-Year + 2;
```

```
IF (Month = 3) THEN Day-of-Year := Day-of-Year + 3;
```

```
IF (Month = 4) THEN Day-of-Year := Day-of-Year + 4;
```

```
IF (Month = 5) THEN Day-of-Year := Day-of-Year + 5;
```

```
IF (Month = 6) THEN Day-of-Year := Day-of-Year + 6;
```

```
IF (Month = 7) THEN Day-of-Year := Day-of-Year + 7;
```

```
IF (Month = 8) THEN Day-of-Year := Day-of-Year + 8;
```

```
IF (Month = 9) THEN Day-of-Year := Day-of-Year + 9;
```

```
IF (Month = 10) THEN Day-of-Year := Day-of-Year + 10;
```

```
IF (Month = 11) THEN Day-of-Year := Day-of-Year + 11;
```

```
IF (Month = 12) THEN Day-of-Year := Day-of-Year + 12;
```

Potential contributors to the Software Design section should contact James Ludvik, Information Systems News, 3 East Shore Road, Manhasset, N.Y. 11030. Phone: 516-82-



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Date Calculation Algorithms

These algorithms should be implemented using 32 bit or 9 digit precision arithmetic in the computer language of your choice. All division is integer division, i.e. you drop the remainder. For example, 35 / 4 is 8; to make this clear the algorithms use the INT function, INT(35/4). These algorithms make use of the MOD function, the remainder after integer division.

The following algorithms are included:

- [Convert from YYYY,MM,DD to YYYY,NNN and determine day-of-week](#)
- [Convert from YYYY,NNN to YYYY,MM,DD and determine day-of-week](#)
- [Convert from YYYY,NNN to Lilian \(day 1=Fri Oct 15, 1582\)](#)
- [Convert from Lilian to YYYY,NNN](#)
- [Convert from Lilian to day-of-week](#)
- [Convert from YYYY,MM,DD to YYYY,NNN](#)
- [Convert from YYYY,MM,DD to day-of-week](#)

NOTE: Day 1 of the Lilian date in these algorithms is Friday, 15 October 1582.

Convert from YYYY,MM,DD to YYYY,NNN and determine day-of-week

Input: YYYY, MM, DD

Output: NNN (1-366) and DOW (0-6, 0=Sunday, etc)

```

IF MOD(YYYY,4) = 0 THEN LY = 1 ELSE LY = 0
IF MOD(YYYY,100) = 0 THEN LY = 0
IF MOD(YYYY,400) = 0 THEN LY = 1
* LY is 1 if it is a leap year
NNN = INT(((MM + 2) * 3055) / 100) + DD - 91
IF NNN > (59 + LY) THEN NNN = NNN - 2 + LY
T = INT(YYYY / 100) - 6 - INT(YYYY / 400)
DOW = MOD((NNN + INT((YYYY * 5) / 4) - LY - T),7)

```

Example: 1996, Nov 1 results in NNN = 306, DOW = 5

Convert from YYYY,NNN to YYYY,MM,DD and determine day-of-week

Input: YYYY, NNN (1-366)

Output: MM, DD and DOW (0-6, 0=Sunday,etc)

```

IF MOD(YYYY,4) = 0 THEN LY = 1 ELSE LY = 0
IF MOD(YYYY,100) = 0 THEN LY = 0 IF MOD(YYYY,400) = 0
THEN LY = 1
* LY is 1 if it is a leap year
WORK = NNN
IF WORK > (LY + 59) THEN WORK = WORK + 2 - LY
MM = INT(((WORK + 91) * 100) / 3055)
DD = (WORK + 91) - INT((MM * 3055) / 100)
MM = MM - 2;
T = INT(YYYY / 100) - 6 - INT(YYYY / 400)
DOW = MOD((NNN + INT((YYYY * 5) / 4) - LY - T),7)

```



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Example: 1996, 306 results in Nov 1, DOW = 5

Convert from YYYY,NNN to Lilian

Day 1 of the Lilian date in these algorithms is Friday, 15 October 1582.

Input: YYYY, NNN (1-366) Output: LIL

```
LIL = INT(((YYYY - 1201) * 36525) / 100) -
      139444 + NNN -
      INT((YYYY - 1201) / 100) +
      INT((YYYY - 1201) / 400)
```

Example: 1996,306 results in LIL = 151229

Example: May 16, 1988, NNN = 137, results in LIL = 148138

Convert from Lilian to YYYY,NNN

Day 1 of the Lilian date in these algorithms is Friday, 15 October 1582.

Input: LIL Output: YYYY, NNN (1-366)

```
CLD = INT(((LIL + 139444) * 100) / 3652425)
NNN = CLD + LIL + 139444 - INT(CLD / 4)
WORK = INT((NNN * 100) / 36525)
IF MOD((NNN * 100), 36525) = 0 THEN WORK = WORK - 1
* (in some computer languages the 2 lines above can be
* implemented as divide 36525 into (NNN * 100) giving
* WORK remainder REM if REM = 0 then WORK = WORK - 1)
NNN = NNN - INT((WORK * 36525) / 100)
YYYY = WORK + 1201;
```

Example: 151229 results in YYYY = 1996, NNN = 306

Convert from Lilian to day-of-week

Input: LIL Output: DOW (0-6, 0=Sunday, 1=Monday, etc.)

```
DOW = MOD((LIL + 4), 7)
```

Example: 151229 (Nov 1, 1996, 306) results in DOW = 5

Convert from YYYY,MM,DD to YYYY,NNN

Input: YYYY, MM, DD Output: NNN

```
IF MOD(YYYY, 4) = 0 THEN LY = 1 ELSE LY = 0
IF MOD(YYYY, 100) = 0 THEN LY = 0
IF MOD(YYYY, 400) = 0 THEN LY = 1
* LY is 1 if it is a leap year
NNN = INT(3 / (MM + 1)) * (31 * (MM - 1) + DD) +
      INT((MM + 9) / 12) * (INT(((305 * (MM - 1) - 15) +
      INT((MM + 3) / 12) * 5 * INT(18 / MM)) / 10) +
      DD + LY);
```

Example: Nov 1, 1996 results in NNN = 306

Convert from YYYY,MM,DD to day-of-week

Input: YYYY, MM, DD

Output: day-of-week (0-6, 0=Sunday, etc.)

```
WDD = DD
IF MM < 3 THEN
  WMM = MM + 12
  WYYYY = YYYY - 1
ELSE
  WMM = MM
  WYYYY = YYYY
DOW = MOD((WDD + 1 + (WMM * 2) + INT(((WMM + 1) * 3) / 5) +
  WYYYY + INT(WYYYY / 4) -
  INT(WYYYY / 100) + INT(WYYYY / 400)), 7)
```

Example: Nov 1, 1996 results in DOW = 5

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Senator Bennett, I have three supercritical points for your attention:

- 1) When is a czar not a czar?
 - 2) The popular windowing solution is uncontrolled and dangerous.
 - 3) Existing standards for representing dates are insufficient.
- 1) The press to the contrary, a chairman of a Presidential Council is not a "czar". He has no powers derived from and assigned by the Congress. The press releases do not say that he has been given executive powers. Can he, for example, order the US Post Office to change the cancelling machinery to mark a 4-digit year followed by month, day and 24-hour time? Canada has already done most of this. Why not US? Can he impose rules for date data interchange that supersede the pitiful specifications of the GSA? Can he order businesses to change their practices?

My keynote speech for a Washington Y2K conference last December, which I faxed to you, said basically that we are in a situation comparable to the two great World Wars. And no person in charge is acting as if this were true. Where is the greatness of a Churchill?

- 2) I have asked repeatedly for the US Government standard for a very simple item. "For what value are 2-digit year numbers less than that value assumed to be in the next century?" No one can tell me. Millions of people are using such a method of repair, and they are using different such values! At a minimum can't we agree on a single value - say 50? Not doing so is a recipe for more disaster. Governments can set speed limits. Can't they set year limits?
- 3) Your example of a railway merger demonstrated brilliantly the disasters that can occur without standards. It was probably as simple as the first company having the ship date starting in column 16, whereas the ship date for the other company started in column 38, and nobody told the computer about it!

The GSA Federal Acquisition Regulation (applicable only to US Government purchases) is excerpted at the end of this paper. I can't say that it is laughable in this situation, although it otherwise qualifies as such.

So let's see how we did it for 2 digits, for the year (19)98:

0011 1001 0011 1000	PC octet form (ASCII)
1111 1001 1111 1000	IBM octet form (EBCDIC)
0000 1001 1000 1111	IBM packed decimal form #1
0000 1001 1000 1110	IBM packed decimal form #2, etc.
0110 0010	Anybody's binary form
1001 1101	Anybody's 2's complement binary

Now do the same to represent all four digits of the year 1998:

0011 0001 0011 1001 0011 1001 0011 1000	PC octet form (ASCII)	+4
1111 0001 1111 1001 1111 1001 1111 1000	IBM octet form (EBCDIC)	+4
0000 0001 1001 1001 1000 1111	IBM packed decimal form #1	+2
0000 0001 1001 1001 1000 1110	IBM packed decimal form #2, etc.	+2
0000 0111 1100 1110	Anybody's binary form	+2
1111 1000 0011 0001	Anybody's 2's complement binary	+2
1000 1001 0011 1000	V2K octet form (ASCII)	0
1000 1001 1111 1000	V2K octet form (EBCDIC)	0
0000 1001 1000 1000	V2K packed decimal form	0

Looks confusing, doesn't it? But the point is that ALL of these forms are valid and legal ways to represent a year value. When one agency sends year data to another, the question is "Which form?" And, with computers, such issues cannot be evaded.

The baseball dilemma -- "You can't tell the players without a scorecard" (with their numbers).

I invented the escape sequence in 1960, and it means more than just the key on the upper left of your keyboard. It is tailor-made to tell and indicate WHICH one of these forms is the one the original user used. If escape sequences can control screen color, laser printing, and change your screen to show Russian or Arabic, they can certainly discriminate unambiguously between ways we represent the date.

A white paper has existed on our WebVenue "bmrsoftware.com" since last October. It was dedicated to the GSA, and marked as in the public domain. It describes quite fully the way to solve this problem. But Ms Cynthia Warner of the GSA said she had only three people, and as of last December they had not enough time to even read it! Our Government is spending \$BILLIONS, and the GSA has only four people assigned?

The voluntary standards effort has not even addressed the problem of interchanging date data. Yet this is now agreed by all to be the most dangerous aspect of this entire problem! But their procedures are too cumbersome to do it now. There's little time left!

The US Government has an institution called NIST, for "National Institute for Standards and Technology". Note the word "Standards" in the name. Why doesn't the Congress order them to create the necessary standards, not just for the US Government, but for the US people, and for the people of the world who have the same problem? I'll be glad to show them just how to do it!

Bob Bemer

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Richardson, TX 75081

From FAR Final Rule, effective October 21, 1997. (sic)

39.002 Definitions.

* * * * *

"Year 2000 compliant, as used in this part, means, with respect to information technology, that the information technology accurately processes date/time data (including, but not limited to, calculating, comparing, and sequencing) from, into, and between the twentieth and twenty-first centuries, and the years 1999 and 2000 and leap year calculations, to the extent that other information technology, used in combination with the information technology being acquired, properly exchanges date/time data with it."

This is followed by the weasel words ...

"Solicitations and contracts should require ... that non-compliant information technology be upgraded to be compliant in a timely manner."

Senator, that's no way to run a railroad! Even a Government-only railroad.

UNIVERSAL DATE VALUE INTERCHANGE

R. W. Bemer, BMR Software (bmrsoftware.com)

Computers do only three things with date values. They

- 1) Take them in,
- 2) Do calculations and other manipulations based upon them.
- 3) Put them out, to display or another computer.

(2) is the tough part, where most of the Y2K problems lie, due to

- o Programs that operate upon them in myriad ways, often so poorly documented as to be ununderstandable, and
- o Again, their insufficient form (missing century).

(1) and 3) present more problems. The insufficiency, yes, but also the format/layout. Is a date for import (1) or export (3)

- o In YYMMDD or MMDDYY or DDDMMYY form?
- o In YYYYMMDD or MMDDYYYY or DDDMMYYYY form?
- o Encoded in decimal or binary numbers?
- o Encoded in some symbolic form other than direct numbers?
- o If decimal, 8 bits or 4 bits per digit of date?
- o If discrete binary, 16 bits or 8 bits per date unit?
- o If full binary, 32 bits or 16 bits per complete date?
- o Relative to some other date by a number of days?
- o Interspersed with delimiters and/or spaces?

But the big question is -- with all these possible and existing uses, how do we know which? More properly, how does a stranger know? We know, of course, because it's all implicit in the programs we are using.

WE CAN MOSTLY FIX (1) AND (3) FOR INTERCHANGE RIGHT NOW!

HERE IS HOW

Only one unflinching human method of demarking time exists. The earth rotates once each day. Has and will. Two more rotations make it two days later. Thus there is only one basic way to know the date. How many days is it from some starting date? Unsurprisingly such a method exists. It is called the Julian Day system. The Julian day for the first day of Year 1 A.D. had the value:

0001 = 1 721 475

For day 1 of the following centuries the Julian Day was/will be:

400 = 1 867 157	1700 = 2 341 973	2100 = 2 488 070
800 = 2 013 254	1800 = 2 378 497	2200 = 2 524 594
1200 = 2 159 351	1900 = 2 415 021	2300 = 2 561 118
1600 = 2 305 448	2000 = 2 451 545	2400 = 2 597 642

The leading digit doesn't change for 27 centuries. 12 centuries with a leading "2" have passed, and we have 15 more to go before the "2" rolls over to "3". So we don't need the leading "2". Imply it, and you ALMOST get what is called the Smithsonian Day (which is that value + 1). Call this value the Xchange Day (X Day). It has some lovely properties:

- o Scrap all of your leap year code. The 100- and 400-year leap year exceptions are built into the conversion formulas.
- o To get the day of the week, add 2 to the X Day value, divide by 7, and add 1 to the remainder (Monday=1).
- o One can't mistake the first two digits as month or day values, etc.
- o It needs the same space -- 6 zoned-, or 4 signed packed decimal-, or 3 unsigned packed decimal-bytes -- to accommodate 27 centuries as separate 2-digits for year and month and day do for just one century. Don't change your record formats; fill them differently.
- o This would accommodate the current minimum representation, due to Equifax, of 3 bytes, one each for discrete binary day, month, year. Full binary, which gets 16777216 in 3 bytes, can get only 65536 in 2 bytes, for a span of at most 179 years, which is not good enough.
- o Vertex 2000 TM has the same minimums, and we need that internally for now, but V2K dates are just as easily converted to X Days.

Let's make the X Day the gold standard, the lingua franca, the common denominator, the canonical form -- our salvation in the world of data interchange. Use it like Euro currency, one unit of which should be equivalent to so many lira, or dollars, or pounds, or francs, or rubles. But the Euro is artificially derived; days come from the real world.

So no matter what you use at home, in the world market you can use the X Day exclusively to represent the date.

What does that mean to us in the present crisis? We know it won't fix all programs an entity uses to run its enterprise, but it will surely work as the default medium of exchange. And exchange has two properties:

- 1) Businesses can most likely put an exact finger on the character of dates they input and output externally.
- 2) Everyone now realizes the greatest danger of the 2-digit year to be nonstandardized and unrecognizable interchange, which this cures.

Can the United States and the rest of the world profit NOW by using only the X Day for interchange?

- o Will this solve the Year 2000 problem? Definitely not.
- o Will it take the sting out of our coming collapse? Definitely yes.
- o Can it be done in time? With the right authority, a good chance.

What must be done? First we must get agreement to standardize this. If we wait for the GSA or business groups to agree, forget it! But suppose the Congress passes a law like this?

In date data interchange under private agreement between exporter and importer, both may represent the date in any way they agree to.

Absent such agreement, electronic interchange of year values must be done only in X Day form.

Converting X Day to all other forms, simple and compound, is easy. The formulas are known and simple (but I have copied them in an Appendix). I had planned for my company to make available to all, as a free public service, source and object computer programs, in the common computer languages, for translation to and from X Day from other forms such as calendar, ordinal, and fiscal dates.

But others have a huge debt to us users for being at fault for Y2K. Let's ask Microsoft to provide these as their gift to ameliorating this crisis, in compensation for having done it wrong in the first place. Imagine sitting at your PC:

```
C:\>time
Current time is 2:17:31.29p
Enter new time:
```

```
C:\>date
Current date is Wed 03-18-1998
Enter new date:
```

```
C:\>xday
Current X Day is 450891
```

```
C:\>dayo (or maybe we choose this name)
Bad command or file name
```

Let's ask Sun to contribute free Java applets for these rules. Let's ask IBM and UNISYS and others to provide all such routines free for their computers. They should respond gladly and soon. Or is patriotism dead? Or is self-interest going to be totally destructive?

Such a package would be applied by the sender just before sending, and by the receiver to convert to the form they need. Instead of talking face-to-face, interpose two translating telephones. Then when and if the standards people ever get around to deriving what I suggested in my White Paper to the GSA, they can use any other date form for which an escape sequence is registered.

Would I wish that every computer in the world processed dates in X Day form? I certainly would. It's absolutely the simplest and best way. And one would hope that for the future, once the present 2000 crisis is passed, that they all would be so programmed. I think it as critical a standard to set as ASCII (the ISO Code).

(SEE THE FORMULAS ON THE OTHER SIDE)

```
-----
| For questions, |
| call Bob Bemer |
| 972-671-5000   |
|-----
```

```
-----
| file is \Y2K\XDAY |
| prepared 1998-03-15 |
|-----
```

APPENDIX -- X DAY CONVERSION FORMULAS (integer arithmetic!)

XD=X Day value Y=4-digit year yyyy FY=fiscal year
 JD=Julian Day value M=2-digit month mm FW=fiscal week
 JD1=JD for January 01 D=2-digit day dd FD=fiscal day
 S,T=working OD=ordinal day FC=fiscal constant

My 1980 TEX program "DATE" adopted the following plan for conversions (that they may be further compacted to remove the "IF"s is obvious):

```

A) CAL_to_JD          do (1)
B) CAL_to_JD1        do (2)          (for 1st day of CAL year)
C) CAL_to_FIS        do (D) and (F)
D) CAL_to_ORD        do (4) and (5)          (CAL year known)

E) ORD_to_CAL        do (4) and (6)          (CAL year known)
F) ORD_to_FIS        do (7) and (9)
G) ORD_to_JD         do (2) and (JD=JD1+OD-1)

H) FIS_to_ORD        Y=FY do (7) and (8)          JD=XD+2000000
I) FIS_to_CAL        do (H) and (E)          XD=JD-2000000
J) FIS_to_JD         do (H) and (G)

-----
K) JD_to_CAL        do (3)          | For questions, |
L) JD_to_FIS        do (K) and (C)   | call Bob Bemer |
M) JD_to_ORD        do (K) and (D)   | 972-671-5000  |
-----

1)  S=(M-14)/12 ... T=D-32075+1461*(Y+4800+S)/4
    JD=T+367*(M-2-S*12)/12-3*((Y+4900+S)/100)/4

2)  JD1=1461*(Y+4799)/4-31378-3*((Y+4899)/100)/4

3)  T=JD+68569          --> M=80*T/2447
    S=4*T/146097          n      D=T-2447*M/80
    T=T-(146097*S+3)/4    e      T=M/11
    Y=4000*(T+1)/1461001 h      M=M+2-12*T
    T=T-1461*Y/4+31      t      Y=100*(S-49)+Y+T

4)  LEAP=1-(Y-Y/4*4+3)/4+(Y-Y/100*100+99)/100-(Y-Y/400*400+399)/400
    T=Y/4000 if remainder: eq:0 LEAP=0          (optional)

5)  OD=3055*(M+2)/100-(M+10)/13*2-91+LEAP*(M+10)/13+D

6)  T=OD+((305+OD-LEAP)/365)*(2-LEAP)
    M=((T+91)*100)/3055-2
    D=T+30-(M*3056)/100

-----
7)  do (2) ... T=JD1-JD1/7*7          | Wow! It would be so |
    FC=T+7-(T+3)/7*7                 | easy to build a chip |
-----
8)  OD=7*FW+FD-FC ... do (4)         | for these conversions |
    if OD:gt:(365+LEAP) Y=Y+1 OD=OD-365-LEAP | file is \Y2K\XDAY.APP |
    if OD:lt:1 Y=Y-1 do (4) OD=365+LEAP+OD | prepared 1998-03-15  |
    -----
9)  FY=Y ... FW=(OD+FC-1)/7
    FD=remainder+1
    if FW:eq:53 if (FC+LEAP):lt:10 FY=Y+1 FW=1
    if FW:eq:0 Y=Y-1 FY=Y do (4) Y=Y+1 FW=53-(FC+1-LEAP)/6
    
```

BLACK1

```
VB40016 DLL 935,632 08-15-95 12:00a VB40016.DLL
OC25 DLL 536,048 08-15-95 12:00a OC25.DLL
README TXT 710 07-24-98 4:22p readme.txt
XDAYCVT EXE 19,056 08-03-98 1:09p XDAYCVT.EXE
```

BLUE1

```
VB40016 DLL 935,632 08-15-95 12:00a VB40016.DLL
OC25 DLL 536,048 08-15-95 12:00a OC25.DLL
README 710 07-24-98 4:22p readme
RUN EXE 19,056 08-03-98 1:09p run.exe
```

- 1) copy all files on both disks to a directory
- 2) run xdaycvt.exe (RUN.EXE on blue diskettes)
- 3) enjoy

the algorithms are:

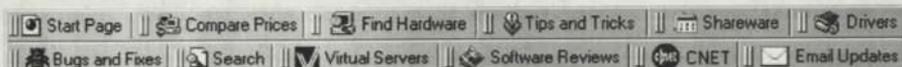
```
Public Sub date2xday()
  Dim t1, t2 As Long
  t1 = (theMonth - 14) \ 12
  t2 = theDay - 2032075 + (1461 * (theYear + 4800 + t1)) \ 4
  theXday = t2 + 367 * (theMonth - 2 - t1 * 12) \ 12 - 3 * ...
  ... ((theYear + 4900 + t1) \ 100) \ 4
End Sub
```

```
Public Sub xday2date()
  Dim t1, t2, t3, t4 As Long
  t1 = theXday + 2068569
  t2 = (4 * t1) \ 146097
  t1 = t1 - (146097 * t2 + 3) \ 4
  t3 = (4000 * (t1 + 1)) \ 1461001
  t1 = t1 - (1461 * t3) \ 4 + 31
  t4 = (80 * t1) \ 2447
  theDay = t1 - (2447 * t4) \ 80
  t1 = t4 \ 11
  theMonth = t4 + 2 - 12 * t1
  theYear = 100 * (t2 - 49) + t3 + t1
End Sub
```

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ECREW Timer	Version 1.5			Online Registration Not Yet Available		
	20-Jan-00	303K	Win 95/98/NT	Shareware \$20.00	Expiration Unknown	Install
	2 min at 28.8K		1 min at 56K		<1 min at ISDN 128K	
	Ecrew Timer is a full-featured graphic add-on for the Windows Taskbar's standard clock. It includes an alarm, a cuckoo sound, desktop corner anchors, and changeable screen positions, fonts, colors, and time and date formats. This version has a limited number of alarms.					
	Published by Anatoly			ECREW Timer Home Page		

TimeNode	Version 1.0			Online Registration Not Yet Available		
	20-Jan-00	4,392K	Win 98/NT	Shareware	Expiration Unknown	Install & Uninstall
	27 min at 28.8K		10 min at 56K		5 min at ISDN 128K	
	TimeNode allows your computer time to be synchronized from atomic clocks over the Internet. TimeNode can also become a server and redistribute this time to a network of downstream computers to maintain a time synchronization network. Runs as Icon on System Tray.					
	Published by Mike Waldo/GeoSoft Development Group			TimeNode Home Page		

Whatime	Version 2.0			No Registration Required		
	20-Jan-00	17K	Win 95/98/NT	Freeware	Never Expires	Install & Uninstall
	<1 min at 28.8K		<1 min at 56K		<1 min at ISDN 128K	
	A must have for those with international friends, buisness, or family. This program allows you to see what time it is in any time zone, without hogging precious desktop space. It simply puts an entry on your task bar that contains the user specified label, and applies the desired hour and minute shift to the current time. This small download will work fine on any comuter with VB 5.0 runtimes present. If you do not have these runtimes, you can download the full program with runtimes at the homepage. Most computers have these runtimes already installed, so the small download should be fine. The new version has the ability to start automatically with any preset configuration. Enjoy! Requires the VB 5.0 Runtimes .					
	Published by Andrew Baker			Whatime Home Page		

 JogglerPlus	Version 4.4				Register Now	
	19-Jan-00	3,780K	Win 95/98/NT	Shareware \$17.00	Expires after 14 Days	Install & Uninstall
	24 min at 28.8K		8 min at 56K		4 min at ISDN 128K	
	A timer utility program for Windows 95, 98 and NT. It is similar in use to a kitchen timer, but contains many features for the advanced user providing three independent actions that can be taken upon interval expiration. The number of timers that you can have active at a given time is limited only by the availability of system resources. You have complete control of each individual timer and groups of timers through settings.					
Published by Leepware			JogglerPlus Home Page			

 SetTime32	Version 2.20				Online Registration Not Yet Available	
	19-Jan-00	1,307K	Win 95/98/NT	Shareware \$19.95	Expires after 45 Days	Install & Uninstall
	8 min at 28.8K		3 min at 56K		1 min at ISDN 128K	
	Updates your computer's time from NIST's Internet time service. Automatically calculates your computer clock's drift rate and schedules time checks to keep you clock accurate. Several automatic and manual modes. Runs quietly in the background. Just install and let it do its work!					
Published by Tony Isaac			SetTime32 Home Page			

 WebTime for Windows 95/NT	Version v2.7				No Registration Required	
	19-Jan-00	74K	Win 95/98/NT	Freeware	Never Expires	Install
	<1 min at 28.8K		<1 min at 56K		<1 min at ISDN 128K	
	A small utility program that will synchronize your PC's internal clock with one of the several atomic clocks maintained by the United States National Institute of Standards and Technology.					
Published by Gregory Braun			WebTime for Windows 95/NT Home Page			

 WorldTime	Version 5.3.0.606				No Registration Required	
	15-Jan-00	3,877K	Win 95/98/NT	Freeware	Never Expires	Install & Uninstall
	24 min at 28.8K		9 min at 56K		4 min at ISDN 128K	
	A World clock with Local, UTC, and 8 other configurable clocks, each with it's own time zone, Daylight savings time rule and description. Uses the Network Time Protocol (NTP) to synchronize your computers system time (UTC) to any internet time source. Calculates and displays the Julian Date, unlimited stopwatches accurate to 1/100 sec with unlimited LAP times that only display if used, and a module that tracks the amount of time since or until any specified date down to the second.					
Published by Paw Print Graphics			WorldTime Home Page			

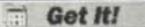
 Alarm Clock	Version 1.35				No Registration Required	
	12-Jan-00	2,301K	Win 95/98/NT	Freeware	Never Expires	Install & Uninstall
	14 min at 28.8K		5 min at 56K		3 min at ISDN 128K	
	This is a simple, yet cool looking, alarm clock / variable timer for Windows 95/98/NT. Includes help file.					
Published by Thad Hogan			No Home Page Available			

 VAKCER Project Tracker PE	Version 2.0.101				Online Registration Not Yet Available	
	12-Jan-00	797K	Win 95/98/NT	Demo \$65.00	Expires after 21 Days	Install & Uninstall
	5 min at 28.8K		2 min at 56K		1 min at ISDN 128K	
	Keeps track of running applications and open documents and records time spent on them automatically. There's no need to start and stop timer. VPT detects more than 200 popular applications such as illustration, image editing, web design, word processing, communication, file management and much more. The list of supported applications now stored in separate files allowing to configure the list easily. Supports more than 200 applications and has enhanced program tracking algorithm as well as auto backup					

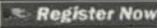
and autosave project features. VPT also calculates project cost based on hourly rates for each application. Project reports can be viewed and printed with a click of a mouse.

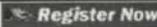
Published by **VAKCER Corporation**

[VAKCER Project Tracker PE Home Page](#)

 Horas	Version 3.11				Online Registration Not Yet Available	
	11-Jan-00	340K	Win 95/98/NT	Shareware \$15.00	Expires after 30 Days	Install & Uninstall
	2 min at 28.8K		1 min at 56K		<1 min at ISDN 128K	
	<p>Horas helps you keep track of the time around the world by letting you create several clocks corresponding to different time zones. Horas has many features including the automatic adjustment of your computer clock, a time converter, a time lookup tool, and it takes very little space on your desktop.</p>					
Published by Basta Computing				Horas Home Page		

 CountDown	Version 1.0				Online Registration Not Yet Available	
	04-Jan-00	568K	Win 95/98/NT	Shareware \$10.00	Expires after 30 Days	Install & Uninstall
	4 min at 28.8K		1 min at 56K		1 min at ISDN 128K	
	<p>Count Down is a program originally intended just to count down to the year 2000. However, as the year drew on, and that purpose became less and less important, it was developed into a true countdown program, which takes events, and names them, and then you can cycle through them and see when they will come to pass. It displays the time remaining in an LED Panel sort of style, which will allow you to edit, change and add new events to it.</p>					
Published by Joshua Butcher				CountDown Home Page		

 CountDown	Version 5.0					
	04-Jan-00	1,953K	Win 95/98/NT	Shareware \$9.00	Expires after 21 Uses	Install & Uninstall
	12 min at 28.8K		4 min at 56K		2 min at ISDN 128K	
	<p>CountDown is a timer utility that counts the time down to your specified entry and then sounds an alarm (WAV file) and shows you a visual message. Two timers, which can be run simultaneously, are included. A stopwatchlike feature also allows you to track time, such as how long you've been online or working on a specific task.</p>					
Published by Ron Grau				CountDown Home Page		

 Speaking Clock Deluxe	Version 2.01					
	30-Dec-99	1,442K	Win 95/98/NT	Shareware \$15.00	Expiration Unknown	Install & Uninstall
	9 min at 28.8K		3 min at 56K		2 min at ISDN 128K	
	<p>A very competent clock which tells the time in many different languages (English is included, many more languages can be freely downloaded). The clock also has a multiple alarm system, so you can have up to 50 different alarms, with the possibility of announcing the time, playing any wave file or even starting another program. The alarms can be set to go off once or be repeated daily, weekly, monthly or yearly. In addition it also features a time synchronization function, choice of two digital displays and one analog display and a very attractive interface design. The clock can be minimized in the system tray (where it also shows the time) and be set to start when Windows starts.</p>					
Published by Leif Porskev				Speaking Clock Deluxe Home Page		

 MFAC	Version 1.0			No Registration Required		
	28-Dec-99	174K	Win 95/98/NT	Freeware	Never Expires	No Install
	1 min at 28.8K		<1 min at 56K		<1 min at ISDN 128K	
	You need a clock that is relatively small on your desktop ? It should have an alarm function also ? You need a tool for an count down or count up, both 100% free configurable.					
Published by TwinSoft				No Home Page Available		

 Multi Timer	Version 1.0			No Registration Required		
	28-Dec-99	115K	Win 95/98/NT	Freeware	Never Expires	No Install
	1 min at 28.8K		<1 min at 56K		<1 min at ISDN 128K	
	Ten independent Timers in one program, to count down to zero or up to max. 100 hours, with 1 second accuracy. Timers can be viewed one by one or all at once. Timers can resume on a later computer session, all settings are remembered from the previous time ran. Sound signal (optional) and blinking message window (cannot be hidden with other windows) with user-defined message on alarm.					
Published by Johannes Wallroth				Multi Timer Home Page		

 World-time Countdown Clock	Version 1.1			Online Registration Not Yet Available		
	28-Dec-99	1,423K	Win 95/98/NT	Shareware \$20.00	Expiration Unknown	Install & Uninstall
	9 min at 28.8K		3 min at 56K		2 min at ISDN 128K	
	A beautiful world map clock and it's always right there when you need it. 1-click on its task bar icon opens a satellite map of the world with three clocks showing time around the world. Click on any of over 50 major cities to see its timezone and set one of the three clocks to show its time continuously. The map also shows the day and night regions of the world. Watch the sunrise creeping around the Earth. On registration you can set a date to which a banner counts down with a message of your own and enter a second text message which scrolls across the window.					
Published by Silkmoth plc				World-time Countdown Clock Home Page		

 @NetClock Time Server	Version 1.00b			Online Registration Not Yet Available		
	24-Dec-99	413K	Win 95/98/NT	Shareware \$79.00	Expires after 15 Days	Install & Uninstall
	3 min at 28.8K		1 min at 56K		<1 min at ISDN 128K	
	@NetClock gives you the ability to have the Date/Time on all of your networked PC's correct at all times. @NetClock is an Internet standards SNTP Time Server system specifically designed for PC networks/intranets. It provides everything you need to obtain the correct Date/Time from any Internet Atomic clock, and then keep the clocks on all of your networked PC's set to the correct Date and Time at all times.					
Published by NetcPlus Internet Solutions Inc				@NetClock Time Server Home Page		

 KaTimeClock	Version 1.9.1.65			Online Registration Not Yet Available		
	24-Dec-99	610K	Win 95/98/NT	Shareware \$100.00	Expires after 30 Days	No Install
	4 min at 28.8K		1 min at 56K		1 min at ISDN 128K	
	KaTimeClock is a timeclock designed specifically for small businesses. It supports the following features: ** Continuous Filing Technology ** Independent Employee Passwords ** Easy clock-in/clock-out ** Simple Administration ** Runs under Windows 95, 98, NT 4.0, and Windows 2000 RC2					
Published by KAST				KaTimeClock Home Page		

 CC Clock	Version 3.1.22			Online Registration Not Yet Available		
	23-Dec-99	1,500K	Win 95/98/NT	Shareware \$20.00	Expiration Unknown	Install & Uninstall
	9 min at 28.8K		3 min at 56K		2 min at ISDN 128K	
	The Courteous Clock! An intelligent, customizable desktop clock/calendar app that gets out of your way. Will chime, post reminders, start programs, shut down windows and more. Will display seconds, analog or digital.					
Published by cadman			CC Clock Home Page			

 Chameleon Clock	Version 2.11			Register Now		
	18-Dec-99	1,187K	Win 95/98/NT	Shareware \$24.95	Never Expires	Install & Uninstall
	7 min at 28.8K		3 min at 56K		1 min at ISDN 128K	
	The only skinnable digital clock that totally replaces Windows tray clock and thus does not eat any desktop space. Enjoy customising its look using Winamp skins and bitmap digits - there are more than 3000 of them available. It always keeps exact time by synchronizing your clock with Internet Time Servers. Need to be reminded to make a call, go to a meeting, or just not to miss a TV program? Try the alarm feature that makes messages using MP3, WAV, MIDI, and CD-Audio sounds, opens applications/documents, and shuts down your PC at the specified time. It's also very handy to have a calendar, both floating and in the Tooltip, and time zones support. There is also one feature that you probably will not want others to see, and that's why it cannot be described here.					
Published by Jury Gerasimov			Chameleon Clock Home Page			

 EldoS Clock	Version 3.14			Register Now		
	01-Dec-99	1,150K	Win 95/98/NT	Shareware \$19.95	Expiration Unknown	Install & Uninstall
	7 min at 28.8K		3 min at 56K		1 min at ISDN 128K	
	EldoS Clock shows the time in multiple time zones at the same time. It also shows different system information (memory usage, drive space etc.). EldoS Clock includes Advanced Calendar, LaunchPad, regular and countdown timers, alarms and reminders system and Taskbar Clock replacement. Includes Time Zone Editor, that allows you to add, remove and modify Windows time zone records and fix errors in them. EldoS Clock includes plugins support, so adding additional features is quick and easy.					
Published by EldoS			EldoS Clock Home Page			

 Clock G2	Version 3.1			Online Registration Not Yet Available		
	30-Nov-99	600K	Win 95/98/NT	Shareware \$10.00	Never Expires	Install
	4 min at 28.8K		1 min at 56K		1 min at ISDN 128K	
	PC clock synchronizer, desktop clock and screen saver. Synchronize your PC clock automatically with popular Internet Atomic time servers. Desktop display options include analog, digital, millennium, world analog and world digital.					
Published by GetWare			Clock G2 Home Page			

 WebTimeSync	Version 3.1			No Registration Required		
	27-Nov-99	388K	Win 95/98/NT	Freeware	Never Expires	Install & Uninstall
	2 min at 28.8K		1 min at 56K		<1 min at ISDN 128K	
	connects to one of the NIST time servers to get the current time for your system. Version 3.1 adds startup at system startup, fixes a bug in the Apply button code of the Options dialog and adds a few minor stability improvements as well. Requires the VB 6.0 Runtimes .					
Published by VicTech			WebTimeSync Home Page			

 Hamsin Clock	Version 1.01			No Registration Required		
	24-Nov-99	408K	Win 95/98/NT	Freeware	Never Expires	No Install
	3 min at 28.8K		1 min at 56K		<1 min at ISDN 128K	
Hamsin Clock is a completely customizable digital desktop clock with a powerful alarm system. The program allows selecting color, font and opaque/transparent mode.						
Published by Sergey V. Popov			Hamsin Clock Home Page			

 World Time Clock	Version 2.1			No Registration Required		
	24-Nov-99	481K	Win 95/98/NT	Freeware	Never Expires	Install & Uninstall
	3 min at 28.8K		1 min at 56K		1 min at ISDN 128K	
The program shows the time of five different timezones, with analog and digital clocks. Choose from a list of 150 countries and 400 cities and define 5 countries/cities of your own. Correctly implemented daylight savings time rules.						
Published by Johannes Wallroth			World Time Clock Home Page			

 Kilroy's Clock	Version 2.0			No Registration Required		
	22-Nov-99	1,569K	Win 95/98/NT	Freeware	Never Expires	Install & Uninstall
	10 min at 28.8K		3 min at 56K		2 min at ISDN 128K	
A clock that allows the user to change the color of most stuff in the app. It also has the ability to open pictures. Has all required files in setup!						
Published by Jeff			Kilroy's Clock Home Page			

 UK Speaking Clock	Version 7.2.0			Online Registration Not Yet Available		
	19-Nov-99	45K	Win 95/98/NT	Shareware \$15.00	Expires after 15 Days	Install Unknown
	<1 min at 28.8K		<1 min at 56K		<1 min at ISDN 128K	
Speaking Clock is a desktop clock that uses one or two Microsoft Agent characters of your choice to announce the time and date, and to act out various expressions relating to the clock. It can automatically announce the time at intervals you specify or on demand. You can set five independent alarms, each of which can launch a program and announce a message. Skins let you customize the clock and date's appearance.						
Published by UK Software			UK Speaking Clock Home Page			

 Clock	Version 1611			No Registration Required		
	17-Nov-99	59K	Win 95/98/NT	Freeware	Never Expires	No Install
	<1 min at 28.8K		<1 min at 56K		<1 min at ISDN 128K	
Simple, but nice alarm clock. Can change skins. Can synchronise time with Internet servers. There are no any documentation or controls, in order to change anything look into .cfg files.						
Published by Alex Artamonov			Clock Home Page			

 PACT ShowTime	Version 2000					
	16-Nov-99	2,913K	Win 95/98/NT	Shareware \$14.00	Never Expires	Install & Uninstall
	18 min at 28.8K		6 min at 56K		3 min at ISDN 128K	
Movable date and time display, with phase of moon, highly configurable! Taskbar tray icon with 2-line display, e.g. with date and day of week. Alarm, countdown, hour signal, world times, integrated notes editor.						
Published by PACT Software			PACT ShowTime Home Page			

 Reminder	Version 1.0			No Registration Required		
	13-Nov-99	348K	Win 95/98/NT	Freeware	Never Expires	No Install
	2 min at 28.8K		1 min at 56K		<1 min at ISDN 128K	
To keep you from forgetting those tasks you have to do, Reminder will pop up and tell you at the time you need to do them so that you don't forget.						
Published by Zero Alpha			Reminder Home Page			

	Version 1.5				Register Now	
	03-Nov-99	149K	Win 95/98/NT	Shareware \$10.00	Expires after 15 Days	Install & Uninstall
	1 min at 28.8K		<1 min at 56K		<1 min at ISDN 128K	
	A network time protocol client that calibrates the system time of your computer with a timeserver on the Internet. Features include automatic selection of the closest server, scheduled time synchronization, taskbar tray support and easy-to-use and attractive user interface.					
Published by Sami Tolvanen				Sync-It with Atom Home Page		

	Version 1.0				No Registration Required	
	02-Nov-99	960K	Win 95/98/NT	Freeware	Never Expires	Install & Uninstall
	6 min at 28.8K		2 min at 56K		1 min at ISDN 128K	
	TimeLeft is a countdown/stopwatch clock using Winamp skins to show digits. TimeLeft counts how much time (year, months, days, hours, minutes and seconds) is left of any given deadline. You can customize alarm time, alert message text, icon, etc.					
Published by Kyrylo Nesterenko				Time Left Home Page		

	Version 1.5				No Registration Required	
	02-Nov-99	10K	Win 95/98/NT	Freeware	Never Expires	No Install
	<1 min at 28.8K		<1 min at 56K		<1 min at ISDN 128K	
	ZULU quickly calculates what time it is in other time zones. Ideal for communication by phone, IRC, ICQ, AIM, etc., to help you determine the current local time for the person you are communicating with. Also very handy for purposes where you need ready access to Greenwich Mean Time (GMT). Requires VB5 runtimes.					
Published by LoafieWare				ZULU Home Page		

	Version 1.0				Online Registration Not Yet Available	
	01-Nov-99	719K	Win 95/98/NT	Shareware \$10.00	Never Expires	Install & Uninstall
	4 min at 28.8K		2 min at 56K		1 min at ISDN 128K	
	Prevent your computer from processing time beyond a certain date. There are two dates which may potentially cause problems with different software applications: December 31, 1999 to January 1st, 2000, and February 28th to February 29th, 2000 (Leap Year).					
Published by Labyrinth Software				Hold Back Time Home Page		

	Version 1.2				No Registration Required	
	30-Oct-99	344K	Win 95/98/NT	Freeware	Never Expires	No Install
	2 min at 28.8K		1 min at 56K		<1 min at ISDN 128K	
	Stop Watch has all the features of a real stop watch.					
Published by Zero Alpha				Stop Watch Home Page		

	Version 1.2				No Registration Required	
	28-Oct-99	344K	Win 95/98/NT	Freeware	Never Expires	No Install
	2 min at 28.8K		1 min at 56K		<1 min at ISDN 128K	
	StopWatch has all the features of a real stopwatch.					
Published by Zero Alpha				StopWatch Home Page		

 CLOX Worldwide Clocks	Version 2000.7.0				Online Registration Not Yet Available	
	27-Oct-99	2,565K	Win 95/98/NT	Shareware \$10.00	Never Expires	Install & Uninstall
	16 min at 28.8K		6 min at 56K		3 min at ISDN 128K	
	An international clocks applet which displays a row of analogue and digital clocks which show the times in user-selected locations around the world. Clocks can be set using a clickable map but manual override is possible. In addition to the times, the day in each location is also given to avoid confusion. Setting daylight saving times is simplified and registered users receive updated information, internet support and other benefits. All in all CLOX is a very neat, simple to use way of knowing exactly what time it is anywhere on earth. Includes a calendar and alarm and can automatically adjust your system time via the internet.					
Published by Ian Tragen			CLOX Worldwide Clocks Home Page			

 Y2KCountdown	Version 2.0				No Registration Required	
	26-Oct-99	220K	Win 95/98/NT	Freeware	Never Expires	No Install
	1 min at 28.8K		<1 min at 56K		<1 min at ISDN 128K	
	Customizable utility that counts down to Y2K.					
Published by SurfWare			Y2KCountdown Home Page			

 Christmas 1999	Version 2.0				No Registration Required	
	23-Oct-99	3,460K	Win 95/98/NT	Freeware	Expires on 12/26/99	Install & Uninstall
	22 min at 28.8K		8 min at 56K		4 min at ISDN 128K	
	Christmas 1999 counts down the days, hours, minutes, and seconds until Christmas. The program lets you create and manage Christmas lists of items to buy, and who to buy them for. These lists can be password protected. Christmas 1999 also enables you to go shopping on-line, download Christmas stuff, or send e-greeting cards. In addition, the program includes a calendar.					
Published by Focusmedia Interactive			Christmas 1999 Home Page			

 Bobb's Y2K Countdown Special Edition	Version 1.0				No Registration Required	
	22-Oct-99	500K	Win 95/98/NT	Freeware	Expires on 1/2/00	Install
	3 min at 28.8K		1 min at 56K		1 min at ISDN 128K	
	Countdown timer til midnight january first 2000 with a few added features.					
Published by Bobb Voigt			Bobb's Y2K Countdown Special Edition Home Page			

 New Year Countdown	Version 1.0				No Registration Required	
	19-Oct-99	1,900K	Win 95/98/NT	Freeware	Never Expires	Install & Uninstall
	12 min at 28.8K		4 min at 56K		2 min at ISDN 128K	
	This program is a little countdown timer until the new year of every year. It displays will show you how many days-hours-minutes-seconds there are left in the year.					
Published by Joseph Martin			No Home Page Available			

 The PC Timer	Version 3.0				Online Registration Not Yet Available	
	12-Oct-99	1,817K	Win 95/98/NT	Shareware \$7.95	Expires after 20 Days	Install & Uninstall
	11 min at 28.8K		4 min at 56K		2 min at ISDN 128K	
	An easy to use countdown timer. Just enter the length of time you desire, and click the start button. Minimizes to, and runs quietly in, the system tray. Reappears, and sounds an alarm, when the timer ends. Manage the time you spend working or playing on the computer more efficiently. Whether you need to be reminded to turn off the stove, or for setting a time limit on how long your children spend on the computer. The PC Timer is the answer!					
Published by Buffalo Software			The PC Timer Home Page			

 Joggler	Version 5.1		Register Now			
	05-Oct-99	3,746K	Win 95/98/NT	Shareware \$12.00	Expires after 14 Days	Install & Uninstall
	23 min at 28.8K		8 min at 56K		4 min at ISDN 128K	
	A timer utility program for Windows 95. It is somewhat like a kitchen timer, but much more. Using it, you can be reminded every 20 minutes to perform your stretching exercises; to remind yourself to call Melissa in 30 minutes; to keep track of the time you spend on a task; or do all three by running multiple instances of Joggler at the same time.					
Published by Leepware			Joggler Home Page			

 TimeSlice	Version 1.3.0		Online Registration Not Yet Available			
	02-Oct-99	1,718K	Win 95/98/NT	Shareware \$40.00	Expiration Unknown	No Install
	11 min at 28.8K		4 min at 56K		2 min at ISDN 128K	
	Automates the task of tracking your time and billing for hourly work. You can list clients, projects and/or categories with applicable rates, then start timing when you begin work. An expense amount can be added to each time entry. You can easily add time entries when you have been working away from your computer. TimeSlice allows you to bill by minutes or tenth, quarter, half, or whole hour and then generate invoices or reports for any set of time recorded. You can bill time against clients, projects, or specific tasks and keep notes on exactly what you're doing. TimeSlice data can be exported to database, spreadsheet, word processing programs so that you can create custom invoices and reports. TimeSlice stays out of your way while you work on your computer by providing the ability to command the timer and edit active time entries while TimeSlice is minimized.					
Published by Maui Software			TimeSlice Home Page			

 Timeless Time & Expense	Version 1.32		Online Registration Not Yet Available			
	27-Sep-99	1,420K	Win 95/98/NT	Shareware \$42.99	Expires after 30 Days	Install & Uninstall
	9 min at 28.8K		3 min at 56K		2 min at ISDN 128K	
	Designed to track time and expenses without taking all a lot of time. Timeless Time & Expense allows you to easily track time at a fine level of detail by project and/or activity. With Timeless Time & Expense's flexible reporting capability, you get the information needed to accurately estimate time and costs on future tasks in addition to accurate billing information. Also includes Invoice reports, To Do list and International support for Time, Date and Currency formats.					
Published by MAG Softwrx			Timeless Time & Expense Home Page			

 Multilingual Speaking Clock	Version 1.3		No Registration Required		
	22-Sep-99	867K	Win 95/98/NT	Freeware	Never Expires No Install
	5 min at 28.8K		2 min at 56K		1 min at ISDN 128K
	The Multilingual Speaking Clock is a freeware program that turns your expensive multimedia computer into a \$9.95 speaking alarm clock! It has a nice graphical frontend that mimics a LC-display, it can speak in different languages and it has an alarm for reminding you at a preset time.				
Published by Leif Porsklev			Multilingual Speaking Clock Home Page		

 RovoClock	Version 1.0		No Registration Required		
	29-Aug-99	819K	Win 95/98/NT	Freeware	Never Expires Install & Uninstall
	5 min at 28.8K		2 min at 56K		1 min at ISDN 128K
	Part of the upcoming RovoScape Accessories set. It is the only component of the accessory set to be freeware. RovoClock is not an ordinary clock, it's an attractive (in our opinion) looking one. The clock features plastic looking panels and clock arms and a smooth illustrative, non-standard, user interface. It also features as functionality a Y2K countdown (in seconds) and 3 starter buttons to start up apps and web links. It can be also set to stay on top of other windows.				

Published by RovoScape Software		RovoClock Home Page	
 Candy Clock	Version 1.0		No Registration Required
	27-Aug-99	650K	Win 95/98/NT Freeware
	4 min at 28.8K	1 min at 56K	Never Expires Install & Uninstall 1 min at ISDN 128K
A colourful and highly configurable desktop clock program. The background for the clock can be loaded in from a graphics file, most common formats are supported including animated GIFs. The hands, border and numbers can then be modified to compliment the background and then all the settings saved into a small ascii file which can be reloaded at a later stage. Candy Clock comes with a variety of ready made clocks, and new ones can easily be created using clip art, graphics from the web etc.			
Published by Gallicrow Software		Candy Clock Home Page	
 Chasiki	Version 1.5.3b		No Registration Required
	26-Aug-99	25K	Win 95/98/NT Freeware
	<1 min at 28.8K	<1 min at 56K	Never Expires No Install <1 min at ISDN 128K
This nice clock lies on your desktop and doesn't bother you. Now you can hide the button (it jars on somebody). Setting of the right time will take you a moment (click the button 'Sec00' or 'Set'). If you click the right button of your mouse on the clock then the menu appears. Now you can change the font, colors and format of date type. The indication of the clock and the date corresponds to the Windows setting.			
Publisher Unknown		Chasiki Home Page	
 Alarm Clock	Version 1.0.5		No Registration Required
	25-Aug-99	9K	Win 95/98/NT Freeware
	<1 min at 28.8K	<1 min at 56K	Never Expires No Install <1 min at ISDN 128K
A simple alarm clock program I came up with in Visual Basic 6. Set the alarm to the time you desire, and then at that time the computer will loop your default sound until you shut it off again. Be sure to read the readme file!			
Published by Dynasty Productions		Alarm Clock Home Page	
 Tardis	Version 1.1		Online Registration Not Yet Available
	25-Aug-99	980K	Win 95/98/NT Shareware \$20.00
	6 min at 28.8K	2 min at 56K	Expiration Unknown Install & Uninstall 1 min at ISDN 128K
Within a closed Intranet it can operate to ensure that all PCs agree on the time. If you have ever tried to develop applications across more than one PC you will know the problems caused by machines having a different idea of what time it is, or even what day in some cases!			
Published by H.C. Mingham-Smith		Tardis Home Page	
 Project TimeClock	Version 1.5.3		No Registration Required
	22-Aug-99	1,013K	Win 95/98/NT Freeware
	6 min at 28.8K	2 min at 56K	Never Expires Install 1 min at ISDN 128K
Excellent Project, Task, or DayCare TimeClock. Keeps track of time spent on tasks. Each task can have its own Charge amount \$/hour. Very Configurable. Can generate, save and print reports. Reports can be monthly, weekly or daily. For those tracking Government projects, time can be tracked in tenths of an hour if you wish. Very friendly, it remembers the settings and modes that it was last used in. Completely FREE for ALL Users. Email me if you like it!			
Published by Chad Capps		Project TimeClock Home Page	

 Talking Agent Clock	Version 1.5			No Registration Required		
	20-Aug-99	1,919K	Win 95/98/NT	Freeware	Never Expires	Install & Uninstall
	12 min at 28.8K		4 min at 56K		2 min at ISDN 128K	
	Uses Microsoft Agents characters to speak the time and messages that you can assign to alarms. Microsoft Agents are part of the Windows 2000 operating system. You can install Microsoft Agents under Windows 95/98/NT by downloading the Agent 2.0 core components, text to speak engine, and Agent character files from the Microsoft Agents website.					
Published by Guy Campbell/Terry Wood/Mary Mills			Talking Agent Clock Home Page			

 Time	Version 1.0			No Registration Required		
	20-Aug-99	1,424K	Win 95/98/NT	Freeware	Never Expires	Install
	9 min at 28.8K		3 min at 56K		2 min at ISDN 128K	
	A simple updating Time displaying program. With Copy, Color, Pause, and other options. A small, useful program.					
Published by Wes DeMoney			Time Home Page			

 40tude Time	Version 1.0			Online Registration Not Yet Available		
	18-Aug-99	2,513K	Win 95/98/NT	Shareware \$19.95	Expires after 30 Days	Install & Uninstall
	16 min at 28.8K		6 min at 56K		3 min at ISDN 128K	
	Synchronizes your system clock through an Internet Timeserver, is a replacement for the standard Windows tray clock, enhancing it by showing the current time at locations around the world, renders a breathtaking photo-realistic image of the current illumination on earth that can be used as the desktop wallpaper and in the screensaver that comes with the program and gives you information about public holidays in countries around the world.					
Published by 40tude Software			40tude Time Home Page			

 Proj Clock	Version 3.04			Online Registration Not Yet Available		
	18-Aug-99	1,298K	Win 95/98/NT	Shareware \$45.00	Expires after 30 Days	Install & Uninstall
	8 min at 28.8K		3 min at 56K		1 min at ISDN 128K	
	A project time tracking system that runs in the Windows system tray. Proj Clock is a useful utility for anyone who must keep track of time billed to different projects. Time can be punched in and out for each project. A running total displays the total time billed to each project for the day. A history database is kept to record all time transactions. Reports summarize all billed project time in the given time period. Data may be viewed by saveable SQL calls. Proj Clock Pro is multi-user network ready and has user-customizable reports.					
Published by CyberMatrix Corporation Inc.			Proj Clock Home Page			

 Binary Clock	Version 1.0			No Registration Required		
	15-Aug-99	1,490K	Win 95/98/NT	Freeware	Never Expires	Install & Uninstall
	9 min at 28.8K		3 min at 56K		2 min at ISDN 128K	
	Displays the time in Binary format, using images of LED's (Light Emitting Diodes) to represent real ones (Duh...) creates different patterns to represent the time. Interesting and cool to look at, especially once you learn how to read it!! ;) A tutorial is built into the program.					
Published by Dark Eclipse			Binary Clock Home Page			

 Chrono	Version Release 2 Beta			No Registration Required		
	11-Aug-99	989K	Win 95/98/NT	Freeware	Never Expires	Install & Uninstall
	6 min at 28.8K		2 min at 56K		1 min at ISDN 128K	
	Answers the need for a fast, simple utility that displays the current time or date. It can be used either as a replacement for the clock in the system tray, or as a companion -- for those situations when you're in the eleventh hour and need constant watch over the current time. With its customizable interface and flexible mix of settings, it can be configured to suit almost any need. Support time display in 12/24 hour format with/without AM/PM symbols, and date display.					
Published by Chanh-Duy Tran			Chrono Home Page			

 Voice Clock	Version 1.1			No Registration Required		
	09-Aug-99	8,020K	Win 95/98/NT	Freeware	Never Expires	Install & Uninstall
	50 min at 28.8K		18 min at 56K		9 min at ISDN 128K	
	Digital clock that supports auto-resizing skins with transparency! Has voice plug-ins that can automatically speak the time every 1, 15, 30, or 60 minutes. It can also automatically set your PC's time using the internet time server of your choice. Has alarms with ability for pre-reminders so many days in advance and snooze buttons. You can make an alarm a reoccurring reminder (never forget a birthday!). On alarms it can SPEAK ANY PHRASE, show a message, launch files, shutdown, reboot, log off, or flash the clock. You can also hide the clock and show a tray icon instead.					
Published by Jeff L. Williams			Voice Clock Home Page			

 Time Meter	Version 1.00			No Registration Required		
	08-Aug-99	171K	Win 95/98/NT	Freeware	Never Expires	No Install
	1 min at 28.8K		<1 min at 56K		<1 min at ISDN 128K	
	Time Meter was developed to provide a quick way to count the time. No Stopwatch. No Save.					
Published by Tong Naraktisood			Time Meter Home Page			

 HyperTime	Version 1.0			No Registration Required		
	07-Aug-99	2,560K	Win 95/98/NT	Freeware	Never Expires	Install
	16 min at 28.8K		6 min at 56K		3 min at ISDN 128K	
	Lets you assign sound files (wav, midi, or MPEG) to times. Use it as an audible clock, or just a friendly reminder. Download our collection of bird sounds and in seconds, and you'll have a lovely sounding bird clock! With HyperTime, you can specify sounds that play at the top of each hour, every half hour, or every 15 minutes. You can even have a special sound play at the time you specify - a great way to remind you of a meeting, appointment, or your favorite net show!freely.					
Published by Hyperpresence			HyperTime Home Page			

 Big Ben	Version 2.2					
	06-Aug-99	1,900K	Win 95/98/NT	Shareware \$10.00	Never Expires	Install
	12 min at 28.8K		4 min at 56K		2 min at ISDN 128K	
	Turn your PC into Big Ben and chime the quarters and the hours with the sound of London's most famous bells. An ideal utility for New Year's Eve parties as we approach the Millennium. This shareware utility is quite unobtrusive, and will play a section of the Westminster Chimes on each quarter-hour, and will mark each hour with a number of tolls of Big Ben itself.					
Published by KPJ Jones			Big Ben Home Page			

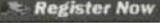
 CC TimeKeeper	Version 1.4			No Registration Required	
	04-Aug-99	285K	Win 95/98/NT	Freeware	Never Expires Install & Uninstall
	2 min at 28.8K		1 min at 56K		<1 min at ISDN 128K
	Helps you track the time you spend working at the computer. Start, Pause, Stop and document your work and then save to a file for later use. With its small footprint and intuitive interface, this freeware proves that great things come in small packages.				
Published by Crystalline Concepts			CC TimeKeeper Home Page		

 Lifelock	Version 2.0			No Registration Required	
	04-Aug-99	828K	Win 95/98/NT	Freeware	Never Expires Install & Uninstall
	5 min at 28.8K		2 min at 56K		1 min at ISDN 128K
	A 32-bit Windows application that predicts/estimates your death date and how long you have to live using accurate life expectancy tables. Requires the VB 6.0 Runtimes.				
Published by Alon Or-bach			Lifelock Home Page		

 Today	Version 2000			Online Registration Not Yet Available	
	03-Aug-99	1,890K	Win 95/98/NT	Shareware \$5.00	Expiration Unknown Install & Uninstall
	12 min at 28.8K		4 min at 56K		2 min at ISDN 128K
	Ever wish you could just glance at your computer screen and instantly know what today's date is? "Today 2000" is a tiny (96K) little program that shows you the date, right next to the time, without having to move your mouse at all. It has no fancy alarms or menus, just the date and a small calendar that appears when you click it. "Today 2000" is fast and simple, but will quickly become one of the most frequently used additions to your computer.				
Published by vanhouwelingen.com			Today Home Page		

 CurrentTime	Version 1.0.1			No Registration Required	
	31-Jul-99	38K	Win 95/98/NT	Freeware	Never Expires No Install
	<1 min at 28.8K		<1 min at 56K		<1 min at ISDN 128K
	Will always make sure your PC clock is accurate by connecting to time servers on the Internet and fetching the correct time with second precision. If you use a dial-up connection to reach the Internet, CurrentTime will synchronize the time every time you connect. With a full-time Internet connection, you may choose the interval at which synchronization will take place. Full C source code is included.				
Published by Magnus Baeck			CurrentTime Home Page		

 ionus iAlarm	Version 1.1			No Registration Required	
	20-Jul-99	12K	Win 95/98/NT	Freeware	Never Expires No Install
	<1 min at 28.8K		<1 min at 56K		<1 min at ISDN 128K
	A next-generation clock with reminder functionality. See-it-and-love-it.				
Published by Christian Hofstaedtler			ionus iAlarm Home Page		

 WorldTime2000	Version 2.00				
	18-Jul-99	1,020K	Win 95/98/NT	Shareware \$9.00	Expires after 14 Days Install & Uninstall
	6 min at 28.8K		2 min at 56K		1 min at ISDN 128K
	An application for simultaneously viewing many different time zones from around the world. Comes with time information for over 400 cities and time zones. Set alarms, modify, delete or add locations. With your choice of fonts, colors and wallpapers, you can achieve a very individual look. Modern, 'cool' look.				
Published by PCM Computer Systems Pty Ltd			WorldTime2000 Home Page		

	Version 1.00				No Registration Required	
	17-Jul-99	67K	Win 95/98/NT	Freeware	Never Expires	No Install
	<1 min at 28.8K		<1 min at 56K		<1 min at ISDN 128K	
	Displays the time of any country in the world relative to your current location from a neat, clear interface.					
Published by Jamie Brown			Apex World Time Home Page			

	Version 1.0				Online Registration Not Yet Available	
	12-Jul-99	1,431K	Win 95/98/NT	Shareware \$10.00	Expiration Unknown	Install & Uninstall
	9 min at 28.8K		3 min at 56K		2 min at ISDN 128K	
	Introduces a new dimension in desktop novelties - the ROUND clock. RoundClock 99 is a color, draggable, hideable and customizable (in the registered version) desktop clock which has the added novelty being circular. It also shows the current date and updates every second.					
Published by Graham Taylor			RoundClock99 Home Page			

	Version 1.01				No Registration Required	
	10-Jul-99	244K	Win 95/98/NT	Freeware	Never Expires	Install
	2 min at 28.8K		1 min at 56K		<1 min at ISDN 128K	
	This software connects to an atomic time server and uses the received time to generate the 'Swatch Internet Time'					
Published by Philipp Robbel			Beetle Atomic Time Home Page			

	Version 2.0.2				Register Now	
	07-Jul-99	654K	Win 95/98/NT	Shareware \$35.00	Expires after 30 Days	Install & Uninstall
	4 min at 28.8K		1 min at 56K		1 min at ISDN 128K	
	The program displays times in various cities around the world. There are two displays that can be used for this purpose, the World Time window and the Time Zones window. Both windows are user configurable for content and format. The World Time window is limited to displaying information for four cities whereas the Time Zone window, which is a world map, can contain as many cities as there are available. A "What if" feature allows the user to input a time in one city to see what time it would be in another city. City times are adjusted to their local times based on which time zone they are in and the status of the Daylight Saving data. All International settings are supported.					
Published by Alister J Nicol			World Clock Home Page			

	Version 1.2				Online Registration Not Yet Available	
	06-Jul-99	1,741K	Win 95/98/NT	Shareware \$15.00	Expiration Unknown	Install & Uninstall
	11 min at 28.8K		4 min at 56K		2 min at ISDN 128K	
	A tiny earth that sits on your Windows desktop. In addition to just sitting there it knows the local time and population of all major cities around the world. It also shows where it is day or night at the moment.					
Published by Dirk Djuga			WinGlobe Home Page			

	Version 1.00				Online Registration Not Yet Available	
	04-Jul-99	760K	Win 95/98/NT	Shareware \$20.00	Expiration Unknown	Install & Uninstall
	5 min at 28.8K		2 min at 56K		1 min at ISDN 128K	
	While it sounds like it might be a PIM, Time Manager is actually a countdown timer and stopwatch combo. You can launch both its modules from the system tray. The Stopwatch is a handy tool - and the Timer has some nice features. When it goes off it can play a sound, display a message box, launch a program or document, and/or shutdown/restart Windows. Select from terminating or repeating modes. You can also					

pick the font and colors used for the numbers for both modules, choose from two window sizes, and elect to keep the smaller versions of each on top of your desktop.

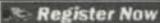
Published by **Vira Tech Development**

[Time Manager Home Page](#)

	Magohn's Worldtime 2	Version 1.1		No Registration Required			
		24-Jun-99	1,000K	Win 95/98/NT	Freeware	Never Expires	Install & Uninstall
		<1 min at 28.8K		2 min at 56K		1 min at ISDN 128K	
		Gives fast and accurate accessibility to nine major world titles. The application easily switches between all U.S. timezones. The application has been tested rigorously and functions flawlessly on any Windows95, 98 or NT machine.					
Published by Magohn Software			Magohn's Worldtime 2 Home Page				

	Traveler's Clock	Version 1.0		No Registration Required			
		15-Jun-99	7K	Win 95/98/NT	Freeware	Never Expires	No Install
		<1 min at 28.8K		<1 min at 56K		<1 min at ISDN 128K	
		Are you a traveler that doesn't feel like paying \$15 for an alarm clock? Well, this alarm clock is small, easy to use, and best of all free! I just made this today, and it features a clock, and choice of different beep preferences. This clock will ensure you that you don't miss your bosses' meeting, or miss your flight!					
Published by Jason Rand			Traveler's Clock Home Page				

	BeatNik Internet Clock	Version 2.0b8		No Registration Required			
		02-Jun-99	568K	Win 95/98/NT	Freeware	Never Expires	Install & Uninstall
		<1 min at 28.8K		1 min at 56K		1 min at ISDN 128K	
		A nonrectangular skinnable clock. Synchronize your clock with Atomic Clock via direct internet connection or SOCKS 4 proxy. Displays time in 12/24-hour and Internet Time formats. Includes a skin editor.					
Published by Something Decent			BeatNik Internet Clock Home Page				

	StarClock	Version 2.51					
		02-Jun-99	2,095K	Win 95/98/NT	Shareware \$11.00	Expiration Unknown	Install & Uninstall
		13 min at 28.8K		5 min at 56K		2 min at ISDN 128K	
		An analog or digital clock on your desktop with a cartoonish picture of a boy in the clock's face. Every few seconds the boy's expression changes. He can be happy, angry, or sleeping, complete with appropriate sound effects played at regular intervals. Other features include a right-click menu that lets you launch common Windows components, two screen savers, system tray support, shutdown controls, and optional background music. Despite a few rough edges and a nag screen that pops up every so often, StarClock might take a nice desktop companion.					
Published by Yolim Communication			StarClock Home Page				

	Responsive Time Logger	Version 3.20.04		Online Registration Not Yet Available			
		01-Jun-99	1,544K	Win 95/98/NT	Demo \$89.00	Expiration Unknown	Install & Uninstall
		10 min at 28.8K		3 min at 56K		2 min at ISDN 128K	
		A professional time and billing tool for consultants, lawyers, engineers, and others who bill for their time. Use the built-in stopwatch for time tracking, or enter time and expense data at the end of the day. Produce customized time reports. Design your invoices with your favorite word processor, or use the templates provided with the application. Track payments with the straightforward accounts receivable section.					
Published by Alan Macy			Responsive Time Logger Home Page				

 Active Desktop Alarm Clock 2000	Version 2.04			Online Registration Not Yet Available		
	31-May-99	394K	Win 95	Shareware \$5.00	Expiration Unknown	Install
	2 min at 28.8K		1 min at 56K		<1 min at ISDN 128K	
	<p>The best Active Desktop Alarm Clock program uniquely designed for life after the year 2000, and specifically designed for Windows 95/98 and MS IE 4/5+ browser users. Providing you with a choice of having 2 different event settings for every day of the week. Now you'll never miss another scheduled event again with an easy to use utility having multiple alarm and/or event settings. Use your custom messages for alert reminders. Use your favorite sound, music, picture, video files and even live web audio or video feeds for the alert signals or events. Can be used as an Active Desktop (recommended) or as an external application. If selected to do so... when the alarm is activated, it will change into an alert mode sounding the alarm signal for two (2) minutes before changing into a Snooze mode. Then, after six (6) minutes of snoozing, it will return to sound the alarm again. The alarm will automatically repeat the alarm cycle four (4) times; with three (3) snooze cycles, then end, unless you select Stop (at any time). If the alarm is left unattended while activated, it will function for a total of 26 minutes, then reset itself to a standby mode until the next day. About the same way as most any other digital alarm clock functions, except this clock is Internet user interactive.</p>					
Published by Maurice Travis			Active Desktop Alarm Clock 2000 Home Page			

 SetTime Client	Version 2.1.2			No Registration Required		
	26-May-99	1,062K	Win 95/98/NT	Freeware	Never Expires	Install & Uninstall
	7 min at 28.8K		2 min at 56K		1 min at ISDN 128K	
	<p>Synchronizes your PC clock to the world standard. An SNTP client that is a whole lot more. SetTime Client also includes a stop-watch timer and complete scheduling features. SetTime Client can display a message, check the time, run a program, or open a document at anytime - any day. Get on time. Stay on time. Be on time.</p>					
Published by Breese IT & C			SetTime Client Home Page			

 TinyTimer	Version 1.30			No Registration Required		
	23-May-99	407K	Win 95/98/NT	Freeware	Never Expires	Install & Uninstall
	3 min at 28.8K		1 min at 56K		<1 min at ISDN 128K	
	<p>This small system tray accessory provides the user with a small, easy to use Pop-Up timer. Use it to monitor your online time, or any general purpose timing activity. Installs itself in the system tray.</p>					
Published by Popcorn Software			TinyTimer Home Page			

 @Time Internet Time Clock	Version 2.0 beta 2			No Registration Required		
	18-May-99	2,000K	Win 95/98/NT	Freeware	Never Expires	Install & Uninstall
	12 min at 28.8K		4 min at 56K		2 min at ISDN 128K	
	<p>On the Internet? Of course you are! Why not run on Internet Time? Get the @Time Desktop Clock; Internet Time right there, on your screen! Features include Alarms, A Buddy List, and a customizable interface.</p>					
Published by CreativEngine			@Time Internet Time Clock Home Page			

 ClockG2	Version 2.0			Online Registration Not Yet Available		
	17-May-99	250K	Win 95/98/NT	Shareware \$10.00	Expiration Unknown	No Install
	2 min at 28.8K		1 min at 56K		<1 min at ISDN 128K	
	<p>A combination PC clock synchronizer and desktop clock. Synchronize your PC clock automatically with popular Internet Atomic time servers. Specify how often you wish ClockG2 to synchronize your PC clock. Display choices include analog, digital, and world clock. World clock displays the times of six different major cities of your choice. ClockG2 follows your Windows color schemes. No installation is necessary. Simply download and run.</p>					
Published by GetWare			ClockG2 Home Page			

 Y2KountDown	Version 1.0			No Registration Required		
	14-May-99	683K	Win 95/98/NT	Freeware	Never Expires	Install & Uninstall
	4 min at 28.8K		2 min at 56K		1 min at ISDN 128K	
	Clearly displays the time remaining until the year 2000. In the main window, the time remaining, as well as the current date and time are displayed. As well, the time remaining is displayed when the mouse is left over a system tray icon for a second.					
Published by CyberTech Software			Y2KountDown Home Page			

 Arkosoft StopWatch	Version 1.0			No Registration Required		
	12-May-99	134K	Win 95/98/NT	Freeware	Never Expires	No Install
	1 min at 28.8K		<1 min at 56K		<1 min at ISDN 128K	
	A very useful time tracking utility. It let's you keep track of time while you're busy "hacking code", plus you can save a log file for future reference. Excellent productivity tool for all of you consultants out there.					
Published by Arkosoft Technologies			Arkosoft StopWatch Home Page			

 AKClock	Version 1.5					
	11-May-99	407K	Win 95/98/NT	Shareware \$10.00	Expires after 7 Days	Install & Uninstall
	3 min at 28.8K		1 min at 56K		<1 min at ISDN 128K	
	A small, compact and simple watch clock for your desktop. Clock may take any exterior by using skins. Create your own skins for Clock, its really simple! Clock window in analog mode may be rectangular or rounded. Also available many features. As for instance: analog and digital modes, alert, signal, hiding from mouse (it allow you to use controls stated above on your desktop than Clock) and more! You may set the sound files for signal and alert. Watch the system time with AKClock!					
Published by Dimension X Software			AKClock Home Page			

 WorldClock	Version 2.0			Online Registration Not Yet Available		
	10-May-99	4,983K	Win 95/98/NT	Shareware \$39.95	Expires after 30 Days	Install & Uninstall
	31 min at 28.8K		11 min at 56K		5 min at ISDN 128K	
	This program allows you to display times for more than one place in the World. There are so many configuration options there will certainly be something to suit your needs.					
Published by Stuart Folo			WorldClock Home Page			

 Time Synchronization	Version 1.2			Online Registration Not Yet Available		
	09-May-99	190K	Win NT	Shareware \$10.00	Expiration Unknown	Install & Uninstall
	1 min at 28.8K		<1 min at 56K		<1 min at ISDN 128K	
	A small add-on for Microsoft Windows NT. The purpose of this software is to synchronize the local time (on local machine) with another computer on local network. It works with almost clockwork precision, because the precision is in tens of nanoseconds. The most common use is to synchronize with network server. It is designed as a service, which is controlled by control panel extension.					
Published by David Hrbac			Time Synchronization Home Page			

 Bill Central Time & Billing	Version 3.0			Online Registration Not Yet Available		
	02-May-99	2,644K	Win 95/98/NT	Demo \$59.00	Expiration Unknown	Install & Uninstall
	17 min at 28.8K		6 min at 56K		3 min at ISDN 128K	
	A professional time and billing system suitable for anyone who must invoice clients for time or services rendered. This useful program also acts as a management tool to allow you to track your clients' billing history and to analyze the effectiveness of your operation and billing procedures. Additional program features include recurring billing, project tracking, customizable invoice forms, and extensive reporting and printing capabilities. The program is well designed and easy to understand and navigate. A network/multi-user version is also available.					
Published by Integratech Software				Bill Central Time & Billing Home Page		

 CoolClock	Version 1.1			No Registration Required		
	02-May-99	341K	Win 95/98/NT	Freeware	Never Expires	No Install
	2 min at 28.8K		1 min at 56K		<1 min at ISDN 128K	
	A digital style texture mapped clock and date that is actually written on your desktop. Not in a window so you can click through the numbers! Very configurable with built in CD Player and wake up functions. Animates bitmaps across the surface of the clock to give a flowing lava/clouds/etc look.					
Published by Coollest.com				CoolClock Home Page		

 WorldTimer	Version 3.01			Online Registration Not Yet Available		
	25-Apr-99	1,186K	Win 95/98/NT	Shareware \$15.00	Expires after 30 Days	Install & Uninstall
	7 min at 28.8K		3 min at 56K		1 min at ISDN 128K	
	A user configurable world clock that can display a number of clocks in different time zones. As well as changing the label and timezone of each clock, the user may change the background colour and the text colour to suit their individual tastes. A world map can be displayed and optionally the world time zones can be superimposed on this map.					
Published by Castle Software Ltd				WorldTimer Home Page		

 AtomTime	Version 2.1b			Online Registration Not Yet Available		
	17-Apr-99	488K	Win 95/98/NT	Shareware \$20.00	Never Expires	Install & Uninstall
	3 min at 28.8K		1 min at 56K		1 min at ISDN 128K	
	A 32-bit Windows Internet (Winsock) application which will connect to the Atomic Clock time server in Boulder, Colorado (USA) and fetch the current atomic clock time value. It compares this value to your PC time and displays the difference. You then have the option of updating your PC clock to match the atomic clock value. There are a number of options to automate the update process. AtomTime98 also features support for most proxy servers.					
Published by Bruce Adelman				AtomTime Home Page		

 Outatime	Version 3.0			Register Now		
	17-Apr-99	846K	Win 95/98/NT	Shareware \$25.00	Expires after 30 Days	Install & Uninstall
	5 min at 28.8K		2 min at 56K		1 min at ISDN 128K	
	Will help you to record how long you spend working on each of your daily activities. On a regular basis, "Outatime" will appear on your screen, and ask you to click on the activity (or activities) that you have been working on since the last time it appeared. You will find that this is a great way to realise exactly what you are doing during the day. If you have to fill out a timesheet at the end of the week, "Outatime" will be able to calculate your figures automatically.					
Published by EarthSpin Pty Ltd				Outatime Home Page		

 Timelt!	Version 2.4			No Registration Required		
	10-Apr-99	1,500K	Win 95/98/NT	Freeware	Never Expires	Install & Uninstall
	9 min at 28.8K		3 min at 56K		2 min at ISDN 128K	
	Timer application to keep track of time spent on-line or length of time spent working on a project. "Pause" feature included. Also displays current date and time. Alarm added with this version!					
Published by Duquesne SoftWorks				Timelt! Home Page		

 When	Version 2.31			Online Registration Not Yet Available		
	30-Mar-99	1,616K	Win 95/98/NT	Shareware \$10.00	Expires after 15 Days	Install & Uninstall
	10 min at 28.8K		4 min at 56K		2 min at ISDN 128K	
	Much more than a desktop clock, offering an alarm with AutoSnooze, a countdown timer, and a calendar. Fully customizable, you may choose options like military time, various alarm sounds and a custom alarm/timer message. ?When has an easy to read oversize display that can be moved and resized to fit your needs. 15 day fully functional trial version.					
Published by SW Systems, Inc.				When Home Page		

 WTClock	Version 2.1			No Registration Required		
	30-Mar-99	35K	Win 95/98/NT	Freeware	Never Expires	No Install
	<1 min at 28.8K		<1 min at 56K		<1 min at ISDN 128K	
	Simple analogue clock for your desktop. Very realistic 3D interface - the result of combine using of MS VB and MM Flash technics. Requires the VB 5.0 Runtimes.					
Published by Irek Souleimanov				WTClock Home Page		

 TSTC (Time Server - Time Client)	Version 2.0			Online Registration Not Yet Available		
	26-Mar-99	60K	Win 95/98/NT	Shareware	Never Expires	No Install
	<1 min at 28.8K		<1 min at 56K		<1 min at ISDN 128K	
	This is a program implementing the NTP time server protocol. It can both be a time client and a time server. It is useful to build a time network chain, in the case one station only can be connected to Internet (due to firewall limitations). That station reads time from the internet, and serve this time to all other stations on the network. You can use any other time client to connect to TSTC server. This program is freeware, but if you can send me an email to tell me you like it, do it men!! Features: - Client access can be tested on base of IP address - Scheduled client (one time a day) - .ini file support - traces logging support - possibility to choose between client/server, client or server - many other options.					
Published by Louis-Marie Croizez				TSTC (Time Server - Time Client) Home Page		

 dCAL	Version 1.0			No Registration Required		
	25-Mar-99	12K	Win 95/98/NT	Freeware	Never Expires	No Install
	<1 min at 28.8K		<1 min at 56K		<1 min at ISDN 128K	
	A nifty little command line utility to display a calendar for the current month and year, or for any given month and year. Uses the 32-bit Windows API to support month and day names that are not in english. Similar to the CAL.EXE utility on many Unix/Linux systems.					
Published by Dave Navarro				dCAL Home Page		

 GPCountDown	Version 1.0			No Registration Required		
	24-Mar-99	2,036K	Win 95/98/NT	Freeware	Never Expires	Install & Uninstall
	13 min at 28.8K		4 min at 56K		2 min at ISDN 128K	
	A free Countdown utility that allows you to specify up to 10 events that the program will count down to. It is very easy to configure. The download includes the VB6 runtimes. If you don't need them, then go to the web page and select the quick download option.					
Published by Grant Porteous			GPCountDown Home Page			

 World Clock	Version 2.0			Online Registration Not Yet Available		
	24-Mar-99	5,300K	Win 95/98/NT	Shareware \$39.95	Expiration Unknown	Install & Uninstall
	33 min at 28.8K		12 min at 56K		6 min at ISDN 128K	
	The definitive multi zoned, graphical world clock. Data base support, on screen life like watch with dozens of clock faces.					
Published by SIMCOM Software			World Clock Home Page			

 PrimeTimeSync	Version 1.0			No Registration Required		
	23-Mar-99	1,473K	Win 95/98/NT	Freeware	Never Expires	Install & Uninstall
	9 min at 28.8K		3 min at 56K		2 min at ISDN 128K	
	A simple utility that sets your system time from the Internet. Just click on the Set Time button and it automatically connects to the NTP server at MIT and sets your clock.					
Published by Prime Software			PrimeTimeSync Home Page			

 Cmdtime	Version 1.0			No Registration Required		
	22-Mar-99	49K	Win 95/98/NT	Freeware	Never Expires	No Install
	<1 min at 28.8K		<1 min at 56K		<1 min at ISDN 128K	
	An extremely easy to use freeware command-line utility for synchronizing computer's time over the Internet. It uses fast and reliable Simple Network Time Protocol. It's designed to use either standalone, or in batch-files, or with external shedulers.					
Published by Jury Gerasimov			Cmdtime Home Page			

 MR Tech ClockAlign	Version 1.0			No Registration Required		
	22-Mar-99	92K	Win 95/98/NT	Freeware	Never Expires	No Install
	1 min at 28.8K		<1 min at 56K		<1 min at ISDN 128K	
	Simple Network Time Protocol (SNTP) client originally written to support: RFC868 (Time Protocol) & RFC2030 (SNTP Protocol) Features include: Startup minimized to systray. Align on startup optional, this allows you to copy to your startup folder and re-align on startup. Date stamp as your tray icon so that you don't have to keep looking at a calendar to see what today's date is.					
Published by Mel Reyes			MR Tech ClockAlign Home Page			

 Y2KClock	Version 1.1.8			No Registration Required		
	14-Mar-99	120K	Win 95/98/NT	Freeware	Never Expires	Install & Uninstall
	1 min at 28.8K		<1 min at 56K		<1 min at ISDN 128K	
	A countdown timer to that date of all dates, January 1, 2000. You can set the clock to countdown a number of different ways, and you can place the clock on top of all other windows. All user options are stored as persistent data. That means, if you set it to display hours to go, any time you run the application, it will display hours to go, until you change that option. Also, where you place the Y2KClock on your Windows desktop will be the same anytime you run it. Hurry, there's less than 40 million seconds left!					
Published by Carl CJ Lambrecht			Y2KClock Home Page			

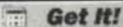
 Planet.Clock	Version 2.0				No Registration Required	
	10-Mar-99	268K	Win 95/98/NT	Freeware	Never Expires	Install & Uninstall
	2 min at 28.8K		1 min at 56K		<1 min at ISDN 128K	
A multifaceted clock that integrates into the Windows O/S 95, 98 and NT and uses the Windows time zone information to produce as many clocks as you want on your screen. Fonts and colors are adjustable, stay on top or not, daylight savings time and much more. And, it is free.						
Published by VictoryServices, Inc.				Planet.Clock Home Page		

 TraxTime	Version 3.4				Online Registration Not Yet Available	
	07-Mar-99	2,303K	Win 95/98/NT	Shareware \$19.50	Expiration Unknown	Install & Uninstall
	14 min at 28.8K		5 min at 56K		3 min at ISDN 128K	
Your own personal punch clock. It's perfect for consultants, professionals, and everyone else who wants to know how they're spending their time. Its simple punch clock metaphore allows users to punch in and out of an unlimited number of projects. Custom reports can be sent to printers, disk files, or viewed on screen. Memos (of any length) can be written to accompany the time entries. A manager's version is also available.						
Published by Spud City Software Co.				TraxTime Home Page		

 Umi Clock	Version 4.0				No Registration Required	
	04-Mar-99	173K	Win 95/98/NT	Freeware	Never Expires	No Install
	1 min at 28.8K		<1 min at 56K		<1 min at ISDN 128K	
A freeform shape analog clock for Windows 95/98 and Windows NT 4.0. It's fully customizable in look and shape. Uses layered alpha blended images to build the clock. Several anime related themes available.						
Published by EI Barto				Umi Clock Home Page		

 Standard Time Keeper	Version 4.3				Online Registration Not Yet Available	
	03-Mar-99	247K	Win 95/98/NT	Shareware \$10.00	Expires after 30 Days	Install & Uninstall
	2 min at 28.8K		1 min at 56K		<1 min at ISDN 128K	
STK Can keep your system clock within 0.01 second of the official master clock. And STK corrects the time discrepancy to a 0.01 second margin if error with calculations based on the discrepancy tendency at the time of synchronization. So it is not necessary to make contact the official cesium atomic master clock every day. This saves you money on your telephone bill. STK counteracts boot time deviation and accurately corrects time discrepancies.						
Published by Tamie				Standard Time Keeper Home Page		

 HotClock	Version 1.0				Online Registration Not Yet Available	
	01-Mar-99	501K	Win 95/98/NT	Shareware \$29.95	Expiration Unknown	Install & Uninstall
	3 min at 28.8K		1 min at 56K		1 min at ISDN 128K	
Scheduling graphics software that illustrates a sequence of events by creating a pie chart that looks like the face of a clock. Displays time intervals that span from as short as a second to as long as 24 hours. Graphically present any agenda or schedule. Perfect tool for meeting and conference planning. Customize your clock by inserting a logo, choosing colors, and specifying the fill pattern for each pie segment. The "drag and drop" feature allows you to place labels anywhere on the page without retyping.						
Published by Code Workshop LLC				HotClock Home Page		

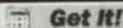
 TimeCard	Version 2.7.3		 Get It!		Online Registration Not Yet Available	
	25-Feb-99	4,100K	Win 95/98/NT	Shareware \$50.00	Expiration Unknown	Install & Uninstall
	26 min at 28.8K		9 min at 56K		5 min at ISDN 128K	
	An electronic "punch clock" for companies. Helps employees (and administrators) track hours and wages. Features include individual password protection, direct administrative access to employee data, earned wage calculation, task tracking, a printed report, customization and more!					
Published by Bill Staples			TimeCard Home Page			

 Automachron	Version 4.004				No Registration Required	
	23-Feb-99	130K	Win 95/98/NT	Freeware	Never Expires	Install
	1 min at 28.8K		<1 min at 56K		<1 min at ISDN 128K	
	A freeware SNTP client - Simple Network Time Protocol - for synchronizing your computer's time with an NTP server. Automachron works under Win95/98 and WinNT4. Automachron supports SNTP as well as TIME for synchronizing time over the internet. Automachron is much less intrusive than its predecessor Netdate.					
Published by One Guy Coding			Automachron Home Page			

 TimeMeter	Version 1.0				No Registration Required	
	20-Feb-99	190K	Win 95/98/NT	Freeware	Never Expires	No Install
	1 min at 28.8K		<1 min at 56K		<1 min at ISDN 128K	
	Tiny tray TimeMeter was developed to provide a quick way to count the time. Load in tray, No alarm, just simply count the time.					
Published by Tong Naraktisood			TimeMeter Home Page			

 T-Minus	Version 2.0				Online Registration Not Yet Available	
	20-Feb-99	1,391K	Win 95/98/NT	Shareware \$5.00	Expiration Unknown	Install & Uninstall
	9 min at 28.8K		3 min at 56K		2 min at ISDN 128K	
	How much time do you have left before the year 2000? What about your mother-in-law's birthday? Or your next vacation? With this handy little tool, you'll know exactly how much time is left before the events you define!					
Published by LoafieWare			T-Minus Home Page			

 Millennium Countdown Clock	Version 1.0				No Registration Required	
	19-Feb-99	1,900K	Win 95/98/NT	Freeware	Never Expires	Install
	12 min at 28.8K		4 min at 56K		2 min at ISDN 128K	
	Digital clock that shows the months, days, hours, minutes, seconds, total days, and total hours until the Millennium.					
Published by JPM Computer			Millennium Countdown Clock Home Page			

 SocketWatch	Version 3.2		 Get It!		Online Registration Not Yet Available	
	14-Feb-99	401K	Win 95/98/NT	Shareware \$10.00	Expiration Unknown	Install & Uninstall
	3 min at 28.8K		1 min at 56K		<1 min at ISDN 128K	
	One of the best Internet time clients available. It handles everything for you. Smart Server Search automatically scans through a list of more than 100 public access time servers and quickly finds the one that will give you the quickest and most accurate time. Rarely if ever is SocketWatch affected by the performance of a busy or inactive server.					
Published by Locutus Codeware			SocketWatch Home Page			

	Version 2.2				No Registration Required	
	11-Feb-99	2,030K	Win 95/98/NT	Freeware	Never Expires	Install & Uninstall
	13 min at 28.8K		4 min at 56K		2 min at ISDN 128K	
	A simple program that lives in the system tray and calculates your time for you (e.g., time spent on a project). It eliminates the need for counting your time using a piece of paper, and it is much more accurate! New features in version 2.0 include a customizable interface, a popup menu from the tray, the ability to work with projects, and calculation of the total time spent on a project.					
Published by Dave Beauchemin				The Work Timer Home Page		

	Version 3.0				No Registration Required	
	09-Feb-99	873K	Win 95/98/NT	Freeware	Never Expires	No Install
	5 min at 28.8K		2 min at 56K		1 min at ISDN 128K	
	Windows 95 time client which synchronizes your PC clock with a number of time servers from around the world using the TCP protocol. With this accurate reading you can set every clock in your house to the EXACT time!					
Published by Karl Sudar				TimeRC Home Page		

	Version 3.0				Online Registration Not Yet Available	
	03-Feb-99	2,197K	Win 95/98/NT	Shareware \$20.00	Expiration Unknown	Install & Uninstall
	14 min at 28.8K		5 min at 56K		2 min at ISDN 128K	
	A stardate clock and converter based on the stardate used in Star Trek: The Next Generation and its spin-offs.					
Published by Mish Handwerker				SD-2000 Home Page		

	Version 2.0c				No Registration Required	
	03-Feb-99	2,140K	Win 95/98/NT	Freeware	Never Expires	Install & Uninstall
	13 min at 28.8K		5 min at 56K		2 min at ISDN 128K	
	This will install Count-down to Star Wars. Based on your system time, it counts down the time until the day Episode 1 comes out. It has cool sounds and graphics as well! Written by Duke Witchel cause I thought it would be cool to have.					
Published by Duke Witchel				Star Wars Count-down Home Page		

	Version 1.0				No Registration Required	
	28-Jan-99	7K	Win 95/98/NT	Freeware	Never Expires	No Install
	<1 min at 28.8K		<1 min at 56K		<1 min at ISDN 128K	
	Puts an icon in the system tray. Hovering over the icon gives a tooltip which shows how long since you last rebooted. You can also see the last reboot time.					
Published by Matt Cawley				ShellTime Home Page		

	Version 1.00				Online Registration Not Yet Available	
	27-Jan-99	335K	Win 95/98/NT	Shareware \$5.00	Never Expires	Install & Uninstall
	2 min at 28.8K		1 min at 56K		<1 min at ISDN 128K	
	A count up/count down timer/clock (5 minutes for the unregistered version, 100 hours for the registered version) designed to run in the title bar of the current application.					
Published by Tbproducts				No Home Page Available		

 Java Time Protocol Client (RFC 868)	Version 1.00			No Registration Required		
	25-Jan-99	7K	Win 95/98/NT	Freeware	Never Expires	No Install
	<1 min at 28.8K		<1 min at 56K		<1 min at ISDN 128K	
	This small Java standalone application reads the current date and time from a given time protocol server (RFC 868) and optionally sets the date and time on the local system.					
Published by Andy Brunner			Java Time Protocol Client (RFC 868) Home Page			

 Millennium Tray	Version 1.1			No Registration Required		
	23-Jan-99	168K	Win 95/98/NT	Freeware	Never Expires	No Install
	1 min at 28.8K		<1 min at 56K		<1 min at ISDN 128K	
	A tray app program for WIN95-98-NT that allows fast and easy one-click check for current time/date and countdown to year 2000. Also plays your favourite sound (.wav file) every hour.					
Published by Utilmind SH			Millennium Tray Home Page			

 Show Internet Time	Version 1.0			No Registration Required		
	19-Jan-99	18K	Win 95/98/NT	Freeware	Never Expires	No Install
	<1 min at 28.8K		<1 min at 56K		<1 min at ISDN 128K	
	A freeware utility that displays the current Swatch Internet Time in your icon tray, and has a built in time conversion tool.					
Published by Left Side Software			Show Internet Time Home Page			

 Track-IT Light	Version 3.1			Online Registration Not Yet Available		
	19-Jan-99	1,345K	Win 95/98/NT	Shareware \$79.00	Expires after 30 Days	Install & Uninstall
	8 min at 28.8K		3 min at 56K		1 min at ISDN 128K	
	A professional windows-based software that allows individuals to keep track of the time spent on projects and activities while working. It eliminates the need for paper time sheets. Just choose the appropriate project and activity, click the start button and see how a true picture of your day helps improve productivity. Track time as work is being done or enter the information at the end of the day or week in a spreadsheet format. Can be used with Track-IT pro for project workgroups.					
Published by Dovico			Track-IT Light Home Page			

 WinDate	Version 2.41			No Registration Required		
	17-Jan-99	156K	Win 95/98/NT	Freeware	Never Expires	Install & Uninstall
	1 min at 28.8K		<1 min at 56K		<1 min at ISDN 128K	
	WinDate will put Time/+Date/+Day/+Message in current window's title bar. Alarm option. New to this version: Day name is now localised to your language. Single exe.					
Published by Mark Dickinson			WinDate Home Page			

 Stop Watch	Version 1.01			No Registration Required		
	14-Jan-99	30K	Win 95/98/NT	Freeware	Never Expires	No Install
	<1 min at 28.8K		<1 min at 56K		<1 min at ISDN 128K	
	What can we say, it's a stop watch, measuring up to 100 hours, showing hours, minutes and seconds. The display wraps after 100 hours. A lap feature is also included.					
Published by BTT Software			Stop Watch Home Page			

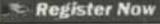
 QuickAlarm	Version 1.11			No Registration Required		
	12-Jan-99	212K	Win 95/98/NT	Freeware	Never Expires	No Install
	1 min at 28.8K		<1 min at 56K		<1 min at ISDN 128K	
	A alarm program in Chinese Language. It can play sound by user defined interval and popup alarm message daily, monthly, yearly or only once at your preference. Usually it minimizes itself in tray icon and run in low system resource.					
Published by Pumking Meng			QuickAlarm Home Page			

	Version 1.0			No Registration Required		
	11-Jan-99	960K	Win 95/98/NT	Freeware	Expiration Unknown	Install Unknown
	6 min at 28.8K		2 min at 56K		1 min at ISDN 128K	
	TimeLeft is a countdown/stopwatch clock using Winamp skins to show digits. TimeLeft counts how much time (year, months, days, hours, minutes and seconds) is left to (or elapsed from) New Year's Day (or your chief birthday or your project deadline). You can customize alarm time, alert message text, icon, etc.					
Published by NesterSoft			TimeLeft Home Page			

	Version 1.0			Online Registration Not Yet Available		
	07-Jan-99	678K	Win 95/98/NT	Shareware \$10.00	Expiration Unknown	Install
	4 min at 28.8K		1 min at 56K		1 min at ISDN 128K	
	Shows the system time in form of some LEDs. You can define an alarm time. When it is reached, it plays a WAV-File of your choice.					
Published by Andreas Heidt			SysClock Home Page			

	Version 2.01			No Registration Required		
	07-Jan-99	1,873K	Win 95/98/NT	Freeware	Never Expires	Install & Uninstall
	12 min at 28.8K		4 min at 56K		2 min at ISDN 128K	
	A new version of a popular countdown clock, ticking towards 2000 with dozens of all-new legal and technical tips. Improved interface, too!					
Published by Macaulay McColl			Y2K Countdown 99 Home Page			

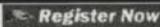
	Version 1.0			No Registration Required		
	06-Jan-99	228K	Win 95/98/NT	Freeware	Never Expires	No Install
	1 min at 28.8K		1 min at 56K		<1 min at ISDN 128K	
	A simple clock and timer application. Displays analog and digital clocks in 24 hour time or AM/PM format. Stores multiple alarms which will run once or multiple times.					
Published by James Ryan			Timer Home Page			

	Version 1.52					
	05-Jan-99	190K	Win 95/98/NT	Shareware \$19.95	Expires after 30 Days	Install
	1 min at 28.8K		<1 min at 56K		<1 min at ISDN 128K	
	A tiny yet very handy utility for correcting system time. Does not require Internet access. Ideal for correcting time drifts less than 1 minute per week. Clocks, date/time stamps etc. will stay accurate to within seconds.					
Published by RealEzy PC Utilities			TweakEzy Home Page			

	Version 1.0			No Registration Required		
	02-Jan-99	45K	Win 95/98/NT	Freeware	Never Expires	No Install
	<1 min at 28.8K		<1 min at 56K		<1 min at ISDN 128K	
	Another tiny and nice-looking little application, that shows you the days, hours, minutes and seconds till the year 2000.					
Published by yanone			Millenium Clock Home Page			

	Version 1.0			Online Registration Not Yet Available		
	01-Jan-99	1,568K	Win 95/98/NT	Shareware \$11.48	Expiration Unknown	Install & Uninstall
	10 min at 28.8K		3 min at 56K		2 min at ISDN 128K	
	Khronos displays the date and time in a small window on your desktop. Fully customizable. Also chimes on the quarter hours. Complete install/uninstall capability.					
Published by Steve Berst			Khronos Home Page			

 Millennium	Version 3.07			Online Registration Not Yet Available		
	01-Jan-99	281K	Win 95/98/NT	Shareware \$1.00	Expires after 30 Days	Install & Uninstall
	2 min at 28.8K		1 min at 56K		<1 min at ISDN 128K	
	<p>This program calculates how long is it till the Millennium, or the year of 2001. If you don't like it to count to 2001, you can change it to 2000. It resides on your desktop and system icon tray. Two display types can be chosen - regular and digital. You can change the display from regular, which is the original display, to Digital Display, which looks just like some of the clocks. You can also make the Millennium a always-on-top window. With the cool appearance, it makes your desktop neat and professional. Requires the VB 5.0 Runtimes.</p>					
Published by Tien-Hao Lan			Millennium Home Page			

 Atom Time 98	Version 2.1a					
	21-Dec-98	509K	Win 95/98/NT	Shareware \$15.00	Never Expires	Install & Uninstall
	3 min at 28.8K		1 min at 56K		1 min at ISDN 128K	
	<p>Will synchronize your PC clock with the Atomic Clock time server in Boulder, Colorado. This program is the sequel to the highly rated AtomTime95.</p>					
Published by Bruce Adelman			Atom Time 98 Home Page			

 TeaTimer	Version 1.8			No Registration Required		
	21-Dec-98	64K	Win 95/98/NT	Freeware	Never Expires	No Install
	<1 min at 28.8K		<1 min at 56K		<1 min at ISDN 128K	
	<p>A small timer application. It uses the systray area, can play a sound and displays a messagebox when the timer stops. You can set the timer to a specified time, let it run for several minutes or start a countup. With TeaTimer you can choose from one of three ways to display the timer progress, first a standard Windows progressbar, second the icon in the systray area and third one of four 3D display types. You need OpenGL support installed on you System to use TeaTimer.</p>					
Published by Arndt Teinert			TeaTimer Home Page			

 Clock9X	Version 1.0			No Registration Required		
	20-Dec-98	10K	Win 95/98/NT	Freeware	Never Expires	No Install
	<1 min at 28.8K		<1 min at 56K		<1 min at ISDN 128K	
	<p>A really cool program that will display the time or the date in HH:MM:SS format, or MM/DD/YY format. Great to put in your startup menu, lots of options, coded in Microsoft Visual Basic.</p>					
Published by James Bertelson			No Home Page Available			

 TalkClock	Version 1.01			No Registration Required		
	05-Dec-98	1,100K	Win 95/98/NT	Freeware	Never Expires	Install & Uninstall
	7 min at 28.8K		2 min at 56K		1 min at ISDN 128K	
	<p>A FREE Windows 95/98/NT program that announces the time at specified intervals or at the push of a button. TalkClock is very easy to use with its simple user interface. TalkClock can be minimized and still run in the background without taking up your desktop space.</p>					
Published by George Callow			TalkClock Home Page			

 NukeTime	Version 2.1			Online Registration Not Yet Available		
	30-Nov-98	1,500K	Win 95/98/NT	Shareware \$20.00	Expiration Unknown	Install & Uninstall
	9 min at 28.8K		3 min at 56K		2 min at ISDN 128K	
	A pure software solution to apply your country's official local time to your system. It includes numerous functions allowing a precise and reliable easy to use way to synchronize your PC or (NT) Server with internet or telephone time services. Support for Win98 Tasklaner plus build-in tasklaner for unattended operation. Autom. time synch. at any internet or e-mail session.					
Published by MicroLogic Software				NukeTime Home Page		

 Big-Time Clock	Version 2.5			Online Registration Not Yet Available		
	26-Nov-98	33K	Win 95/98/NT	Shareware \$6.75	Expiration Unknown	No Install
	<1 min at 28.8K		<1 min at 56K		<1 min at ISDN 128K	
	This program generates a running digital clock which displays your computer's system time in bold, cleverly handcrafted numerals on the center of your screen and a customizable solid or flashing colon.					
Published by B. Carley				Big-Time Clock Home Page		

 TimeKeeper	Version 1.6			Online Registration Not Yet Available		
	23-Nov-98	323K	Win 95/98/NT	Shareware \$10.00	Expiration Unknown	Install & Uninstall
	2 min at 28.8K		1 min at 56K		<1 min at ISDN 128K	
	Will track the amount of time spent on a project. You can also add an hourly rate to get the real billing cost of a project. You can even use it to figure out the accumulated time spent hooked onto your Internet provider. Requires the VB 5.0 Runtimes.					
Published by Program-Action				TimeKeeper Home Page		

 The Good Morning Program	Version 5.0			No Registration Required		
	22-Nov-98	1,249K	Win 95/98/NT	Freeware	Never Expires	Install & Uninstall
	8 min at 28.8K		3 min at 56K		1 min at ISDN 128K	
	Says "Good Morning" in the morning, "Good Afternoon" in the afternoon, "Good Evening" in the evening, "Good Night" at night.					
Published by Jonathan Arehart				The Good Morning Program Home Page		

 EZ-Timer	Version 4.00			Online Registration Not Yet Available		
	21-Nov-98	2,860K	Win 95/98/NT	Shareware \$15.00	Expires after 14 Days	Install & Uninstall
	18 min at 28.8K		6 min at 56K		3 min at ISDN 128K	
	A great program for anybody to have! Whether you need to count up or down to an event, EZ-Timer is up to the task -- and more. This handy 32-bit utility lets you select from either timer or stopwatch modes. Any combination of five things can happen when the time reaches 00:00:00: EZ-Timer can play a sound, pop up a customizable dialog box, launch a program, shut down your PC, or restart your PC. The timer can also be set to automatically repeat. Plus, the properties of the time display (background color and text size/font/color) can be easily adjusted. Version 3.01 adds new features like the ability to use command-line arguments and you can now register over the Internet or telephone(TOLL-FREE)! With Version 3.01, you can also select which icon you want to put in any message boxes that EZ-Timer displays.					
Published by Vira Tech Development				EZ-Timer Home Page		

 JX PHOTO CLOCK	Version 0.99			No Registration Required		
	21-Nov-98	1,400K	Win 95/98/NT	Freeware	Never Expires	Install
	9 min at 28.8K		3 min at 56K		2 min at ISDN 128K	
	Want to put your favorite picture on a clock? BMP, JPG, GIF....JX PHOTO CLOCK let you define everything by yourself! Clock Size, Font, Color. SCREEN SAVER function will display a ANIMATION in the background. Play your MP3 files at chime time!					
Published by Jeffrey Xuan			JX PHOTO CLOCK Home Page			

 Time Tracker	Version 1.0			Online Registration Not Yet Available		
	18-Nov-98	3,589K	Win 95/98/NT	Shareware \$20.00	Expiration Unknown	No Install
	22 min at 28.8K		8 min at 56K		4 min at ISDN 128K	
	An Electronic Time Card program that will allow a person to track the number of hours that they spend working on different account/projects per day. The program supports up to twenty different accounts. Each account is selectable by a radio button. The hours are calculated for a total per day and each account is calculated separately for a total of hours for the account per day. The total hours are then taken and multiplied against a cost per hour. This gives you a total cost for the week. Charges are incremented in .1 of hours or every 6 minutes. The data is stored in a Microsoft Access 7.0 database format for later retrieval. Free lifetime upgrades with registration.					
Published by Jason Alexander			Time Tracker Home Page			

 BarClock	Version 2.1			No Registration Required		
	16-Nov-98	361K	Win 95/98/NT	Freeware	Never Expires	No Install
	2 min at 28.8K		1 min at 56K		<1 min at ISDN 128K	
	With this tiny program, just keep an eye on the time. But to do this, you don't need to have a special window always on top or maintain the explorer's task bar visible. In fact, the current time is displayed in the active title bar of the active window. This software is very easy to use. To always have the time under your eyes, just put the executable file (or a link to it) in the startup menu.					
Published by Guillaume Brocker			BarClock Home Page			

 UTC Clock	Version 1.1			No Registration Required		
	16-Nov-98	174K	Win 95/98/NT	Freeware	Never Expires	Install & Uninstall
	1 min at 28.8K		<1 min at 56K		<1 min at ISDN 128K	
	This program gives you three clocks that show UTC, Local and a desired time zone. The display is compact allowing it to hide in the corner of the monitor. The program is free but if you download it send me and e-mail telling me what you think.					
Published by Jason Alexander			UTC Clock Home Page			

 TimeZone	Version 1.1.3			No Registration Required		
	14-Nov-98	1,747K	Win 95/98	Freeware	Never Expires	Install & Uninstall
	11 min at 28.8K		4 min at 56K		2 min at ISDN 128K	
	This program shows the time in the 4 main US time zones. The next version should have 'round the world support and perhaps even an atomic clock sync feature.					
Published by Victor Technologies			TimeZone Home Page			

 Meganet Clock	Version 1.20			No Registration Required		
	04-Nov-98	1,360K	Win 95/98/NT	Freeware	Never Expires	Install
	8 min at 28.8K		3 min at 56K		1 min at ISDN 128K	
	A small clock, when excited is auto-matically minimized. When minimized it displays the current date and time. Very useful when doing reports etc. and you need to know the current date! When maximized it displays the time in 24hr format, and the date in long format. Can be easily uninstalled with the add/remove options in control panel.					
Published by Joel Andrews			Meganet Clock Home Page			

 Timer	Version 1.7			No Registration Required		
	03-Nov-98	870K	Win 95/98/NT	Freeware	Never Expires	Install & Uninstall
	5 min at 28.8K		2 min at 56K		1 min at ISDN 128K	
	A simple timing program. Created to help when taking on-line tests. Kind of like an electronic alarm clock. Timer has a progress bar and digital display that shows as the minutes/seconds count down. When the time is up, a wav file called FINISH.WAV is played and a splash screen is displayed. Pretty simple app to write, but did learn a few things in Delphi. Source available upon request.					
Published by Scott C. Russell			Timer Home Page			

 TopClock	Version 2.0			Online Registration Not Yet Available		
	29-Oct-98	537K	Win 95/98/NT	Demo \$8.00	Expires after 15 Days	Install & Uninstall
	3 min at 28.8K		1 min at 56K		1 min at ISDN 128K	
	With TopClock you can get the most exactly time from Internet servers with two clicks. It has digital clock interface and alarm clock function. Also the additional options are: the full info about Moon phases, Sun rises, day time lenght in every corner of the World and etc.					
Published by Tomas Rutkauskas			TopClock Home Page			

 Dimension 4	Version 4.3			No Registration Required		
	20-Oct-98	293K	Win 95/98/NT	Freeware	Never Expires	Install & Uninstall
	2 min at 28.8K		1 min at 56K		<1 min at ISDN 128K	
	Incredibly easy to use SNTP/Time client synchronizes PC's time to within 50ms of USNO or any other NTP/Time server.					
Published by Rob Chambers			Dimension 4 Home Page			

 Timer	Version 1.0			No Registration Required		
	12-Oct-98	8K	Win 95/98/NT	Freeware	Never Expires	No Install
	<1 min at 28.8K		<1 min at 56K		<1 min at ISDN 128K	
	This very simple program shows in the task bar how long it is running, as a sort of chronometer. You can use it to time anything you want, from the time you're online to how long you're playing Quake.					
Published by Wim Heirman			Timer Home Page			

 Power Clock	Version 3.08			Online Registration Not Yet Available		
	10-Oct-98	950K	Win 95/98/NT	Shareware \$89.00	Expiration Unknown	Install & Uninstall
	6 min at 28.8K		2 min at 56K		1 min at ISDN 128K	
	Employee Time-clock, Email, Multi-site communications. Employee timeclock. Export to Quickbooks. Auto-Sync of data among different locations. Small and fast. Runs on any Windows PC. Customizable security for all features. Wide array of reports.					
Published by Rob Fletcher			Power Clock Home Page			

 TimeClock Lyte	Version 1.25			Online Registration Not Yet Available		
	09-Oct-98	5,400K	Win 95/98/NT	Shareware \$49.99	Expires after 30 Days	Install & Uninstall
	34 min at 28.8K		12 min at 56K		6 min at ISDN 128K	
	A simple time and attendance package. Allows employee to punch-in/out by employee number or name or initials. Easy "who is here" feature with optional punch-out comments. Allows tracking time by department, location, or type of hours. Particular PCs on the network can be assigned to a particular employee or department or location. Easy to understand timecard report. Data may also be accessed with any product that can read an Access 7.0 data file. Data export feature for importing into payroll packages.					
Published by Quality Software Solutions, Inc.			TimeClock Lyte Home Page			

 Standard Time Keeper	Version 3.7			Online Registration Not Yet Available		
	01-Oct-98	247K	Win 95/98/NT	Shareware \$10.00	Expires after 30 Days	Install & Uninstall
	2 min at 28.8K		1 min at 56K		<1 min at ISDN 128K	
	Can keep your system clock within 0.01 second of the official master clock. And STK corrects the time discrepancy to a 0.01 second margin if error with calculations based on the discrepancy tendency at the time of synchronization. So it is not necessary to make contact the official cesium atomic master clock every day. This saves you money on your telephone bill. STK counteracts boot time deviation and accurately corrects time discrepancies.					
Published by Tamie			Standard Time Keeper Home Page			

 Millennium Countdown	Version 2.0			No Registration Required		
	28-Sep-98	1,933K	Win 95/98/NT	Freeware	Never Expires	Install & Uninstall
	12 min at 28.8K		4 min at 56K		2 min at ISDN 128K	
	A small freeware digital display which Accurately! calculates Seconds, Hours, Days & Weeks to go to the turn of the millennium. Many options - Weeks, Secs Etc can be switched on or off and displayed as totals or as remaining time. Resides on your desktop and system icon tray and can set to be always on top. Professional one click install & uninstall.					
Published by Alert Technology			Millennium Countdown Home Page			

 Berlin uhr	Version 1.0			No Registration Required		
	27-Sep-98	131K	Win 95/98/NT	Freeware	Never Expires	No Install
	1 min at 28.8K		<1 min at 56K		<1 min at ISDN 128K	
	This Software emulates the famous Berlin Uhr.					
Published by Christophe Gevrey			Berlin uhr Home Page			

 DateTime	Version 1.1			No Registration Required		
	18-Aug-98	300K	Win 95/98/NT	Freeware	Never Expires	Install
	2 min at 28.8K		1 min at 56K		<1 min at ISDN 128K	
	A useful freeware Windows 95/98/NT utility that allows computer users with an Internet connection to accurately set their system date and time. It's easy to use and fast. With just a few clicks of your mouse you can fetch the current date and time from an Internet Date/Time host. You can compare new values with your system data and time. You can easily update your PC clock settings with new, correct values.					
Published by PrimaSoft PC			DateTime Home Page			

 InterTime 98	Version 1.11			Online Registration Not Yet Available		
	10-Aug-98	1,477K	Win 95/98/NT	Shareware \$9.95	Expires after 30 Days	Install & Uninstall
	9 min at 28.8K		3 min at 56K		2 min at ISDN 128K	
	Using NTP servers located from around the world, InterTime can update your system clock to within 200 milliseconds of accuracy. Advanced features like ServerCheck and SmartSearch allow you to locate a time server within your own country and even city! ModemSpy for Applications allows you to schedule clock updates, distinguishing between whether you are online or offline. No more random connections. Completely designed for Windows 95 and 98, InterTime is different from any other clock sync product you can buy. It's easy to use, automatic and good looking. For under 10 bucks, you couldn't ask for more!					
Published by Pipsoft			InterTime 98 Home Page			

 Time (DeskTop Clock)	Version 1.2.5			No Registration Required		
	07-Aug-98	1,900K	Win 95/98/NT	Freeware	Never Expires	Install
	12 min at 28.8K		4 min at 56K		2 min at ISDN 128K	
	A small border-less window that shows your system time on your desktop. You may change the location, font, Display style, and colors, in 12 or 24 hour format. Also available are countdown timer, countdown alarm, and alarm clock. "Time" will announce the time on the hour and 1/2 hour with chimes at the 1/4 & 3/4 hour, (if you have the sound files).					
Published by Daniel Campau			Time (DeskTop Clock) Home Page			

 Up To 2000	Version 1.00a			No Registration Required		
	23-Jul-98	272K	Win 95/98/NT	Freeware	Never Expires	No Install
	2 min at 28.8K		1 min at 56K		<1 min at ISDN 128K	
	A very small application that tells you the number of days remaining to the year 2000.					
Published by Albani iperCreation			Up To 2000 Home Page			

 WinActivity for Windows	Version 2.0			Online Registration Not Yet Available		
	07-Jul-98	2,200K	Win 95/98/NT	Shareware \$19.00	Expiration Unknown	Install & Uninstall
	14 min at 28.8K		5 min at 56K		2 min at ISDN 128K	
	Keep track on the time you spend working on various projects, surfing on the web or just playing games. Generate & print reports and graphs or publish your reports on your intranet/internet site.					
Published by Pitrinec Software			WinActivity for Windows Home Page			

 Days	Version 1.0			No Registration Required		
	21-Jun-98	122K	Win 95/98/NT	Freeware	Never Expires	No Install
	1 min at 28.8K		<1 min at 56K		<1 min at ISDN 128K	
	Calculates the number of days between any two user selected dates. Uses a graphical calendar for date selection.					
Published by Matt Billenstein			Days Home Page			

 YATS32	Version 6.7			Online Registration Not Yet Available		
	20-Jun-98	841K	Win 95/98/NT	Shareware \$25.00	Expiration Unknown	Install Unknown
	5 min at 28.8K		2 min at 56K		1 min at ISDN 128K	
	YATS32 (Yet Another Time Synchronizer) is a time synchronization application. YATS32 allows you to synchronize your system clock to any number of time servers available on any TCP/IP network such as the Internet or your corporate UNIX network. A large list of international Internet time servers is provided in the Help file. Multiple servers and time protocols are supported. Connections via HTTP proxy server are also supported for some time protocols.					
Published by Dillobits Software			YATS32 Home Page			

 PBXAlarm	Version 0.9b			No Registration Required		
	16-Jun-98	1,660K	Win 95/98/NT	Freeware	Never Expires	Install & Uninstall
	10 min at 28.8K		4 min at 56K		2 min at ISDN 128K	
	Uses your home PBX to alarm you. It works like this: You set the time you want it to call you, you tell it which extension to call, and once this time arrives it triggers a dial-up event, calling the extension you specified using your modem.					
Published by Rapid Developments			PBXAlarm Home Page			

 Count98!	Version 1.0.98				No Registration Required	
	09-Jun-98	1,495K	Win 95/98/NT	Freeware	Never Expires	Install & Uninstall
	9 min at 28.8K		3 min at 56K		2 min at ISDN 128K	
	This is a countdown to Windows98. Developed by Ricky Girglani.					
Published by Ricky Girglani				Count98! Home Page		

 CLOX 2000	Version 1.0				Online Registration Not Yet Available	
	02-Jun-98	2,913K	Win 95/98/NT	Shareware \$10.00	Expiration Unknown	Install & Uninstall
	18 min at 28.8K		6 min at 56K		3 min at ISDN 128K	
	Latest version of this exceptional world clocks program with analogue and digital timezone clocks. Internet features include the ability to automatically set the time via the internet, newflashes and more. CLOX 2000 is super-accurate and includes an animated world daylight map, an alarm clock and calendar. Full online help is provided making it really easy to use.					
Published by Mirage Audio Visual Media				CLOX 2000 Home Page		

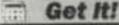
 TimeManager	Version 1.01				No Registration Required	
	26-May-98	293K	Win 95/98/NT	Freeware	Never Expires	No Install
	2 min at 28.8K		1 min at 56K		<1 min at ISDN 128K	
	Controls and displays Time and TimeZone absolutely! The first Program which brings light into the darkness of the windows time management!					
Published by Martin Bachem				No Home Page Available		

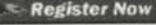
 InnaMinute	Version 1.0				Online Registration Not Yet Available	
	25-May-98	14K	Win 95/98/NT	Shareware \$10.00	Never Expires	No Install
	<1 min at 28.8K		<1 min at 56K		<1 min at ISDN 128K	
	Most timers have way too many features. Need to turn off the oven in five minutes? Need to stop surfing an hour from now? Click, click. InnaMinute waits in the tray to remind you without complicated dials, options, parameters or fuss. Put it in your StartUp folder!					
Published by Ed Halley				InnaMinute Home Page		

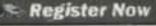
 The One Dollar Clock	Version 1.0				Online Registration Not Yet Available	
	30-Apr-98	688K	Win 95/98/NT	Shareware \$1.00	Expiration Unknown	No Install
	4 min at 28.8K		2 min at 56K		1 min at ISDN 128K	
	Displays the the time and the day of the week in a user specified format.					
Published by D. Ferrell				The One Dollar Clock Home Page		

 TimeEzy :Global Clock	Version 1.02				Register Now	
	22-Apr-98	222K	Win 95/98/NT	Shareware \$19.95	Expires after 30 Days	Install
	1 min at 28.8K		<1 min at 56K		<1 min at ISDN 128K	
	Intelligent Global Clock for Win 95 and NT 4.0. An exceptionally easy to use utility which offers point'n'click access to timezones around the world. Takes Daylight Savings Time into account wherever and whenever appropriate.					
Published by RealEzy PC Utilities				TimeEzy :Global Clock Home Page		

 ClockIt	Version 1.3.5				No Registration Required	
	21-Apr-98	527K	Win 95/NT	Freeware	Never Expires	Install & Uninstall
	3 min at 28.8K		1 min at 56K		1 min at ISDN 128K	
	<p>A timer that totals the time you spend working on a project. It supports multiple projects, it can be minimized to the system tray or set "Always on Top". You can view your log file in the program and increment/decrement the time displayed on the timer. This update fixes minor bugs in the program. Requires the VB 5.0 Runtimes.</p>					
Published by Richard Gelinas				ClockIt Home Page		

 GetTime	Version 2.13p3				Online Registration Not Yet Available	
	13-Apr-98	206K	Win 95/98/NT	Shareware \$15.00	Never Expires	Install & Uninstall
	1 min at 28.8K		<1 min at 56K		<1 min at ISDN 128K	
	<p>Would you like to have all the computers on your network synchronized to a common time source? Now you can with GetTime! GetTime runs unobtrusively on Windows 95/NT machines, quietly updating the system clock with a central time source (in this case, another computer on the network). You don't need access to the Internet. However, if you do have access to the Internet, then you can have all the computers on your network synchronized to one of several time servers on the Internet.</p>					
Published by Ken Salter				GetTime Home Page		

 Global Dialing Assistant	Version 2.8.32					
	15-Nov-97	3,905K	Win 95/98/NT	Shareware \$29.00	Expiration Unknown	Install & Uninstall
	24 min at 28.8K		9 min at 56K		4 min at ISDN 128K	
	<p>Integrates three powerful International Business Tools into one easy-to-use money-saving package. First, the Animated World Time Clock allows you to see at a glance where it is daytime and nighttime around the world as well as the current date and time of key locations you choose. Next, the International Dialing Guide gives you quick access to information on over 1,600 cities worldwide (including dialing access codes, current date/time, and high/medium/low-cost calling periods) that will help you maximize the value of your calls. Additionally, you can reduce costly mistakes when setting up conference calls with the Conference Calculator that automatically converts between your local date/time and that of any other location you choose.</p>					
Published by Strategic Information Systems				Global Dialing Assistant Home Page		

 MouseClock	Version 1.0					
	15-Aug-97	500K	Win 95/98/NT	Shareware \$10.00	Expiration Unknown	Install & Uninstall
	3 min at 28.8K		1 min at 56K		1 min at ISDN 128K	
	<p>MouseClock is the only cursor enhancement you'll ever need! MouseClock virtually becomes part of your mouse pointer. It stays out of the way, while providing you with the current time and free system resources. MouseClock also features a rate clock and supports 24-hour format. Imagine having all this information right in front of you when you need it. In a professional that gets paid hourly? Why not keep your rates straight with the MouseClock rate clock? MouseClock can stay on top, or be put behind other Windows when you no longer require its use. Easy to use and fully configurable. Another very handy utility from AMF.</p>					
Published by AMF				MouseClock Home Page		

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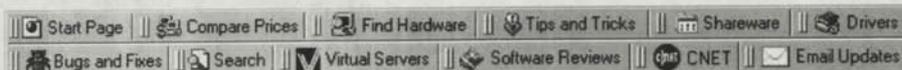
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	Version 1.0			Online Registration Not Yet Available		
	20-Jan-00	4,392K	Win 98/NT	Shareware	Expiration Unknown	Install & Uninstall
	27 min at 28.8K		10 min at 56K		5 min at ISDN 128K	
	TimeNode allows your computer time to be synchronized from atomic clocks over the Internet. TimeNode can also become a server and redistribute this time to a network of downstream computers to maintain a time synchronization network. Runs as Icon on System Tray.					
	Published by Mike Waldo/GeoSoft Development Group			TimeNode Home Page		

	Version 1.31			Online Registration Not Yet Available		
	19-Jan-00	602K	Win 95/98	Shareware \$15.00	Expiration Unknown	Install & Uninstall
	4 min at 28.8K		1 min at 56K		1 min at ISDN 128K	
	A popup world time reference utility that allows you to monitor an unlimited number of time-zones around the world. Ideal for family, friends and relatives living overseas and need to know what time of the day is on the other side of the world. Installs itself in the system tray.					
	Published by Popcorn Software			GlobeTime 1.31 Home Page		

	Version 4.4					
	19-Jan-00	3,780K	Win 95/98/NT	Shareware \$17.00	Expires after 14 Days	Install & Uninstall
	24 min at 28.8K		8 min at 56K		4 min at ISDN 128K	
	A timer utility program for Windows 95, 98 and NT. It is similar in use to a kitchen timer, but contains many features for the advanced user providing three independent actions that can be taken upon interval expiration. The number of timers that you can have active at a given time is limited only by the availability of system resources. You have complete control of each individual timer and groups of timers through settings.					
	Published by Leepware			JogglerPlus Home Page		

 SetTime32	Version 2.20			Online Registration Not Yet Available		
	19-Jan-00	1,307K	Win 95/98/NT	Shareware \$19.95	Expires after 45 Days	Install & Uninstall
	8 min at 28.8K		3 min at 56K		1 min at ISDN 128K	
	Updates your computer's time from NIST's Internet time service. Automatically calculates your computer clock's drift rate and schedules time checks to keep you clock accurate. Several automatic and manual modes. Runs quietly in the background. Just install and let it do its work!					
Published by Tony Isaac			SetTime32 Home Page			

 WebTime for Windows 95/NT	Version v2.7			No Registration Required		
	19-Jan-00	74K	Win 95/98/NT	Freeware	Never Expires	Install
	<1 min at 28.8K		<1 min at 56K		<1 min at ISDN 128K	
	A small utility program that will synchronize your PC's internal clock with one of the several atomic clocks maintained by the United States National Institute of Standards and Technology.					
Published by Gregory Braun			WebTime for Windows 95/NT Home Page			

 WorldTime	Version 5.3.0.606			No Registration Required		
	15-Jan-00	3,877K	Win 95/98/NT	Freeware	Never Expires	Install & Uninstall
	24 min at 28.8K		9 min at 56K		4 min at ISDN 128K	
	A World clock with Local, UTC, and 8 other configurable clocks, each with it's own time zone, Daylight savings time rule and description, Uses the Network Time Protocol (NTP) to synchronize your computers system time (UTC) to any internet time source, Calculates and displays the Julian Date, unlimited stopwatches accurate to 1/100 sec with unlimited LAP times that only display if used, and a module that tracks the amount of time since or until any specified date down to the second.					
Published by Paw Print Graphics			WorldTime Home Page			

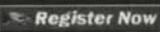
 Alarm Clock	Version 1.35			No Registration Required		
	12-Jan-00	2,301K	Win 95/98/NT	Freeware	Never Expires	Install & Uninstall
	14 min at 28.8K		5 min at 56K		3 min at ISDN 128K	
	This is a simple, yet cool looking, alarm clock / variable timer for Windows 95/98/NT. Includes help file.					
Published by Thad Hogan			No Home Page Available			

 VAKCER Project Tracker PE	Version 2.0.101			Online Registration Not Yet Available		
	12-Jan-00	797K	Win 95/98/NT	Demo \$65.00	Expires after 21 Days	Install & Uninstall
	5 min at 28.8K		2 min at 56K		1 min at ISDN 128K	
	Keeps track of running applications and open documents and records time spent on them automatically. There's no need to start and stop timer. VPT detects more than 200 popular applications such as illustration, image editing, web design, word processing, communication, file management and much more. The list of supported applications now stored in separate files allowing to configure the list easily. Supports more than 200 applications and has enhanced program tracking algorithm as well as auto backup and autosave project features. VPT also calculates project cost based on hourly rates for each application. Project reports can be viewed and printed with a click of a mouse.					
Published by VAKCER Corporation			VAKCER Project Tracker PE Home Page			

 Horas	Version 3.11				Online Registration Not Yet Available	
	11-Jan-00	340K	Win 95/98/NT	Shareware \$15.00	Expires after 30 Days	Install & Uninstall
	2 min at 28.8K		1 min at 56K		<1 min at ISDN 128K	
	<p>Horas helps you keep track of the time around the world by letting you create several clocks corresponding to different time zones. Horas has many features including the automatic adjustment of your computer clock, a time converter, a time lookup tool, and it takes very little space on your desktop.</p> <p>Published by Basta Computing Horas Home Page</p>					

 Darkcore Online Timer	Version 1.0				No Registration Required	
	09-Jan-00	2,770K	Win 95/98	Freeware	Never Expires	Install & Uninstall
	17 min at 28.8K		6 min at 56K		3 min at ISDN 128K	
	<p>Keeps track of time spent online by current session and total time. Also has a reminder when so much time online has gone by.</p> <p>Published by Marty Schoenthaler Darkcore Online Timer Home Page</p>					

 CountDown	Version 1.0				Online Registration Not Yet Available	
	04-Jan-00	568K	Win 95/98/NT	Shareware \$10.00	Expires after 30 Days	Install & Uninstall
	4 min at 28.8K		1 min at 56K		1 min at ISDN 128K	
	<p>Count Down is a program originally intended just to count down to the year 2000. However, as the year drew on, and that purpose became less and less important, it was developed into a true countdown program, which takes events, and names them, and then you can cycle through them and see when they will come to pass. It displays the time remaining in an LED Panel sort of style, which will allow you to edit, change and add new events to it.</p> <p>Published by Joshua Butcher CountDown Home Page</p>					

 CountDown	Version 5.0					
	04-Jan-00	1,953K	Win 95/98/NT	Shareware \$9.00	Expires after 21 Uses	Install & Uninstall
	12 min at 28.8K		4 min at 56K		2 min at ISDN 128K	
	<p>CountDown is a timer utility that counts the time down to your specified entry and then sounds an alarm (WAV file) and shows you a visual message. Two timers, which can be run simultaneously, are included. A stopwatchlike feature also allows you to track time, such as how long you've been online or working on a specific task.</p> <p>Published by Ron Grau CountDown Home Page</p>					

 Speaking Clock Deluxe	Version 2.01					
	30-Dec-99	1,442K	Win 95/98/NT	Shareware \$15.00	Expiration Unknown	Install & Uninstall
	9 min at 28.8K		3 min at 56K		2 min at ISDN 128K	
	<p>A very competent clock which tells the time in many different languages (English is included, many more languages can be freely downloaded). The clock also has a multiple alarm system, so you can have up to 50 different alarms, with the possibility of announcing the time, playing any wave file or even starting another program. The alarms can be set to go off once or be repeated daily, weekly, monthly or yearly. In addition it also features a time synchronization function, choice of two digital displays and one analog display and a very attractive interface design. The clock can be minimized in the system tray (where it also shows the time) and be set to start when Windows starts.</p> <p>Published by Leif Porskev Speaking Clock Deluxe Home Page</p>					

 MFAC	Version 1.0			No Registration Required		
	28-Dec-99	174K	Win 95/98/NT	Freeware	Never Expires	No Install
	1 min at 28.8K			<1 min at 56K		
	You need a clock that is relatively small on your desktop ? It should have an alarm function also ? You need a tool for an count down or count up, both 100% free configurable.					
Published by TwinSoft				No Home Page Available		

 Multi Timer	Version 1.0			No Registration Required		
	28-Dec-99	115K	Win 95/98/NT	Freeware	Never Expires	No Install
	1 min at 28.8K			<1 min at 56K		
	Ten independent Timers in one program, to count down to zero or up to max. 100 hours, with 1 second accuracy. Timers can be viewed one by one or all at once. Timers can resume on a later computer session, all settings are remembered from the previous time ran. Sound signal (optional) and blinking message window (cannot be hidden with other windows) with user-defined message on alarm.					
Published by Johannes Wallroth				Multi Timer Home Page		

 World-time Countdown Clock	Version 1.1			Online Registration Not Yet Available		
	28-Dec-99	1,423K	Win 95/98/NT	Shareware \$20.00	Expiration Unknown	Install & Uninstall
	9 min at 28.8K			3 min at 56K		2 min at ISDN 128K
	A beautiful world map clock and it's always right there when you need it. 1-click on its task bar icon opens a satellite map of the world with three clocks showing time around the world. Click on any of over 50 major cities to see its timezone and set one of the three clocks to show its time continuously. The map also shows the day and night regions of the world. Watch the sunrise creeping around the Earth. On registration you can set a date to which a banner counts down with a message of your own and enter a second text message which scrolls across the window.					
Published by Silkmoth plc				World-time Countdown Clock Home Page		

 @NetClock Time Server	Version 1.00b			Online Registration Not Yet Available		
	24-Dec-99	413K	Win 95/98/NT	Shareware \$79.00	Expires after 15 Days	Install & Uninstall
	3 min at 28.8K			1 min at 56K		<1 min at ISDN 128K
	@NetClock gives you the ability to have the Date/Time on all of your networked PC's correct at all times. @NetClock is an Internet standards SNTP Time Server system specifically designed for PC networks/intranets. It provides everything you need to obtain the correct Date/Time from any Internet Atomic clock, and then keep the clocks on all of your networked PC's set to the correct Date and Time at all times.					
Published by NetcPlus Internet Solutions Inc				@NetClock Time Server Home Page		

 KaTimeClock	Version 1.9.1.65			Online Registration Not Yet Available		
	24-Dec-99	610K	Win 95/98/NT	Shareware \$100.00	Expires after 30 Days	No Install
	4 min at 28.8K			1 min at 56K		1 min at ISDN 128K
	KaTimeClock is a timeclock designed specifically for small businesses. It supports the following features: ** Continuous Filing Technology ** Independent Employee Passwords ** Easy clock-in/clock-out ** Simple Administration ** Runs under Windows 95, 98, NT 4.0, and Windows 2000 RC2					
Published by KASt				KaTimeClock Home Page		

 CC Clock	Version 3.1.22			Online Registration Not Yet Available		
	23-Dec-99	1,500K	Win 95/98/NT	Shareware \$20.00	Expiration Unknown	Install & Uninstall
	9 min at 28.8K		3 min at 56K		2 min at ISDN 128K	
	The Courteous Clock! An intelligent, customizable desktop clock/calendar app that gets out of your way. Will chime, post reminders, start programs, shut down windows and more. Will display seconds, analog or digital.					
Published by cadman			CC Clock Home Page			

 Chameleon Clock	Version 2.11			Register Now		
	18-Dec-99	1,187K	Win 95/98/NT	Shareware \$24.95	Never Expires	Install & Uninstall
	7 min at 28.8K		3 min at 56K		1 min at ISDN 128K	
	The only skinnable digital clock that totally replaces Windows tray clock and thus does not eat any desktop space. Enjoy customising its look using Winamp skins and bitmap digits - there are more than 3000 of them available. It always keeps exact time by synchronizing your clock with Internet Time Servers. Need to be reminded to make a call, go to a meeting, or just not to miss a TV program? Try the alarm feature that makes messages using MP3, WAV, MIDI, and CD-Audio sounds, opens applications/documents, and shuts down your PC at the specified time. It's also very handy to have a calendar, both floating and in the Tooltip, and time zones support. There is also one feature that you probably will not want others to see, and that's why it cannot be described here.					
Published by Jury Gerasimov			Chameleon Clock Home Page			

 Customizable Digital Clock	Version 1.2.1 b			No Registration Required		
	16-Dec-99	1,790K	Win 95/98	Freeware	Never Expires	Install & Uninstall
	11 min at 28.8K		4 min at 56K		2 min at ISDN 128K	
	A completely customizable digital clock program (with auto-update from nasa's atomic clock server)					
Published by Jacob Myers			Customizable Digital Clock Home Page			

 EldoS Clock	Version 3.14			Register Now		
	01-Dec-99	1,150K	Win 95/98/NT	Shareware \$19.95	Expiration Unknown	Install & Uninstall
	7 min at 28.8K		3 min at 56K		1 min at ISDN 128K	
	EldoS Clock shows the time in multiple time zones at the same time. It also shows different system information (memory usage, drive space etc.). EldoS Clock includes Advanced Calendar, LaunchPad, regular and countdown timers, alarms and reminders system and Taskbar Clock replacement. Includes Time Zone Editor, that allows you to add, remove and modify Windows time zone records and fix errors in them. EldoS Clock includes plugins support, so adding additional features is quick and easy.					
Published by EldoS			EldoS Clock Home Page			

 Clock G2	Version 3.1			Online Registration Not Yet Available		
	30-Nov-99	600K	Win 95/98/NT	Shareware \$10.00	Never Expires	Install
	4 min at 28.8K		1 min at 56K		1 min at ISDN 128K	
	PC clock synchronizer, desktop clock and screen saver. Synchronize your PC clock automatically with popular Internet Atomic time servers. Desktop display options include analog, digital, millennium, world analog and world digital.					
Published by GetWare			Clock G2 Home Page			

 WebTimeSync	Version 3.1			No Registration Required		
	27-Nov-99	388K	Win 95/98/NT	Freeware	Never Expires	Install & Uninstall
	2 min at 28.8K		1 min at 56K		<1 min at ISDN 128K	
	connects to one of the NIST time servers to get the current time for your system. Version 3.1 adds startup at system startup, fixes a bug in the Apply button code of the Options dialog and adds a few minor stability improvements as well. Requires the VB 6.0 Runtimes.					
Published by VicTech			WebTimeSync Home Page			

 Hamsin Clock	Version 1.01			No Registration Required		
	24-Nov-99	408K	Win 95/98/NT	Freeware	Never Expires	No Install
	3 min at 28.8K		1 min at 56K		<1 min at ISDN 128K	
	Hamsin Clock is a completely customizable digital desktop clock with a powerful alarm system. The program allows selecting color, font and opaque/transparent mode.					
Published by Sergey V. Popov			Hamsin Clock Home Page			

 World Time Clock	Version 2.1			No Registration Required		
	24-Nov-99	481K	Win 95/98/NT	Freeware	Never Expires	Install & Uninstall
	3 min at 28.8K		1 min at 56K		1 min at ISDN 128K	
	The program shows the time of five different timezones, with analog and digital clocks. Choose from a list of 150 countries and 400 cities and define 5 countries/cities of your own. Correctly implemented daylight savings time rules.					
Published by Johannes Wallroth			World Time Clock Home Page			

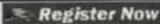
 Kilroy's Clock	Version 2.0			No Registration Required		
	22-Nov-99	1,569K	Win 95/98/NT	Freeware	Never Expires	Install & Uninstall
	10 min at 28.8K		3 min at 56K		2 min at ISDN 128K	
	A clock that allows the user to change the color of most stuff in the app. It also has the ability to open pictures. Has all required files in setup!					
Published by Jeff			Kilroy's Clock Home Page			

 UK Speaking Clock	Version 7.2.0			Online Registration Not Yet Available		
	19-Nov-99	45K	Win 95/98/NT	Shareware \$15.00	Expires after 15 Days	Install Unknown
	<1 min at 28.8K		<1 min at 56K		<1 min at ISDN 128K	
	Speaking Clock is a desktop clock that uses one or two Microsoft Agent characters of your choice to announce the time and date, and to act out various expressions relating to the clock. It can automatically announce the time at intervals you specify or on demand. You can set five independent alarms, each of which can launch a program and announce a message. Skins let you customize the clock and date's appearance.					
Published by UK Software			UK Speaking Clock Home Page			

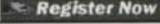
 Clock	Version 1611			No Registration Required		
	17-Nov-99	59K	Win 95/98/NT	Freeware	Never Expires	No Install
	<1 min at 28.8K		<1 min at 56K		<1 min at ISDN 128K	
	Simple, but nice alarm clock. Can change skins. Can synchronise time with Internet servers. There are no any documentation or controls, in order to change anything look into .cfg files.					
Published by Alex Artamonov			Clock Home Page			

 PACT ShowTime	Version 2000					
	16-Nov-99	2,913K	Win 95/98/NT	Shareware \$14.00	Never Expires	Install & Uninstall
	18 min at 28.8K		6 min at 56K		3 min at ISDN 128K	
	Movable date and time display, with phase of moon, highly configurable! Taskbar tray icon with 2-line display, e.g. with date and day of week. Alarm, countdown, hour signal, world times, integrated notes editor.					
Published by PACT Software			PACT ShowTime Home Page			

 Reminder	Version 1.0			No Registration Required		
	13-Nov-99	348K	Win 95/98/NT	Freeware	Never Expires	No Install
	2 min at 28.8K		1 min at 56K		<1 min at ISDN 128K	
	To keep you from forgetting those tasks you have to do, Reminder will pop up and tell you at the time you need to do them so that you don't forget.					
Published by Zero Alpha			Reminder Home Page			

 Virtual Stopwatch	Version 2.07					
	12-Nov-99	982K	Win 95	Shareware \$15.00	Expiration Unknown	Install & Uninstall
	6 min at 28.8K		2 min at 56K		1 min at ISDN 128K	
	Runs as a stopwatch, a countdown timer, or a clock. Time events up to 1/100th of a second in stopwatch or countdown timer mode. Clock mode supports a full featured time logging system. Log data can be edited and reports can be generated from it. You can set up alarms that beep, play a WAV file, run a program, or display a message. Alarms can be set up to repeat at a given interval, run on set days of the week, or run on a specific day. The graphic digit display is configurable through the use of add-on DLL's.					
Published by Spring Creek Software			Virtual Stopwatch Home Page			

 Congratulator	Version 1.12			Online Registration Not Yet Available		
	08-Nov-99	1,011K	Win 95/98	Shareware \$15.00	Expiration Unknown	Install & Uninstall
	6 min at 28.8K		2 min at 56K		1 min at ISDN 128K	
	It congratulates you with current holiday at every Windows start. It has following features: - four semantic groups of calendars; - support of calendars with national holidays in national languages; - calendars include fixed dates as well as not fixed dates (e.g. Last Sunday in July or 40 days after Western/Orthodox Easter); - support of USER CALENDAR in different national languages; - you can install new calendars and national languages (having downloaded it from developer's Web-site).					
Published by Denis Zhuravljov			Congratulator Home Page			

 Sync-It with Atom	Version 1.5					
	03-Nov-99	149K	Win 95/98/NT	Shareware \$10.00	Expires after 15 Days	Install & Uninstall
	1 min at 28.8K		<1 min at 56K		<1 min at ISDN 128K	
	A network time protocol client that calibrates the system time of your computer with a timeserver on the Internet. Features include automatic selection of the closest server, scheduled time synchronization, taskbar tray support and easy-to-use and attractive user interface.					
Published by Sami Tolvanen			Sync-It with Atom Home Page			

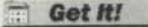
 Time Left	Version 1.0			No Registration Required		
	02-Nov-99	960K	Win 95/98/NT	Freeware	Never Expires	Install & Uninstall
	6 min at 28.8K		2 min at 56K		1 min at ISDN 128K	
	TimeLeft is a countdown/stopwatch clock using Winamp skins to show digits. TimeLeft counts how much time (year, months, days, hours, minutes and seconds) is left of any given deadline. You can customize alarm time, alert message text, icon, etc.					
Published by Kyrylo Nesterenko			Time Left Home Page			

 ZULU	Version 1.5			No Registration Required		
	02-Nov-99	10K	Win 95/98/NT	Freeware	Never Expires	No Install
	<1 min at 28.8K		<1 min at 56K		<1 min at ISDN 128K	
	ZULU quickly calculates what time it is in other time zones. Ideal for communication by phone, IRC, ICQ, AIM, etc., to help you determine the current local time for the person you are communicating with. Also very handy for purposes where you need ready access to Greenwich Mean Time (GMT). Requires VB5 runtimes.					
Published by LoafieWare			ZULU Home Page			

 Hold Back Time	Version 1.0			Online Registration Not Yet Available		
	01-Nov-99	719K	Win 95/98/NT	Shareware \$10.00	Never Expires	Install & Uninstall
	4 min at 28.8K		2 min at 56K		1 min at ISDN 128K	
	Prevent your computer from processing time beyond a certain date. There are two dates which may potentially cause problems with different software applications: December 31, 1999 to January 1st, 2000, and February 28th to February 29th, 2000 (Leap Year).					
Published by Labyrinth Software			Hold Back Time Home Page			

 Stop Watch	Version 1.2			No Registration Required		
	30-Oct-99	344K	Win 95/98/NT	Freeware	Never Expires	No Install
	2 min at 28.8K		1 min at 56K		<1 min at ISDN 128K	
	Stop Watch has all the features of a real stop watch.					
Published by Zero Alpha			Stop Watch Home Page			

 StopWatch	Version 1.2			No Registration Required		
	28-Oct-99	344K	Win 95/98/NT	Freeware	Never Expires	No Install
	2 min at 28.8K		1 min at 56K		<1 min at ISDN 128K	
	StopWatch has all the features of a real stopwatch.					
Published by Zero Alpha			StopWatch Home Page			

 CLOX Worldwide Clocks	Version 2000.7.0				Online Registration Not Yet Available	
	27-Oct-99	2,565K	Win 95/98/NT	Shareware \$10.00	Never Expires	Install & Uninstall
	16 min at 28.8K		6 min at 56K		3 min at ISDN 128K	
	An international clocks applet which displays a row of analogue and digital clocks which show the times in user-selected locations around the world. Clocks can be set using a clickable map but manual override is possible. In addition to the times, the day in each location is also given to avoid confusion. Setting daylight saving times is simplified and registered users receive updated information, internet support and other benefits. All in all CLOX is a very neat, simple to use way of knowing exactly what time it is anywhere on earth. Includes a calendar and alarm and can automatically adjust your system time via the internet.					
Published by Ian Tragen			CLOX Worldwide Clocks Home Page			

	Version 2.0			No Registration Required		
	26-Oct-99	220K	Win 95/98/NT	Freeware	Never Expires	No Install
	1 min at 28.8K		<1 min at 56K		<1 min at ISDN 128K	
	Customizable utility that counts down to Y2K.					
Published by SurfWare			Y2KCountdown Home Page			

	Version 2.0			No Registration Required		
	23-Oct-99	3,460K	Win 95/98/NT	Freeware	Expires on 12/26/99	Install & Uninstall
	22 min at 28.8K		8 min at 56K		4 min at ISDN 128K	
	Christmas 1999 counts down the days, hours, minutes, and seconds until Christmas. The program lets you create and manage Christmas lists of items to buy, and who to buy them for. These lists can be password protected. Christmas 1999 also enables you to go shopping on-line, download Christmas stuff, or send e-greeting cards. In addition, the program includes a calendar.					
Published by Focusmedia Interactive			Christmas 1999 Home Page			

	Version 1.0			No Registration Required		
	22-Oct-99	500K	Win 95/98/NT	Freeware	Expires on 1/2/00	Install
	3 min at 28.8K		1 min at 56K		1 min at ISDN 128K	
	Countdown timer til midnight january first 2000 with a few added features.					
Published by Bobb Voigt			Bobb's Y2K Countdown Special Edition Home Page			

	Version 1.0			No Registration Required		
	19-Oct-99	1,900K	Win 95/98/NT	Freeware	Never Expires	Install & Uninstall
	12 min at 28.8K		4 min at 56K		2 min at ISDN 128K	
	This program is a little countdown timer until the new year of every year. It displays will show you how many days-hours-minutes-seconds there are left in the year.					
Published by Joseph Martin			No Home Page Available			

	Version 3.0			Online Registration Not Yet Available		
	12-Oct-99	1,817K	Win 95/98/NT	Shareware \$7.95	Expires after 20 Days	Install & Uninstall
	11 min at 28.8K		4 min at 56K		2 min at ISDN 128K	
	An easy to use countdown timer. Just enter the length of time you desire, and click the start button. Minimizes to, and runs quietly in, the system tray. Reappears, and sounds an alarm, when the timer ends. Manage the time you spend working or playing on the computer more efficiently. Whether you need to be reminded to turn off the stove, or for setting a time limit on how long your children spend on the computer. The PC Timer is the answer!					
Published by Buffalo Software			The PC Timer Home Page			

	Version 5.1			Register Now		
	05-Oct-99	3,746K	Win 95/98/NT	Shareware \$12.00	Expires after 14 Days	Install & Uninstall
	23 min at 28.8K		8 min at 56K		4 min at ISDN 128K	
	A timer utility program for Windows 95. It is somewhat like a kitchen timer, but much more. Using it, you can be reminded every 20 minutes to perform your stretching exercises; to remind yourself to call Melissa in 30 minutes; to keep track of the time you spend on a task; or do all three by running multiple instances of Jogger at the same time.					
Published by Leepware			Jogger Home Page			

 TimeSlice	Version 1.3.0			Online Registration Not Yet Available		
	02-Oct-99	1,718K	Win 95/98/NT	Shareware \$40.00	Expiration Unknown	No Install
	11 min at 28.8K		4 min at 56K		2 min at ISDN 128K	
	Automates the task of tracking your time and billing for hourly work. You can list clients, projects and/or categories with applicable rates, then start timing when you begin work. An expense amount can be added to each time entry. You can easily add time entries when you have been working away from your computer. TimeSlice allows you to bill by minutes or tenth, quarter, half, or whole hour and then generate invoices or reports for any set of time recorded. You can bill time against clients, projects, or specific tasks and keep notes on exactly what you're doing. TimeSlice data can be exported to database, spreadsheet, word processing programs so that you can create custom invoices and reports. TimeSlice stays out of your way while you work on your computer by providing the ability to command the timer and edit active time entries while TimeSlice is minimized.					
	Published by Maui Software			TimeSlice Home Page		

 Timeless Time & Expense	Version 1.32			Online Registration Not Yet Available		
	27-Sep-99	1,420K	Win 95/98/NT	Shareware \$42.99	Expires after 30 Days	Install & Uninstall
	9 min at 28.8K		3 min at 56K		2 min at ISDN 128K	
	Designed to track time and expenses without taking all a lot of time. Timeless Time & Expense allows you to easily track time at a fine level of detail by project and/or activity. With Timeless Time & Expense's flexible reporting capability, you get the information needed to accurately estimate time and costs on future tasks in addition to accurate billing information. Also includes Invoice reports, To Do list and International support for Time, Date and Currency formats.					
	Published by MAG Softwrx			Timeless Time & Expense Home Page		

 Multilingual Speaking Clock	Version 1.3			No Registration Required		
	22-Sep-99	867K	Win 95/98/NT	Freeware	Never Expires	No Install
	5 min at 28.8K		2 min at 56K		1 min at ISDN 128K	
	The Multilingual Speaking Clock is a freeware program that turns your expensive multimedia computer into a \$9.95 speaking alarm clock! It has a nice graphical frontend that mimics a LC-display, it can speak in different languages and it has an alarm for reminding you at a preset time.					
	Published by Leif Porsklev			Multilingual Speaking Clock Home Page		

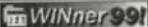
 Alarm Clock	Version 1.0			Online Registration Not Yet Available		
	08-Sep-99	226K	Win 95/98	Shareware \$5.00	Expiration Unknown	Install & Uninstall
	1 min at 28.8K		<1 min at 56K		<1 min at ISDN 128K	
	A program that will allow you to set up to four different times to be reminded of whatever. You can use it to replace the clock in the system tray.					
	Published by John McBride			Alarm Clock Home Page		

 RovoClock	Version 1.0			No Registration Required		
	29-Aug-99	819K	Win 95/98/NT	Freeware	Never Expires	Install & Uninstall
	5 min at 28.8K		2 min at 56K		1 min at ISDN 128K	
	Part of the upcoming RovoScope Accessories set. It is the only component of the accessory set to be freeware. RovoClock is not an ordinary clock, it's an attractive (in our opinion) looking one. The clock features plastic looking panels and clock arms and a smooth illustrative, non-standard, user interface. It also features as functionality a Y2K countdown (in seconds) and 3 starter buttons to start up apps and web links. It can be also set to stay on top of other windows.					
	Published by RovoScope Software			RovoClock Home Page		

	Version 1.0				No Registration Required	
	27-Aug-99	650K	Win 95/98/NT	Freeware	Never Expires	Install & Uninstall
	4 min at 28.8K		1 min at 56K		1 min at ISDN 128K	
	A colourful and highly configurable desktop clock program. The background for the clock can be loaded in from a graphics file, most common formats are supported including animated GIFs. The hands, border and numbers can then be modified to compliment the background and then all the settings saved into a small ascii file which can be reloaded at a later stage. Candy Clock comes with a variety of ready made clocks, and new ones can easily be created using clip art, graphics from the web etc.					
Published by Gallicrow Software				Candy Clock Home Page		

	Version 1.5.3b				No Registration Required	
	26-Aug-99	25K	Win 95/98/NT	Freeware	Never Expires	No Install
	<1 min at 28.8K		<1 min at 56K		<1 min at ISDN 128K	
	This nice clock lies on your desktop and doesn't bother you. Now you can hide the button (it jars on somebody). Setting of the right time will take you a moment (click the button 'Sec00' or 'Set'). If you click the right button of your mouse on the clock then the menu appears. Now you can change the font, colors and format of date type. The indication of the clock and the date corresponds to the Windows setting.					
Publisher Unknown				Chasiki Home Page		

	Version 1.0.5				No Registration Required	
	25-Aug-99	9K	Win 95/98/NT	Freeware	Never Expires	No Install
	<1 min at 28.8K		<1 min at 56K		<1 min at ISDN 128K	
	A simple alarm clock program I came up with in Visual Basic 6. Set the alarm to the time you desire, and then at that time the computer will loop your default sound until you shut it off again. Be sure to read the readme file!					
Published by Dynasty Productions				Alarm Clock Home Page		

	Version 1.1				Online Registration Not Yet Available	
	25-Aug-99	980K	Win 95/98/NT	Shareware \$20.00	Expiration Unknown	Install & Uninstall
	6 min at 28.8K		2 min at 56K		1 min at ISDN 128K	
	Within a closed Intranet it can operate to ensure that all PCs agree on the time. If you have ever tried to develop applications across more than one PC you will know the problems caused by machines having a different idea of what time it is, or even what day in some cases!					
Published by H.C. Mingham-Smith				Tardis Home Page		

	Version 3.5.3				Online Registration Not Yet Available	
	22-Aug-99	2,557K	Win 95/98	Shareware \$28.00	Expires on 12/31/99	Install & Uninstall
	16 min at 28.8K		6 min at 56K		3 min at ISDN 128K	
	Will keep accurate time and date beyond 2000 irrespective of the Y2K compliance status of the PCs RTC and/or BIOS. No need to throw out perfectly good PCs because they are not Y2K compliant! This is an active solution! It is not an RTC or BIOS patch! It is not dependant on Century Bytes in the RTC! It works with every known combination of RTC and BIOS.					
Published by PC Life				PC Life @ 2000 Home Page		

	Version 1.5.3			No Registration Required		
	22-Aug-99	1,013K	Win 95/98/NT	Freeware	Never Expires	Install
	6 min at 28.8K		2 min at 56K		1 min at ISDN 128K	
	<p>Excellent Project, Task, or DayCare TimeClock. Keeps track of time spent on tasks. Each task can have its own Charge amount \$/hour. Very Configurable. Can generate, save and print reports. Reports can be monthly, weekly or daily. For those tracking Government projects, time can be tracked in tenths of an hour if you wish. Very friendly, it remembers the settings and modes that it was last used in. Completely FREE for ALL Users. Email me if you like it!</p>					
Published by Chad Capps			Project TimeClock Home Page			

	Version 1.5			No Registration Required		
	20-Aug-99	1,919K	Win 95/98/NT	Freeware	Never Expires	Install & Uninstall
	12 min at 28.8K		4 min at 56K		2 min at ISDN 128K	
	<p>Uses Microsoft Agents characters to speak the time and messages that you can assign to alarms. Microsoft Agents are part of the Windows 2000 operating system. You can install Microsoft Agents under Windows 95/98/NT by downloading the Agent 2.0 core components, text to speak engine, and Agent character files from the Microsoft Agents website.</p>					
Published by Guy Campbell/Terry Wood/Mary Mills			Talking Agent Clock Home Page			

	Version 1.0			No Registration Required		
	20-Aug-99	1,424K	Win 95/98/NT	Freeware	Never Expires	Install
	9 min at 28.8K		3 min at 56K		2 min at ISDN 128K	
	<p>A simple updating Time displaying program. With Copy, Color, Pause, and other options. A small, useful program.</p>					
Published by Wes DeMoney			Time Home Page			

	Version 1.0			Online Registration Not Yet Available		
	18-Aug-99	2,513K	Win 95/98/NT	Shareware \$19.95	Expires after 30 Days	Install & Uninstall
	16 min at 28.8K		6 min at 56K		3 min at ISDN 128K	
	<p>Synchronizes your system clock through an Internet Timeserver, is a replacement for the standard Windows tray clock, enhancing it by showing the current time at locations around the world, renders a breathtaking photo-realistic image of the current illumination on earth that can be used as the desktop wallpaper and in the screensaver that comes with the program and gives you information about public holidays in countries around the world.</p>					
Published by 40tude Software			40tude Time Home Page			

	Version 3.04			Online Registration Not Yet Available		
	18-Aug-99	1,298K	Win 95/98/NT	Shareware \$45.00	Expires after 30 Days	Install & Uninstall
	8 min at 28.8K		3 min at 56K		1 min at ISDN 128K	
	<p>A project time tracking system that runs in the Windows system tray. Proj Clock is a useful utility for anyone who must keep track of time billed to different projects. Time can be punched in and out for each project. A running total displays the total time billed to each project for the day. A history database is kept to record all time transactions. Reports summarize all billed project time in the given time period. Data may be viewed by saveable SQL calls. Proj Clock Pro is multi-user network ready and has user-customizable reports.</p>					
Published by CyberMatrix Corporation Inc.			Proj Clock Home Page			

 Binary Clock	Version 1.0			No Registration Required		
	15-Aug-99	1,490K	Win 95/98/NT	Freeware	Never Expires	Install & Uninstall
	9 min at 28.8K		3 min at 56K		2 min at ISDN 128K	
	Displays the time in Binary format, using images of LED's (Light Emitting Diodes) to represent real ones (Duh...) creates different patterns to represent the time. Interesting and cool to look at, especially once you learn how to read it!! ;) A tutorial is built into the program.					
Published by Dark Eclipse			Binary Clock Home Page			

 Chrono	Version Release 2 Beta			No Registration Required		
	11-Aug-99	989K	Win 95/98/NT	Freeware	Never Expires	Install & Uninstall
	6 min at 28.8K		2 min at 56K		1 min at ISDN 128K	
	Answers the need for a fast, simple utility that displays the current time or date. It can be used either as a replacement for the clock in the system tray, or as a companion -- for those situations when you're in the eleventh hour and need constant watch over the current time. With its customizable interface and flexible mix of settings, it can be configured to suit almost any need. Support time display in 12/24 hour format with/without AM/PM symbols, and date display.					
Published by Chanh-Duy Tran			Chrono Home Page			

 Voice Clock	Version 1.1			No Registration Required		
	09-Aug-99	8,020K	Win 95/98/NT	Freeware	Never Expires	Install & Uninstall
	50 min at 28.8K		18 min at 56K		9 min at ISDN 128K	
	Digital clock that supports auto-resizing skins with transparency! Has voice plug-ins that can automatically speak the time every 1, 15, 30, or 60 minutes. It can also automatically set your PC's time using the internet time server of your choice. Has alarms with ability for pre-reminders so many days in advance and snooze buttons. You can make an alarm a reoccurring reminder (never forget a birthday!). On alarms it can SPEAK ANY PHRASE, show a message, launch files, shutdown, reboot, log off, or flash the clock. You can also hide the clock and show a tray icon instead.					
Published by Jeff L. Williams			Voice Clock Home Page			

 Time Meter	Version 1.00			No Registration Required		
	08-Aug-99	171K	Win 95/98/NT	Freeware	Never Expires	No Install
	1 min at 28.8K		<1 min at 56K		<1 min at ISDN 128K	
	Time Meter was developed to provide a quick way to count the time. No Stopwatch. No Save.					
Published by Tong Naraktisood			Time Meter Home Page			

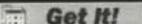
 GhostWatch	Version 2.2			Online Registration Not Yet Available		
	07-Aug-99	479K	Win 95/98	Shareware	Expires after 30 Days	Install & Uninstall
	3 min at 28.8K		1 min at 56K		1 min at ISDN 128K	
	A little desktop watch with an innovative feature: it is transparent! For this motive could remain in sight for all the time, without give bother!					
Published by Alfredo Giometti			No Home Page Available			

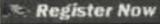
 HyperTime	Version 1.0			No Registration Required		
	07-Aug-99	2,560K	Win 95/98/NT	Freeware	Never Expires	Install
	16 min at 28.8K		6 min at 56K		3 min at ISDN 128K	
	Lets you assign sound files (wav, midi, or MPEG) to times. Use it as an audible clock, or just a friendly reminder. Download our collection of bird sounds and in seconds, and you'll have a lovely sounding bird clock! With HyperTime, you can specify sounds that play at the top of each hour, every half hour, or every 15 minutes. You can even have a special sound play at the time you specify - a great way to remind you of a meeting,					

appointment, or your favorite net show/freely.

Published by **Hyperpresence**

[HyperTime Home Page](#)

 Big Ben	Version 2.2					
	06-Aug-99	1,900K	Win 95/98/NT	Shareware \$10.00	Never Expires	Install
	12 min at 28.8K		4 min at 56K		2 min at ISDN 128K	
	<p>Turn your PC into Big Ben and chime the quarters and the hours with the sound of London's most famous bells. An ideal utility for New Year's Eve parties as we approach the Millennium. This shareware utility is quite unobtrusive, and will play a section of the Westminster Chimes on each quarter-hour, and will mark each hour with a number of tolls of Big Ben itself.</p>					
Published by KPJ Jones			Big Ben Home Page			

 Clik Clocks	Version 1.0.5					
	06-Aug-99	2,518K	Win 95/98	Shareware \$15.00	Expires after 20 Days	Install & Uninstall
	16 min at 28.8K		6 min at 56K		3 min at ISDN 128K	
	<p>Ten ingenious clocks for the desktop. Some brought from outer space alien minds. Include a device to tune the pc clock to the atomic clock, and a double display stopwatch with synchronized functions. Interchangeable skins and sounds. FREE skins on Clik Clocks web site and the real history of these clocks. A must have for clock lovers, smart users and people who loves to have unique software. Complete documentation is included for every time piece. They are fun and mysterious.</p>					
Published by Pablo Grajman			Clik Clocks Home Page			

 CC TimeKeeper	Version 1.4				No Registration Required	
	04-Aug-99	285K	Win 95/98/NT	Freeware	Never Expires	Install & Uninstall
	2 min at 28.8K		1 min at 56K		<1 min at ISDN 128K	
	<p>Helps you track the time you spend working at the computer. Start, Pause, Stop and document your work and then save to a file for later use. With its small footprint and intuitive interface, this freeware proves that great things come in small packages.</p>					
Published by Crystalline Concepts			CC TimeKeeper Home Page			

 Lifeclock	Version 2.0				No Registration Required	
	04-Aug-99	828K	Win 95/98/NT	Freeware	Never Expires	Install & Uninstall
	5 min at 28.8K		2 min at 56K		1 min at ISDN 128K	
	<p>A 32-bit Windows application that predicts/estimates your death date and how long you have to live using accurate life expectancy tables. Requires the VB 6.0 Runtimes.</p>					
Published by Alon Or-bach			Lifeclock Home Page			

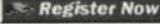
 Today	Version 2000				Online Registration Not Yet Available	
	03-Aug-99	1,890K	Win 95/98/NT	Shareware \$5.00	Expiration Unknown	Install & Uninstall
	12 min at 28.8K		4 min at 56K		2 min at ISDN 128K	
	<p>Ever wish you could just glance at your computer screen and instantly know what today's date is? "Today 2000" is a tiny (96K) little program that shows you the date, right next to the time, without having to move your mouse at all. It has no fancy alarms or menus, just the date and a small calendar that appears when you click it. "Today 2000" is fast and simple, but will quickly become one of the most frequently used additions to your computer.</p>					
Published by vanhouwelingen.com			Today Home Page			

 CurrentTime	Version 1.0.1			No Registration Required		
	31-Jul-99	38K	Win 95/98/NT	Freeware	Never Expires	No Install
	<1 min at 28.8K		<1 min at 56K		<1 min at ISDN 128K	
	Will always make sure your PC clock is accurate by connecting to time servers on the Internet and fetching the correct time with second precision. If you use a dial-up connection to reach the Internet, CurrentTime will synchronize the time every time you connect. With a full-time Internet connection, you may choose the interval at which synchronization will take place. Full C source code is included.					
Published by Magnus Baeck			CurrentTime Home Page			

 Tclock	Version 2.2.6			No Registration Required		
	28-Jul-99	168K	Win 95/98	Freeware	Never Expires	No Install
	1 min at 28.8K		<1 min at 56K		<1 min at ISDN 128K	
	This program lets you change the format of your clock (bottom right of screen) it also allows you to syncanise your clock to online clocks and display swatch internet time.					
Published by Kazuto Sato			No Home Page Available			

 TimeZone 99	Version 1.0.0			No Registration Required		
	24-Jul-99	2,159K	Win 95/98	Freeware	Never Expires	Install & Uninstall
	13 min at 28.8K		5 min at 56K		2 min at ISDN 128K	
	Shows the time in a specified place on the world map. You specify the place by moving the mouse cursor over it.					
Published by Shmalmal Software			TimeZone 99 Home Page			

 ionus iAlarm	Version 1.1			No Registration Required		
	20-Jul-99	12K	Win 95/98/NT	Freeware	Never Expires	No Install
	<1 min at 28.8K		<1 min at 56K		<1 min at ISDN 128K	
	A next-generation clock with reminder functionality. See-it-and-love-it.					
Published by Christian Hofstaedtler			ionus iAlarm Home Page			

 WorldTime2000	Version 2.00					
	18-Jul-99	1,020K	Win 95/98/NT	Shareware \$9.00	Expires after 14 Days	Install & Uninstall
	6 min at 28.8K		2 min at 56K		1 min at ISDN 128K	
	An application for simultaneously viewing many different time zones from around the world. Comes with time information for over 400 cities and time zones. Set alarms, modify, delete or add locations. With your choice of fonts, colors and wallpapers, you can achieve a very individual look. Modern, 'cool' look.					
Published by PCM Computer Systems Pty Ltd			WorldTime2000 Home Page			

 Apex World Time	Version 1.00			No Registration Required		
	17-Jul-99	67K	Win 95/98/NT	Freeware	Never Expires	No Install
	<1 min at 28.8K		<1 min at 56K		<1 min at ISDN 128K	
	Displays the time of any country in the world relative to your current location from a neat, clear interface.					
Published by Jamie Brown			Apex World Time Home Page			

 RoundClock99	Version 1.0			Online Registration Not Yet Available		
	12-Jul-99	1,431K	Win 95/98/NT	Shareware \$10.00	Expiration Unknown	Install & Uninstall
	9 min at 28.8K		3 min at 56K		2 min at ISDN 128K	
	Introduces a new dimension in desktop novelties - the ROUND clock. RoundClock 99 is a color, draggable, hideable and customizable (in the registered version) desktop clock which has the added novelty being circular. It also shows the current					

date and updates every second.	Published by Graham Taylor	RoundClock99 Home Page
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 Beatle Atomic Time	Version 1.01				Register Now	
	10-Jul-99	244K	Win 95/98/NT	Freeware	No Registration Required	Never Expires
	2 min at 28.8K		1 min at 56K		Install	
This software connects to an atomic time server and uses the received time to generate the 'Swatch Internet Time'						
Published by Philipp Robbel				Beatle Atomic Time Home Page		

 World Clock	Version 2.0.2				Register Now	
	07-Jul-99	654K	Win 95/98/NT	Shareware \$35.00	Expires after 30 Days	Install & Uninstall
	4 min at 28.8K		1 min at 56K		1 min at ISDN 128K	
The program displays times in various cities around the world. There are two displays that can be used for this purpose, the World Time window and the Time Zones window. Both windows are user configurable for content and format. The World Time window is limited to displaying information for four cities whereas the Time Zone window, which is a world map, can contain as many cities as there are available. A "What if" feature allows the user to input a time in one city to see what time it would be in another city. City times are adjusted to their local times based on which time zone they are in and the status of the Daylight Saving data. All International settings are supported.						
Published by Alister J Nicol				World Clock Home Page		

 WinGlobe	Version 1.2				Online Registration Not Yet Available	
	06-Jul-99	1,741K	Win 95/98/NT	Shareware \$15.00	Expiration Unknown	Install & Uninstall
	11 min at 28.8K		4 min at 56K		2 min at ISDN 128K	
A tiny earth that sits on your Windows desktop. In addition to just sitting there it knows the local time and population of all major cities around the world. It also shows where it is day or night at the moment.						
Published by Dirk Djuga				WinGlobe Home Page		

 Time Manager	Version 1.00				Online Registration Not Yet Available	
	04-Jul-99	760K	Win 95/98/NT	Shareware \$20.00	Expiration Unknown	Install & Uninstall
	5 min at 28.8K		2 min at 56K		1 min at ISDN 128K	
While it sounds like it might be a PIM, Time Manager is actually a countdown timer and stopwatch combo. You can launch both its modules from the system tray. The Stopwatch is a handy tool -- and the Timer has some nice features. When it goes off it can play a sound, display a message box, launch a program or document, and/or shutdown/restart Windows. Select from terminating or repeating modes. You can also pick the font and colors used for the numbers for both modules, choose from two window sizes, and elect to keep the smaller versions of each on top of your desktop.						
Published by Vira Tech Development				Time Manager Home Page		

 ClockWise	Version 2.21a				Register Now	
	28-Jun-99	413K	Win 95/98	Shareware \$24.95	Expires after 30 Days	Install & Uninstall
	3 min at 28.8K		1 min at 56K		<1 min at ISDN 128K	
A Win95 clock, calendar, alarm/reminder, timer, stopwatch and program scheduler. It also allows the user to automatically set the system clock via Internet NTP or to the atomic clock at NIST via modem. It uses minimal system resources, and yet is extremely powerful. It's biggest feature is its versatile scheduling interface, which allows any program to be run completely unattended. It can also automate setting the system clock, and system shut-down or reboot.						
Published by Richard						

		Joseph (RJ Software)			ClockWise Home Page	
 WatchClock	Version 1.0				No Registration Required	
	25-Jun-99	23K	Win 95/98	Freeware	Never Expires	No Install
	<1 min at 28.8K		<1 min at 56K		<1 min at ISDN 128K	
This is a little neat tool that deals with clocks. You can see the current time, see how many seconds or time until midnight, what today's date is, if it a leap year or not, and finally, if it is a weekday or not.						
Published by Ryan Couch			No Home Page Available			
 Magohn's Worldtime 2	Version 1.1				No Registration Required	
	24-Jun-99	1,000K	Win 95/98/NT	Freeware	Never Expires	Install & Uninstall
	6 min at 28.8K		2 min at 56K		1 min at ISDN 128K	
Gives fast and accurate accessibility to nine major world titles. The application easily switches between all U.S. timezones. The application has been tested rigorously and functions flawlessly on any Windows95, 98 or NT machine.						
Published by Magohn Software			Magohn's Worldtime 2 Home Page			
 Traveler's Clock	Version 1.0				No Registration Required	
	15-Jun-99	7K	Win 95/98/NT	Freeware	Never Expires	No Install
	<1 min at 28.8K		<1 min at 56K		<1 min at ISDN 128K	
Are you a traveler that doesn't feel like paying \$15 for an alarm clock? Well, this alarm clock is small, easy to use, and best of all free! I just made this today, and it features a clock, and choice of different beep preferences. This clock will ensure you that you don't miss your bosses' meeting, or miss your flight!						
Published by Jason Rand			Traveler's Clock Home Page			
 BeatNik Internet Clock	Version 2.0b8				No Registration Required	
	02-Jun-99	568K	Win 95/98/NT	Freeware	Never Expires	Install & Uninstall
	4 min at 28.8K		1 min at 56K		1 min at ISDN 128K	
A nonrectangular skinnable clock. Synchronize your clock with Atomic Clock via direct internet connection or SOCKS 4 proxy. Displays time in 12/24-hour and Internet Time formats. Includes a skin editor.						
Published by Something Decent			BeatNik Internet Clock Home Page			
 StarClock	Version 2.51				Register Now	
	02-Jun-99	2,095K	Win 95/98/NT	Shareware \$11.00	Expiration Unknown	Install & Uninstall
	13 min at 28.8K		5 min at 56K		2 min at ISDN 128K	
	An analog or digital clock on your desktop with a cartoonish picture of a boy in the clock's face. Every few seconds the boy's expression changes. He can be happy, angry, or sleeping, complete with appropriate sound effects played at regular intervals. Other features include a right-click menu that lets you launch common Windows components, two screen savers, system tray support, shutdown controls, and optional background music. Despite a few rough edges and a nag screen that pops up every so often, StarClock might take a nice desktop companion.					
Published by Yolim Communication			StarClock Home Page			
 TCE	Version 0.9 Beta				No Registration Required	
	02-Jun-99	59K	Win 95/98	Freeware	Never Expires	Install & Uninstall
	<1 min at 28.8K		<1 min at 56K		<1 min at ISDN 128K	
A nice clock with extremely powerful alarms system and ability to control Winamp.						
Published by Michael Vladimirov			TCE Home Page			

 Responsive Time Logger	Version 3.20.04				Online Registration Not Yet Available	
	01-Jun-99	1,544K	Win 95/98/NT	Demo \$89.00	Expiration Unknown	Install & Uninstall
	10 min at 28.8K		3 min at 56K		2 min at ISDN 128K	
	A professional time and billing tool for consultants, lawyers, engineers, and others who bill for their time. Use the built-in stopwatch for time tracking, or enter time and expense data at the end of the day. Produce customized time reports. Design your invoices with your favorite word processor, or use the templates provided with the application. Track payments with the straightforward accounts receivable section.					
Published by Alan Macy				Responsive Time Logger Home Page		

 Active Desktop Alarm Clock 2000	Version 2.04				Online Registration Not Yet Available	
	31-May-99	394K	Win 95	Shareware \$5.00	Expiration Unknown	Install
	2 min at 28.8K		1 min at 56K		<1 min at ISDN 128K	
	The best Active Desktop Alarm Clock program uniquely designed for life after the year 2000, and specifically designed for Windows 95/98 and MS IE 4/5+ browser users. Providing you with a choice of having 2 different event settings for every day of the week. Now you'll never miss another scheduled event again with an easy to use utility having multiple alarm and/or event settings. Use your custom messages for alert reminders. Use your favorite sound, music, picture, video files and even live web audio or video feeds for the alert signals or events. Can be used as an Active Desktop (recommended) or as an external application. If selected to do so., when the alarm is activated, it will change into an alert mode sounding the alarm signal for two (2) minutes before changing into a Snooze mode. Then, after six (6) minutes of snoozing, it will return to sound the alarm again. The alarm will automatically repeat the alarm cycle four (4) times; with three (3) snooze cycles, then end, unless you select Stop (at any time). If the alarm is left unattended while activated, it will function for a total of 26 minutes, then reset itself to a standby mode until the next day. About the same way as most any other digital alarm clock functions, except this clock is Internet user interactive.					
Published by Maurice Travis				Active Desktop Alarm Clock 2000 Home Page		

 SetTime Client	Version 2.1.2				No Registration Required	
	26-May-99	1,062K	Win 95/98/NT	Freeware	Never Expires	Install & Uninstall
	7 min at 28.8K		2 min at 56K		1 min at ISDN 128K	
	Synchronizes your PC clock to the world standard. An SNTP client that is a whole lot more. SetTime Client also includes a stop-watch timer and complete scheduling features. SetTime Client can display a message, check the time, run a program, or open a document at anytime - any day. Get on time. Stay on time. Be on time.					
Published by Breese IT & C				SetTime Client Home Page		

 TinyTimer	Version 1.30				No Registration Required	
	23-May-99	407K	Win 95/98/NT	Freeware	Never Expires	Install & Uninstall
	3 min at 28.8K		1 min at 56K		<1 min at ISDN 128K	
	This small system tray accessory provides the user with a small, easy to use Pop-Up! timer. Use it to monitor your online time, or any general purpose timing activity. Installs itself in the system tray.					
Published by Popcorn Software				TinyTimer Home Page		

 @Time Internet Time Clock	Version 2.0 beta 2				No Registration Required	
	18-May-99	2,000K	Win 95/98/NT	Freeware	Never Expires	Install & Uninstall
	12 min at 28.8K		4 min at 56K		2 min at ISDN 128K	
	On the Internet? Of course you are! Why not run on Internet Time? Get the @Time Desktop Clock; Internet Time right there, on your screen! Features include Alarms, A Buddy List, and a customizable interface.					
Published by CreativEngine				@Time Internet Time Clock Home Page		

	Version 2.0			Online Registration Not Yet Available		
	17-May-99	250K	Win 95/98/NT	Shareware \$10.00	Expiration Unknown	No Install
	2 min at 28.8K		1 min at 56K		<1 min at ISDN 128K	
	A combination PC clock synchronizer and desktop clock. Synchronize your PC clock automatically with popular Internet Atomic time servers. Specify how often you wish ClockG2 to synchronize your PC clock. Display choices include analog, digital, and world clock. World clock displays the times of six different major cities of your choice. ClockG2 follows your Windows color schemes. No installation is necessary. Simply download and run.					
Published by GetWare			ClockG2 Home Page			

	Version 1.0			No Registration Required		
	14-May-99	683K	Win 95/98/NT	Freeware	Never Expires	Install & Uninstall
	4 min at 28.8K		2 min at 56K		1 min at ISDN 128K	
	Clearly displays the time remaining until the year 2000. In the main window, the time remaining, as well as the current date and time are displayed. As well, the time remaining is displayed when the mouse is left over a system tray icon for a second.					
Published by CyberTech Software			Y2KountDown Home Page			

	Version 1.0			No Registration Required		
	12-May-99	134K	Win 95/98/NT	Freeware	Never Expires	No Install
	1 min at 28.8K		<1 min at 56K		<1 min at ISDN 128K	
	A very useful time tracking utility. It lets you keep track of time while you're busy "hacking code", plus you can save a log file for future reference. Excellent productivity tool for all of you consultants out there.					
Published by Arkosoft Technologies			Arkosoft StopWatch Home Page			

	Version 1.5			Register Now		
	11-May-99	407K	Win 95/98/NT	Shareware \$10.00	Expires after 7 Days	Install & Uninstall
	3 min at 28.8K		1 min at 56K		<1 min at ISDN 128K	
	A small, compact and simple watch clock for your desktop. Clock may take any exterior by using skins. Create your own skins for Clock, its really simple! Clock window in analog mode may be rectangular or rounded. Also available many features. As for instance: analog and digital modes, alert, signal, hiding from mouse (it allow you to use controls stated above on your desktop than Clock) and more! You may set the sound files for signal and alert. Watch the system time with AKClock!					
Published by Dimension X Software			AKClock Home Page			

	Version 2.0			Online Registration Not Yet Available		
	10-May-99	4,983K	Win 95/98/NT	Shareware \$39.95	Expires after 30 Days	Install & Uninstall
	31 min at 28.8K		11 min at 56K		5 min at ISDN 128K	
	This program allows you to display times for more than one place in the World. There are so many configuration options there will certainly be something to suit your needs.					
Published by Stuart Folo			WorldClock Home Page			

 Bill Central Time & Billing	Version 3.0			Online Registration Not Yet Available		
	02-May-99	2,644K	Win 95/98/NT	Demo \$59.00	Expiration Unknown	Install & Uninstall
	17 min at 28.8K		6 min at 56K		3 min at ISDN 128K	
	A professional time and billing system suitable for anyone who must invoice clients for time or services rendered. This useful program also acts as a management tool to allow you to track your clients' billing history and to analyze the effectiveness of your operation and billing procedures. Additional program features include recurring billing, project tracking, customizable invoice forms, and extensive reporting and printing capabilities. The program is well designed and easy to understand and navigate. A network/multi-user version is also available.					
Published by Integratech Software				Bill Central Time & Billing Home Page		

 CoolClock	Version 1.1			No Registration Required		
	02-May-99	341K	Win 95/98/NT	Freeware	Never Expires	No Install
	2 min at 28.8K		1 min at 56K		<1 min at ISDN 128K	
	A digital style texture mapped clock and date that is actually written on your desktop. Not in a window so you can click through the numbers! Very configurable with built in CD Player and wake up functions. Animates bitmaps across the surface of the clock to give a flowing lava/clouds/etc look.					
Published by Coolest.com				CoolClock Home Page		

 WorldTimer	Version 3.01			Online Registration Not Yet Available		
	25-Apr-99	1,186K	Win 95/98/NT	Shareware \$15.00	Expires after 30 Days	Install & Uninstall
	7 min at 28.8K		3 min at 56K		1 min at ISDN 128K	
	A user configurable world clock that can display a number of clocks in different time zones. As well as changing the label and timezone of each clock, the user may change the background colour and the text colour to suit their individual tastes. A world map can be displayed and optionally the world time zones can be superimposed on this map.					
Published by Castle Software Ltd				WorldTimer Home Page		

 WAVAlarm	Version 1.0			No Registration Required		
	22-Apr-99	1,930K	Win 95/98	Freeware	Expiration Unknown	Install & Uninstall
	12 min at 28.8K		4 min at 56K		2 min at ISDN 128K	
	A cool App that plays any Wav file at any set time. VERY simple and Straight forward to use!					
Published by GMR Software				WAVAlarm Home Page		

 AtomTime	Version 2.1b			Online Registration Not Yet Available		
	17-Apr-99	488K	Win 95/98/NT	Shareware \$20.00	Never Expires	Install & Uninstall
	3 min at 28.8K		1 min at 56K		1 min at ISDN 128K	
	A 32-bit Windows Internet (Winsock) application which will connect to the Atomic Clock time server in Boulder, Colorado (USA) and fetch the current atomic clock time value. It compares this value to your PC time and displays the difference. You then have the option of updating your PC clock to match the atomic clock value. There are a number of options to automate the update process. AtomTime98 also features support for most proxy servers.					
Published by Bruce Adelsman				AtomTime Home Page		

 Outatime	Version 3.0				Register Now	
	17-Apr-99	846K	Win 95/98/NT	Shareware \$25.00	Expires after 30 Days	Install & Uninstall
	5 min at 28.8K		2 min at 56K		1 min at ISDN 128K	

Will help you to record how long you spend working on each of your daily activities. On a regular basis, "Outatime" will appear on your screen, and ask you to click on the activity (or activities) that you have been working on since the last time it appeared. You will find that this is a great way to realise exactly what you are doing during the day. If you have to fill out a timesheet at the end of the week, "Outatime" will be able to calculate your figures automatically.

Published by **EarthSpin Pty Ltd** [Outatime Home Page](#)

 Timelt!	Version 2.4				No Registration Required	
	10-Apr-99	1,500K	Win 95/98/NT	Freeware	Never Expires	Install & Uninstall
	9 min at 28.8K		3 min at 56K		2 min at ISDN 128K	

Timer application to keep track of time spent on-line or length of time spent working on a project. "Pause" feature included. Also displays current date and time. Alarm added with this version!

Published by **Duquesne SoftWorks** [Timelt! Home Page](#)

 When	Version 2.31				Online Registration Not Yet Available	
	30-Mar-99	1,616K	Win 95/98/NT	Shareware \$10.00	Expires after 15 Days	Install & Uninstall
	10 min at 28.8K		4 min at 56K		2 min at ISDN 128K	

Much more than a desktop clock, offering an alarm with AutoSnooze, a countdown timer, and a calendar. Fully customizable, you may choose options like military time, various alarm sounds and a custom alarm/timer message. ?When has an easy to read oversize display that can be moved and resized to fit your needs. 15 day fully functional trial version.

Published by **SW Systems, Inc.** [When Home Page](#)

 WTClock	Version 2.1				No Registration Required	
	30-Mar-99	35K	Win 95/98/NT	Freeware	Never Expires	No Install
	<1 min at 28.8K		<1 min at 56K		<1 min at ISDN 128K	

Simple analogue clock for your desktop. Very realistic 3D interface - the result of combine using of MS VB and MM Flash technics. Requires the VB 5.0 Runtimes.

Published by **Irek Souleimanov** [WTClock Home Page](#)

 Jeff's Clock	Version 9				No Registration Required	
	27-Mar-99	1,589K	Win 95/98	Freeware	Never Expires	Install & Uninstall
	10 min at 28.8K		4 min at 56K		2 min at ISDN 128K	

A 32-bit Windows clock which has many customizable features. It has all required DLLs in the setup package, so no other files are needed.

Published by **Jeff Kelley** [No Home Page Available](#)

 TSTC (Time Server - Time Client)	Version 2.0				Online Registration Not Yet Available	
	26-Mar-99	60K	Win 95/98/NT	Shareware	Never Expires	No Install
	<1 min at 28.8K		<1 min at 56K		<1 min at ISDN 128K	

This is a program implementing the NTP time server protocol. It can both be a time client and a time server. It is useful to build a time network chain, in the case one station only can be connected to Internet (due to firewall limitations). That station reads time from the internet, and serve this time to all other stations on the network. You can use any other time client to connect to TSTC server. This program is freeware, but if you can send me an email to tell me you like it, do it men!! Features: - Client access can be tested on base of IP address - Scheduled client (one time a day) - .ini file support - traces logging support - possibility to choose between client/server, client or server - many other options.

		Published by Louis-Marie Croizez		TSTC (Time Server - Time Client) Home Page				
	dCAL	Version 1.0				No Registration Required		
		25-Mar-99	12K	Win 95/98/NT	Freeware	Never Expires	No Install	
		<1 min at 28.8K		<1 min at 56K		<1 min at ISDN 128K		
		A nifty little command line utility to display a calendar for the current month and year, or for any given month and year. Uses the 32-bit Windows API to support month and day names that are not in english. Similar to the CAL.EXE utility on many Unix/Linux systems.						
		Published by Dave Navarro		dCAL Home Page				
	GPCountDown	Version 1.0				No Registration Required		
		24-Mar-99	2,036K	Win 95/98/NT	Freeware	Never Expires	Install & Uninstall	
		13 min at 28.8K		4 min at 56K		2 min at ISDN 128K		
		A free Countdown utility that allows you to specify up to 10 events that the program will count down to. It is very easy to configure. The download includes the VB6 runtimes. If you don't need them, then go to the web page and select the quick download option.						
		Published by Grant Porteous		GPCountDown Home Page				
	World Clock	Version 2.0				Online Registration Not Yet Available		
		24-Mar-99	5,300K	Win 95/98/NT	Shareware \$39.95	Expiration Unknown	Install & Uninstall	
		33 min at 28.8K		12 min at 56K		6 min at ISDN 128K		
		The definitive multi zoned, graphical world clock. Data base support, on screen life like watch with dozens of clock faces.						
		Published by SIMCOM Software		World Clock Home Page				
	PrimeTimeSync	Version 1.0				No Registration Required		
		23-Mar-99	1,473K	Win 95/98/NT	Freeware	Never Expires	Install & Uninstall	
		9 min at 28.8K		3 min at 56K		2 min at ISDN 128K		
		A simple utility that sets your system time from the Internet. Just click on the Set Time button and it automatically connects to the NTP server at MIT and sets your clock.						
		Published by Prime Software		PrimeTimeSync Home Page				
	Cmdtime	Version 1.0				No Registration Required		
		22-Mar-99	49K	Win 95/98/NT	Freeware	Never Expires	No Install	
		<1 min at 28.8K		<1 min at 56K		<1 min at ISDN 128K		
		An extremely easy to use freeware command-line utility for synchronizing computer's time over the Internet. It uses fast and reliable Simple Network Time Protocol. It's designed to use either standalone, or in batch-files, or with external schedulers.						
		Published by Jury Gerasimov		Cmdtime Home Page				
	MR Tech ClockAlign	Version 1.0				No Registration Required		
		22-Mar-99	92K	Win 95/98/NT	Freeware	Never Expires	No Install	
		1 min at 28.8K		<1 min at 56K		<1 min at ISDN 128K		
		Simple Network Time Protocol (SNTP) client originally written to support: RFC868 (Time Protocol) & RFC2030 (SNTP Protocol) Features include: Startup minimized to systray. Align on startup optional, this allows you to copy to your startup folder and realign on startup. Date stamp as your tray icon so that you don't have to keep looking at a calendar to see what today's date is.						
		Published by Mel Reyes		MR Tech ClockAlign Home Page				

	Version 10			No Registration Required		
	18-Mar-99	537K	Win 95/98	Freeware	Never Expires	No Install
	3 min at 28.8K		1 min at 56K		1 min at ISDN 128K	
	A Windows 9x clock program. It provides a graphic of the light and dark halves of the earth as seen from above the North Pole, with local times for selected cities.					
Published by Jim Davis				No Home Page Available		

	Version 1.1.8			No Registration Required		
	14-Mar-99	120K	Win 95/98/NT	Freeware	Never Expires	Install & Uninstall
	1 min at 28.8K		<1 min at 56K		<1 min at ISDN 128K	
	A countdown timer to that date of all dates, January 1, 2000. You can set the clock to countdown a number of different ways, and you can place the clock on top of all other windows. All user options are stored as persistent data. That means, if you set it to display hours to go, any time you run the application, it will display hours to go, until you change that option. Also, where you place the Y2KClock on your Windows desktop will be the same anytime you run it. Hurry, there's less than 40 million seconds left!					
Published by Carl CJ Lambrecht				Y2KClock Home Page		

	Version 2.0			No Registration Required		
	10-Mar-99	268K	Win 95/98/NT	Freeware	Never Expires	Install & Uninstall
	2 min at 28.8K		1 min at 56K		<1 min at ISDN 128K	
	A multifaceted clock that integrates into the Windows O/S 95, 98 and NT and uses the Windows time zone information to produce as many clocks as you want on your screen. Fonts and colors are adjustable, stay on top or not, daylight savings time and much more. And, it is free.					
Published by VictoryServices, Inc.				Planet.Clock Home Page		

	Version 1.10			No Registration Required		
	07-Mar-99	24K	Win 95/98	Freeware	Never Expires	No Install
	<1 min at 28.8K		<1 min at 56K		<1 min at ISDN 128K	
	This little utility tells you how long have your computer been running.					
Published by John				RunningTime Home Page		

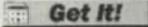
	Version 3.4			Online Registration Not Yet Available		
	07-Mar-99	2,303K	Win 95/98/NT	Shareware \$19.50	Expiration Unknown	Install & Uninstall
	14 min at 28.8K		5 min at 56K		3 min at ISDN 128K	
	Your own personal punch clock. It's perfect for consultants, professionals, and everyone else who wants to know how they're spending their time. Its simple punch clock metaphore allows users to punch in and out of an unlimited number of projects. Custom reports can be sent to printers, disk files, or viewed on screen. Memos (of any length) can be written to accompany the time entries. A manager's version is also available.					
Published by Spud City Software Co.				TraxTime Home Page		

	Version 1.0			No Registration Required		
	04-Mar-99	143K	Win 95/98	Freeware	Never Expires	No Install
	1 min at 28.8K		<1 min at 56K		<1 min at ISDN 128K	
	Multimedia Alarm Clock (can start for example MP3s at bell time) with analog and digital Internet Time. Small, good, easy to use and complete free.					
Published by Sebastian Landenburg				@ beat Home Page		

 Umi Clock	Version 4.0			No Registration Required		
	04-Mar-99	173K	Win 95/98/NT	Freeware	Never Expires	No Install
	1 min at 28.8K		<1 min at 56K		<1 min at ISDN 128K	
	A freeform shape analog clock for Windows 95/98 and Windows NT 4.0. It's fully customizable in look and shape. Uses layered alpha blended images to build the clock. Several anime related themes available.					
Published by EI Barto				Umi Clock Home Page		

 Standard Time Keeper	Version 4.3			Online Registration Not Yet Available		
	03-Mar-99	247K	Win 95/98/NT	Shareware \$10.00	Expires after 30 Days	Install & Uninstall
	2 min at 28.8K		1 min at 56K		<1 min at ISDN 128K	
	STK Can keep your system clock within 0.01 second of the official master clock. And STK corrects the time discrepancy to a 0.01 second margin if error with calculations based on the discrepancy tendency at the time of synchronization. So it is not necessary to make contact the official cesium atomic master clock every day. This saves you money on your telephone bill. STK counteracts boot time deviation and accurately corrects time discrepancies.					
Published by Tamie				Standard Time Keeper Home Page		

 HotClock	Version 1.0			Online Registration Not Yet Available		
	01-Mar-99	501K	Win 95/98/NT	Shareware \$29.95	Expiration Unknown	Install & Uninstall
	3 min at 28.8K		1 min at 56K		1 min at ISDN 128K	
	Scheduling graphics software that illustrates a sequence of events by creating a pie chart that looks like the face of a clock. Displays time intervals that span from as short as a second to as long as 24 hours. Graphically present any agenda or schedule. Perfect tool for meeting and conference planning. Customize your clock by inserting a logo, choosing colors, and specifying the fill pattern for each pie segment. The "drag and drop" feature allows you to place labels anywhere on the page without retyping.					
Published by Code Workshop LLC				HotClock Home Page		

 TimeCard	Version 2.7.3			 Get It!		Online Registration Not Yet Available	
	25-Feb-99	4,100K	Win 95/98/NT	Shareware \$50.00	Expiration Unknown	Install & Uninstall	
	26 min at 28.8K		9 min at 56K		5 min at ISDN 128K		
	An electronic "punch clock" for companies. Helps employees (and administrators) track hours and wages. Features include individual password protection, direct administrative access to employee data, earned wage calculation, task tracking, a printed report, customization and more!						
Published by Bill Staples				TimeCard Home Page			

 Automachron	Version 4.004			No Registration Required		
	23-Feb-99	130K	Win 95/98/NT	Freeware	Never Expires	Install
	1 min at 28.8K		<1 min at 56K		<1 min at ISDN 128K	
	A freeware SNTP client - Simple Network Time Protocol - for synchronizing your computer's time with an NTP server. Automachron works under Win95/98 and WinNT4. Automachron supports SNTP as well as TIME for synchronizing time over the internet. Automachron is much less intrusive than its predecessor Netdate.					
Published by One Guy Coding				Automachron Home Page		

	Version 1.0			No Registration Required		
	20-Feb-99	190K	Win 95/98/NT	Freeware	Never Expires	No Install
	1 min at 28.8K		<1 min at 56K		<1 min at ISDN 128K	
	Tiny tray TimeMeter was developed to provide a quick way to count the time. Load in tray. No alarm, just simply count the time.					
Published by Tong Naraktisood			TimeMeter Home Page			

	Version 2.0			Online Registration Not Yet Available		
	20-Feb-99	1,391K	Win 95/98/NT	Shareware \$5.00	Expiration Unknown	Install & Uninstall
	9 min at 28.8K		3 min at 56K		2 min at ISDN 128K	
	How much time do you have left before the year 2000? What about your mother-in-law's birthday? Or your next vacation? With this handy little tool, you'll know exactly how much time is left before the events you define!					
Published by LoafieWare			T-Minus Home Page			

	Version 1.0			No Registration Required		
	19-Feb-99	1,900K	Win 95/98/NT	Freeware	Never Expires	Install
	12 min at 28.8K		4 min at 56K		2 min at ISDN 128K	
	Digital clock that shows the months, days, hours, minutes, seconds, total days, and total hours until the Millennium.					
Published by JPM Computer			Millennium Countdown Clock Home Page			

	Version 3.2				Online Registration Not Yet Available	
	14-Feb-99	401K	Win 95/98/NT	Shareware \$10.00	Expiration Unknown	Install & Uninstall
	3 min at 28.8K		1 min at 56K		<1 min at ISDN 128K	
	One of the best Internet time clients available. It handles everything for you. Smart Server Search automatically scans through a list of more than 100 public access time servers and quickly finds the one that will give you the quickest and most accurate time. Rarely if ever is SocketWatch affected by the performance of a busy or inactive server.					
Published by Locutus Codeware			SocketWatch Home Page			

	Version 2.2			No Registration Required		
	11-Feb-99	2,030K	Win 95/98/NT	Freeware	Never Expires	Install & Uninstall
	13 min at 28.8K		4 min at 56K		2 min at ISDN 128K	
	A simple program that lives in the system tray and calculates your time for you (e.g., time spent on a project). It eliminates the need for counting your time using a piece of paper, and it is much more accurate! New features in version 2.0 include a customizable interface, a popup menu from the tray, the ability to work with projects, and calculation of the total time spent on a project.					
Published by Dave Beauchemin			The Work Timer Home Page			

	Version 3.0			No Registration Required		
	09-Feb-99	873K	Win 95/98/NT	Freeware	Never Expires	No Install
	5 min at 28.8K		2 min at 56K		1 min at ISDN 128K	
	Windows 95 time client which synchronizes your PC clock with a number of time servers from around the world using the TCP protocol. With this accurate reading you can set every clock in your house to the EXACT time!					
Published by Karl Sudar			TimeRC Home Page			

 SD-2000	Version 3.0			Online Registration Not Yet Available		
	03-Feb-99	2,197K	Win 95/98/NT	Shareware \$20.00	Expiration Unknown	Install & Uninstall
	14 min at 28.8K		5 min at 56K		2 min at ISDN 128K	
	A stardate clock and converter based on the stardate used in Star Trek: The Next Generation and its spin-offs.					
Published by Mish Handwerker				SD-2000 Home Page		

 Star Wars Count-down	Version 2.0c			No Registration Required		
	03-Feb-99	2,140K	Win 95/98/NT	Freeware	Never Expires	Install & Uninstall
	13 min at 28.8K		5 min at 56K		2 min at ISDN 128K	
	This will install Count-down to Star Wars. Based on your system time, it counts down the time until the day Episode 1 comes out. It has cool sounds and graphics as well! Written by Duke Witchel cause I thought it would be cool to have.					
Published by Duke Witchel				Star Wars Count-down Home Page		

 IntRVal Current Time Contol	Version 1.1			No Registration Required		
	02-Feb-99	94K	Win 95/98	Freeware	Never Expires	Install
	1 min at 28.8K		<1 min at 56K		<1 min at ISDN 128K	
	Will allow you to see the current system time and change it as much as you like. it has a original alarm because you will set the time to alarm and you will set what to do when time arrives. and the most important , it's FREE!					
Published by L.A.S.E.R				IntRVal Current Time Contol Home Page		

 WB Clock	Version 1.21			Online Registration Not Yet Available		
	01-Feb-99	284K	Win 95/98	Shareware \$15.00	Expiration Unknown	Install & Uninstall
	2 min at 28.8K		1 min at 56K		<1 min at ISDN 128K	
	With features such as Timer, Stop-Watch, location dependent alarms and the display of current time in virtually any location on Earth, WB Clock is an excellent choice for anyone who values time and is respective of other people's schedules wherever they may reside. The hard-drive space occupied by WB Clock is very small, so you might want to keep it on your computer even if you are not planning on using it right away.					
Published by A. Grishin				WB Clock Home Page		

 ShellTime	Version 1.0			No Registration Required		
	28-Jan-99	7K	Win 95/98/NT	Freeware	Never Expires	No Install
	<1 min at 28.8K		<1 min at 56K		<1 min at ISDN 128K	
	Puts an icon in the system tray. Hovering over the icon gives a tooltip which shows how long since you last rebooted. You can also see the last reboot time.					
Published by Matt Cawley				ShellTime Home Page		

 TBTimer	Version 1.00			Online Registration Not Yet Available		
	27-Jan-99	335K	Win 95/98/NT	Shareware \$5.00	Never Expires	Install & Uninstall
	2 min at 28.8K		1 min at 56K		<1 min at ISDN 128K	
	A count up/count down timer/clock (5 minutes for the unregistered version, 100 hours for the registered version) designed to run in the title bar of the current application.					
Published by Tbproducts				No Home Page Available		

 Java Time Protocol Client (RFC 868)	Version 1.00			No Registration Required		
	25-Jan-99	7K	Win 95/98/NT	Freeware	Never Expires	No Install
	<1 min at 28.8K		<1 min at 56K		<1 min at ISDN 128K	
	This small Java standalone application reads the current date and time from a given time protocol server (RFC 868) and optionally sets the date and time on the local system.					
Published by Andy Brunner			Java Time Protocol Client (RFC 868) Home Page			

 Millennium Tray	Version 1.1			No Registration Required		
	23-Jan-99	168K	Win 95/98/NT	Freeware	Never Expires	No Install
	1 min at 28.8K		<1 min at 56K		<1 min at ISDN 128K	
	A tray app program for WIN95-98-NT that allows fast and easy one-click check for current time/date and countdown to year 2000. Also plays your favourite sound (.wav file) every hour.					
Published by Utilmind SH			Millennium Tray Home Page			

 Show Internet Time	Version 1.0			No Registration Required		
	19-Jan-99	18K	Win 95/98/NT	Freeware	Never Expires	No Install
	<1 min at 28.8K		<1 min at 56K		<1 min at ISDN 128K	
	A freeware utility that displays the current Swatch Internet Time in your icon tray, and has a built in time conversion tool.					
Published by Left Side Software			Show Internet Time Home Page			

 Track-IT Light	Version 3.1			Online Registration Not Yet Available		
	19-Jan-99	1,345K	Win 95/98/NT	Shareware \$79.00	Expires after 30 Days	Install & Uninstall
	8 min at 28.8K		3 min at 56K		1 min at ISDN 128K	
	A professional windows-based software that allows individuals to keep track of the time spent on projects and activities while working. It eliminates the need for paper time sheets. Just choose the appropriate project and activity, click the start button and see how a true picture of your day helps improve productivity. Track time as work is being done or enter the information at the end of the day or week in a spreadsheet format. Can be used with Track-IT pro for project workgroups.					
Published by Dovico			Track-IT Light Home Page			

 WinDate	Version 2.41			No Registration Required		
	17-Jan-99	156K	Win 95/98/NT	Freeware	Never Expires	Install & Uninstall
	1 min at 28.8K		<1 min at 56K		<1 min at ISDN 128K	
	WinDate will put Time/+Date/+Day/+Message in current window's title bar. Alarm option. New to this version: Day name is now localised to your language. Single exe.					
Published by Mark Dickinson			WinDate Home Page			

 Stop Watch	Version 1.01			No Registration Required		
	14-Jan-99	30K	Win 95/98/NT	Freeware	Never Expires	No Install
	<1 min at 28.8K		<1 min at 56K		<1 min at ISDN 128K	
	What can we say, it's a stop watch, measuring up to 100 hours, showing hours, minutes and seconds. The display wraps after 100 hours. A lap feature is also included.					
Published by BTT Software			Stop Watch Home Page			

 QuickAlarm	Version 1.11			No Registration Required		
	12-Jan-99	212K	Win 95/98/NT	Freeware	Never Expires	No Install
	1 min at 28.8K		<1 min at 56K		<1 min at ISDN 128K	
	A alarm program in Chinese Language. It can play sound by user defined interval and popup alarm message daily, monthly, yearly or only once at your preference. Usually it minimizes itself in tray icon and run in low system resource.					
Published by Pumking Meng			QuickAlarm Home Page			

 TimeLeft	Version 1.0			No Registration Required		
	11-Jan-99	960K	Win 95/98/NT	Freeware	Expiration Unknown	Install Unknown
	6 min at 28.8K			2 min at 56K	1 min at ISDN 128K	
	TimeLeft is a countdown/stopwatch clock using Winamp skins to show digits. TimeLeft counts how much time (year, months, days, hours, minutes and seconds) is left to (or elapsed from) New Year's Day (or your chief birthday or your project deadline). You can customize alarm time, alert message text, icon, etc.					
Published by NesterSoft			TimeLeft Home Page			

 SysClock	Version 1.0			Online Registration Not Yet Available		
	07-Jan-99	678K	Win 95/98/NT	Shareware \$10.00	Expiration Unknown	Install
	4 min at 28.8K			1 min at 56K	1 min at ISDN 128K	
	Shows the system time in form of some LEDs. You can define an alarm time. When it is reached, it plays a WAV-File of your choice.					
Published by Andreas Heidt			SysClock Home Page			

 Total Timer	Version 0.4			Online Registration Not Yet Available		
	07-Jan-99	1,400K	Win 95/98	Shareware \$10.00	Expiration Unknown	No Install
	9 min at 28.8K			3 min at 56K	2 min at ISDN 128K	
	This application will show you how long your computer has been on for. Runs in System Tray.					
Published by Radek R			No Home Page Available			

 Y2K Countdown 99	Version 2.01			No Registration Required		
	07-Jan-99	1,873K	Win 95/98/NT	Freeware	Never Expires	Install & Uninstall
	12 min at 28.8K			4 min at 56K	2 min at ISDN 128K	
	A new version of a popular countdown clock, ticking towards 2000 with dozens of all-new legal and technical tips. Improved interface, too!					
Published by Macaulay McColl			Y2K Countdown 99 Home Page			

 Timer	Version 1.0			No Registration Required		
	06-Jan-99	228K	Win 95/98/NT	Freeware	Never Expires	No Install
	1 min at 28.8K			1 min at 56K	<1 min at ISDN 128K	
	A simple clock and timer application. Displays analog and digital clocks in 24 hour time or AM/PM format. Stores multiple alarms which will run once or multiple times.					
Published by James Ryan			Timer Home Page			

 TweakEzy	Version 1.52					
	05-Jan-99	190K	Win 95/98/NT	Shareware \$19.95	Expires after 30 Days	Install
	1 min at 28.8K			<1 min at 56K	<1 min at ISDN 128K	
	A tiny yet very handy utility for correcting system time. Does not require Internet access. Ideal for correcting time drifts less than 1 minute per week. Clocks, date/time stamps etc. will stay accurate to within seconds.					
Published by RealEzy PC Utilities			TweakEzy Home Page			

 Millenium Clock	Version 1.0			No Registration Required		
	02-Jan-99	45K	Win 95/98/NT	Freeware	Never Expires	No Install
	<1 min at 28.8K			<1 min at 56K	<1 min at ISDN 128K	
	Another tiny and nice-looking little application, that shows you the days, hours, minutes and seconds till the year 2000.					
Published by yanone			Millenium Clock Home Page			

 Khronos	Version 1.0			Online Registration Not Yet Available		
	01-Jan-99	1,568K	Win 95/98/NT	Shareware \$11.48	Expiration Unknown	Install & Uninstall
	10 min at 28.8K		3 min at 56K		2 min at ISDN 128K	
	Khronos displays the date and time in a small window on your desktop. Fully customizable. Also chimes on the quarter hours. Complete install/uninstall capability.					
Published by Steve Berst			Khronos Home Page			

 Millennium	Version 3.07			Online Registration Not Yet Available		
	01-Jan-99	281K	Win 95/98/NT	Shareware \$1.00	Expires after 30 Days	Install & Uninstall
	2 min at 28.8K		1 min at 56K		<1 min at ISDN 128K	
	This program calculates how long is it till the Millennium, or the year of 2001. If you don't like it to count to 2001, you can change it to 2000. It resides on your desktop and system icon tray. Two display types can be chosen - regular and digital. You can change the display from regular, which is the original display, to Digital Display, which looks just like some of the clocks. You can also make the Millennium a always-on-top window. With the cool appearance, it makes your desktop neat and professional. Requires the VB 5.0 Runtimes .					
Published by Tien-Hao Lan			Millennium Home Page			

 Atom Time 98	Version 2.1a			Register Now		
	21-Dec-98	509K	Win 95/98/NT	Shareware \$15.00	Never Expires	Install & Uninstall
	3 min at 28.8K		1 min at 56K		1 min at ISDN 128K	
	Will synchronize your PC clock with the Atomic Clock time server in Boulder, Colorado. This program is the sequel to the highly rated AtomTime95.					
Published by Bruce Adelman			Atom Time 98 Home Page			

 TeaTimer	Version 1.8			No Registration Required		
	21-Dec-98	64K	Win 95/98/NT	Freeware	Never Expires	No Install
	<1 min at 28.8K		<1 min at 56K		<1 min at ISDN 128K	
	A small timer application. It uses the systray area, can play a sound and displays a messagebox when the timer stops. You can set the timer to a specified time, let it run for several minutes or start a countdown. With TeaTimer you can choose from one of three ways to display the timer progress, first a standard Windows progressbar, second the icon in the systray area and third one of four 3D display types. You need OpenGL support installed on you System to use TeaTimer.					
Published by Arndt Teinert			TeaTimer Home Page			

 Clock9X	Version 1.0			No Registration Required		
	20-Dec-98	10K	Win 95/98/NT	Freeware	Never Expires	No Install
	<1 min at 28.8K		<1 min at 56K		<1 min at ISDN 128K	
	A really cool program that will display the time or the date in HH:MM:SS format, or MM/DD/YY format. Great to put in your startup menu, lots of options, coded in Microsoft Visual Basic.					
Published by James Bertelson			No Home Page Available			

 TalkClock	Version 1.01			No Registration Required		
	05-Dec-98	1,100K	Win 95/98/NT	Freeware	Never Expires	Install & Uninstall
	7 min at 28.8K		2 min at 56K		1 min at ISDN 128K	
	A FREE Windows 95/98/NT program that announces the time at specified intervals or at the push of a button. TalkClock is very easy to use with its simple user interface. TalkClock can be minimized and still run in the background without taking up your desktop space.					
			TalkClock Home Page			

Published by George Callow

TalkClock Home Page

	Version 2.1			Online Registration Not Yet Available		
	30-Nov-98	1,500K	Win 95/98/NT	Shareware \$20.00	Expiration Unknown	Install & Uninstall
	9 min at 28.8K		3 min at 56K		2 min at ISDN 128K	
	<p>A pure software solution to apply your country's official local time to your system. It includes numerous functions allowing a precise and reliable easy to use way to synchronize your PC or (NT) Server with internet or telephone time services. Support for Win98 Tasklaner plus build-in taskplaner for unattended operation. Autom. time synch. at any internet or e-mail session.</p>					
Published by MicroLogic Software				NukeTime Home Page		

	Version 1.01			No Registration Required		
	29-Nov-98	38K	Win 95/98	Freeware	Never Expires	No Install
	<1 min at 28.8K		<1 min at 56K		<1 min at ISDN 128K	
	<p>A tiny system tray accessory, which shows a tooltip counting down the days to the new year.</p>					
Published by Popcorn Software				NewYear Home Page		

	Version 1.11			No Registration Required		
	29-Nov-98	37K	Win 95/98	Freeware	Never Expires	No Install
	<1 min at 28.8K		<1 min at 56K		<1 min at ISDN 128K	
	<p>A tiny system tray accessory, which shows a tooltip counting down the days to the year 2000. Ideal for system administrators adhering to Y2K projects.</p>					
Published by Popcorn Software				Towards-2000 Home Page		

	Version 1.11			No Registration Required		
	29-Nov-98	38K	Win 95/98	Freeware	Never Expires	No Install
	<1 min at 28.8K		<1 min at 56K		<1 min at ISDN 128K	
	<p>A tiny desktop tray accessory, which displays a tooltip showing the number of days away from Christmas.</p>					
Published by Popcorn Software				Xmas - Christmas Day Countdown Timer Home Page		

	Version 2.5			Online Registration Not Yet Available		
	26-Nov-98	33K	Win 95/98/NT	Shareware \$6.75	Expiration Unknown	No Install
	<1 min at 28.8K		<1 min at 56K		<1 min at ISDN 128K	
	<p>This program generates a running digital clock which displays your computer's system time in bold, cleverly handcrafted numerals on the center of your screen and a customizable solid or flashing colon.</p>					
Published by B. Carley				Big-Time Clock Home Page		

	Version 1.6			Online Registration Not Yet Available		
	23-Nov-98	323K	Win 95/98/NT	Shareware \$10.00	Expiration Unknown	Install & Uninstall
	2 min at 28.8K		1 min at 56K		<1 min at ISDN 128K	
	<p>Will track the amount of time spent on a project. You can also add an hourly rate to get the real billing cost of a project. You can even use it to figure out the accumulated time spent hooked onto your Internet provider. Requires the VB 5.0 Runtimes.</p>					
Published by Program-Action				TimeKeeper Home Page		

 The Good Morning Program	Version 5.0		No Registration Required		
	22-Nov-98	1,249K	Win 95/98/NT	Freeware	Never Expires Install & Uninstall
	8 min at 28.8K		3 min at 56K		1 min at ISDN 128K
	Says "Good Morning" in the morning, "Good Afternoon" in the afternoon, "Good Evening" in the evening, "Good Night" at night.				
Published by Jonathan Arehart			The Good Morning Program Home Page		

 EZ-Timer	Version 4.00		Online Registration Not Yet Available			
	21-Nov-98	2,860K	Win 95/98/NT	Shareware \$15.00	Expires after 14 Days	Install & Uninstall
	18 min at 28.8K		6 min at 56K		3 min at ISDN 128K	
	A great program for anybody to have! Whether you need to count up or down to an event, EZ-Timer is up to the task -- and more. This handy 32-bit utility lets you select from either timer or stopwatch modes. Any combination of five things can happen when the time reaches 00:00:00: EZ-Timer can play a sound, pop up a customizable dialog box, launch a program, shut down your PC, or restart your PC. The timer can also be set to automatically repeat. Plus, the properties of the time display (background color and text size/font/color) can be easily adjusted. Version 3.01 adds new features like the ability to use command-line arguments and you can now register over the Internet or telephone(TOLL-FREE)! With Version 3.01, you can also select which icon you want to put in any message boxes that EZ-Timer displays.					
Published by Vira Tech Development			EZ-Timer Home Page			

 JX PHOTO CLOCK	Version 0.99		No Registration Required		
	21-Nov-98	1,400K	Win 95/98/NT	Freeware	Never Expires Install
	9 min at 28.8K		3 min at 56K		2 min at ISDN 128K
	Want to put your favorite picture on a clock? BMP, JPG, GIF...JX PHOTO CLOCK let you define everything by yourself! Clock Size, Font, Color. SCREEN SAVER function will display a ANIMATION in the background. Play your MP3 files at chime time!				
Published by Jeffrey Xuan			JX PHOTO CLOCK Home Page		

 Time Tracker	Version 1.0		Online Registration Not Yet Available			
	18-Nov-98	3,589K	Win 95/98/NT	Shareware \$20.00	Expiration Unknown	No Install
	22 min at 28.8K		8 min at 56K		4 min at ISDN 128K	
	An Electronic Time Card program that will allow a person to track the number of hours that they spend working on different account/projects per day. The program supports up to twenty different accounts. Each account is selectable by a radio button. The hours are calculated for a total per day and each account is calculated separately for a total of hours for the account per day. The total hours are then taken and multiplied against a cost per hour. This gives you a total cost for the week. Charges are incremented in .1 of hours or every 6 minutes. The data is stored in a Microsoft Access 7.0 database format for later retrieval. Free lifetime upgrades with registration.					
Published by Jason Alexander			Time Tracker Home Page			

 BarClock	Version 2.1		No Registration Required		
	16-Nov-98	361K	Win 95/98/NT	Freeware	Never Expires No Install
	2 min at 28.8K		1 min at 56K		<1 min at ISDN 128K
	With this tiny program, just keep an eye on the time. But to do this, you don't need to have a special window always on top or maintain the explorer's task bar visible. In fact, the current time is displayed in the active title bar of the active window. This software is very easy to use. To always have the time under your eyes, just put the executable file (or a link to it) in the statup menu.				
Published by Guillaume Brocker			BarClock Home Page		

 UTC Clock	Version 1.1			No Registration Required		
	16-Nov-98	174K	Win 95/98/NT	Freeware	Never Expires	Install & Uninstall
	1 min at 28.8K		<1 min at 56K		<1 min at ISDN 128K	
	This program gives you three clocks that show UTC, Local and a desired time zone. The display is compact allowing it to hide in the corner of the monitor. The program is free but if you download it send me and e-mail telling me what you think.					
Published by Jason Alexander			UTC Clock Home Page			

 TimeZone	Version 1.1.3			No Registration Required		
	14-Nov-98	1,747K	Win 95/98	Freeware	Never Expires	Install & Uninstall
	11 min at 28.8K		4 min at 56K		2 min at ISDN 128K	
	This program shows the time in the 4 main US time zones. The next version should have 'round the world support and perhaps even an atomic clock sync feature.					
Published by Victor Technologies			TimeZone Home Page			

 SAVcalendar	Version 1.0			No Registration Required		
	07-Nov-98	900K	Win 95/98	Freeware	Never Expires	Install & Uninstall
	6 min at 28.8K		2 min at 56K		1 min at ISDN 128K	
	Small program I use to check what day it is on a certain date from 1998 to 2010.					
Published by SAV			SAVcalendar Home Page			

 Meganet Clock	Version 1.20			No Registration Required		
	04-Nov-98	1,360K	Win 95/98/NT	Freeware	Never Expires	Install
	8 min at 28.8K		3 min at 56K		1 min at ISDN 128K	
	A small clock, when executed is auto-matically minimized. When minimized it displays the current date and time. Very useful when doing reports etc. and you need to know the current date! When maximized it displays the time in 24hr format, and the date in long format. Can be easily uninstalled with the add/remove options in control panel.					
Published by Joel Andrews			Meganet Clock Home Page			

 Timer	Version 1.7			No Registration Required		
	03-Nov-98	870K	Win 95/98/NT	Freeware	Never Expires	Install & Uninstall
	5 min at 28.8K		2 min at 56K		1 min at ISDN 128K	
	A simple timing program. Created to help when taking on-line tests. Kind of like an electronic alarm clock. Timer has a progress bar and digital display that shows as the minutes/seconds count down. When the time is up, a wav file called FINISH.WAV is played and a splash screen is displayed. Pretty simple app to write, but did learn a few things in Delphi. Source available upon request.					
Published by Scott C. Russell			Timer Home Page			

 TopClock	Version 2.0			Online Registration Not Yet Available		
	29-Oct-98	537K	Win 95/98/NT	Demo \$8.00	Expires after 15 Days	Install & Uninstall
	3 min at 28.8K		1 min at 56K		1 min at ISDN 128K	
	With TopClock you can get the most exactly time from Internet servers with two clicks. It has digital clock interface and alarm clock function. Also the additional options are: the full info about Moon phases, Sun rises, day time lenght in every corner of the World and etc.					
Published by Tomas Rutkauskas			TopClock Home Page			

 Dimension 4	Version 4.3			No Registration Required		
	20-Oct-98	293K	Win 95/98/NT	Freeware	Never Expires	Install & Uninstall
	2 min at 28.8K		1 min at 56K		<1 min at ISDN 128K	
	Incredibly easy to use SNTP/Time client synchronizes PC's time to within 50ms of USNO or any other NTP/Time server.					
Published by Rob Chambers			Dimension 4 Home Page			

 Year 2000 Check	Version 2.10			No Registration Required		
	15-Oct-98	77K	Win 95/98	Freeware	Never Expires	Install & Uninstall
	<1 min at 28.8K		<1 min at 56K		<1 min at ISDN 128K	
	Simple Y2K Test tool. However, does the 5 critical tests with the added advantage of printing individual compliance certificate.					
Published by Tony Treffers			Year 2000 Check Home Page			

 DigiClock	Version 1.00			No Registration Required		
	14-Oct-98	13K	Win 95/98	Freeware	Never Expires	No Install
	<1 min at 28.8K		<1 min at 56K		<1 min at ISDN 128K	
	Get ready to try the most simple clock ever made! It has two functions: Current time and date. To quit, press Escape.					
Published by Bertil Svendsen			No Home Page Available			

 Lap Timer	Version 1.0			Online Registration Not Yet Available		
	12-Oct-98	1,000K	Win 95/98	Demo \$15.00	Expiration Unknown	Install & Uninstall
	6 min at 28.8K		2 min at 56K		1 min at ISDN 128K	
	This program manually times up to four race cars, keeping track of last lap, fastest lap time and lap number and average lap time. It can be customized for car descriptions, track location, date and session. All sessions can be saved for later printing.					
Published by Rare Air Software, Inc.			Lap Timer Home Page			

 Timer	Version 1.0			No Registration Required		
	12-Oct-98	8K	Win 95/98/NT	Freeware	Never Expires	No Install
	<1 min at 28.8K		<1 min at 56K		<1 min at ISDN 128K	
	This very simple program shows in the task bar how long it is running, as a sort of chronometer. You can use it to time anything you want, from the time you're online to how long you're playing Quake.					
Published by Wim Heirman			Timer Home Page			

 Power Clock	Version 3.08			Online Registration Not Yet Available		
	10-Oct-98	950K	Win 95/98/NT	Shareware \$89.00	Expiration Unknown	Install & Uninstall
	6 min at 28.8K		2 min at 56K		1 min at ISDN 128K	
	Employee Time-clock, Email, Multi-site communications. Employee timeclock. Export to Quickbooks. Auto-Sync of data among different locations. Small and fast. Runs on any Windows PC. Customizable security for all features. Wide array of reports.					
Published by Rob Fletcher			Power Clock Home Page			

 ClockWatch	Version 1.3.0			Online Registration Not Yet Available		
	09-Oct-98	3,267K	Win 95/98	Shareware \$19.95	Expiration Unknown	Install & Uninstall
	20 min at 28.8K		7 min at 56K		4 min at ISDN 128K	
	Provides a fast and easy way to synchronize your computer system's clock to the atomic clock over the Internet. ClockWatch queries one of the NIST timeservers, which returns the exact standard time. Settings can be made on demand, on a regularly scheduled basis or automatically based on the specific experience of the local system. Results from clock settings are graphically displayed in windows and charts showing the overall accuracy of computer. Also works in background from system tray or can be invoked from command line.					
Published by Beagle Software			ClockWatch Home Page			

 TimeClock Lyte	Version 1.25			Online Registration Not Yet Available		
	09-Oct-98	5,400K	Win 95/98/NT	Shareware \$49.99	Expires after 30 Days	Install & Uninstall
	34 min at 28.8K		12 min at 56K		6 min at ISDN 128K	
	A simple time and attendance package. Allows employee to punch-in/out by employee number or name or initials. Easy "who is here" feature with optional punch-out comments. Allows tracking time by department, location, or type of hours. Particular PCs on the network can be assigned to a particular employee or department or location. Easy to understand timecard report. Data may also be accessed with any product that can read an Access 7.0 data file. Data export feature for importing into payroll packages.					
Published by Quality Software Solutions, Inc.				TimeClock Lyte Home Page		

 Standard Time Keeper	Version 3.7			Online Registration Not Yet Available		
	01-Oct-98	247K	Win 95/98/NT	Shareware \$10.00	Expires after 30 Days	Install & Uninstall
	2 min at 28.8K		1 min at 56K		<1 min at ISDN 128K	
	Can keep your system clock within 0.01 second of the official master clock. And STK corrects the time discrepancy to a 0.01 second margin if error with calculations based on the discrepancy tendency at the time of synchronization. So it is not necessary to make contact the official cesium atomic master clock every day. This saves you money on your telephone bill. STK counteracts boot time deviation and accurately corrects time discrepancies.					
Published by Tamie				Standard Time Keeper Home Page		

 Millennium Countdown	Version 2.0			No Registration Required		
	28-Sep-98	1,933K	Win 95/98/NT	Freeware	Never Expires	Install & Uninstall
	12 min at 28.8K		4 min at 56K		2 min at ISDN 128K	
	A small freeware digital display which Accurately! calculates Seconds, Hours, Days & Weeks to go to the turn of the millennium. Many options - Weeks, Secs Etc can be switched on or off and displayed as totals or as remaining time. Resides on your desktop and system icon tray and can set to be always on top. Professional one click install & uninstall.					
Published by Alert Technology				Millennium Countdown Home Page		

 Berlin uhr	Version 1.0			No Registration Required		
	27-Sep-98	131K	Win 95/98/NT	Freeware	Never Expires	No Install
	1 min at 28.8K		<1 min at 56K		<1 min at ISDN 128K	
	This Software emulates the famous Berlin Uhr.					
Published by Christophe Gevrey				Berlin uhr Home Page		

 SIARCG!'s Grandfather Clock	Version 2.0			Register Now		
	14-Sep-98	515K	Win 95	Shareware \$10.00	Expiration Unknown	Install & Uninstall
	3 min at 28.8K		1 min at 56K		1 min at ISDN 128K	
	Ahh...the soothing tick tocking...the chimes diligently sounding the hour...that wonderful song they play every fifteen minutes, why not have a Grandfather Clock on your desktop?					
Published by SIARCG! Software				SIARCG!'s Grandfather Clock Home Page		

 WB Clock	Version 1.2			Online Registration Not Yet Available		
	01-Sep-98	284K	Win 95/98	Shareware \$15.00	Expiration Unknown	Install & Uninstall
	2 min at 28.8K		1 min at 56K		<1 min at ISDN 128K	
	With features such as Timer, Stop-Watch, location dependent alarms and the display of current time in virtually any location on Earth, WB Clock is an excellent choice for anyone who values time and is respective of other people's schedules wherever they may reside.					
Published by A. Grishin			WB Clock Home Page			

 DotMatrix Digital Clock	Version 0.98			Online Registration Not Yet Available		
	22-Aug-98	112K	Win 95/98	Shareware \$10.00	Never Expires	No Install
	1 min at 28.8K		<1 min at 56K		<1 min at ISDN 128K	
	Display digital clock under windows95/98 system, look like LED Dot Matrix 5x7dots. Many features. User Define Color, Size.					
Published by Jatuporn Panja			DotMatrix Digital Clock Home Page			

 DateTime	Version 1.1			No Registration Required		
	18-Aug-98	300K	Win 95/98/NT	Freeware	Never Expires	Install
	2 min at 28.8K		1 min at 56K		<1 min at ISDN 128K	
	A useful freeware Windows 95/98/NT utility that allows computer users with an Internet connection to accurately set their system date and time. It's easy to use and fast. With just a few clicks of your mouse you can fetch the current date and time from an Internet Date/Time host. You can compare new values with your system data and time. You can easily update your PC clock settings with new, correct values.					
Published by PrimaSoft PC			DateTime Home Page			

 InterTime 98	Version 1.11			Online Registration Not Yet Available		
	10-Aug-98	1,477K	Win 95/98/NT	Shareware \$9.95	Expires after 30 Days	Install & Uninstall
	9 min at 28.8K		3 min at 56K		2 min at ISDN 128K	
	Using NTP servers located from around the world, InterTime can update your system clock to within 200 milliseconds of accuracy. Advanced features like ServerCheck and SmartSearch allow you to locate a time server within your own country and even city! ModemSpy for Applications allows you to schedule clock updates, distinguishing between whether you are online or offline. No more random connections. Completely designed for Windows 95 and 98, InterTime is different from any other clock sync product you can buy. It's easy to use, automatic and good looking. For under 10 bucks, you couldn't ask for more!					
Published by Pipsoft			InterTime 98 Home Page			

 Time (DeskTop Clock)	Version 1.2.5			No Registration Required		
	07-Aug-98	1,900K	Win 95/98/NT	Freeware	Never Expires	Install
	12 min at 28.8K		4 min at 56K		2 min at ISDN 128K	
	A small border-less window that shows your system time on your desktop. You may change the location, font, Display style, and colors, in 12 or 24 hour format. Also available are countdown timer, countdown alarm, and alarm clock. "Time" will announce the time on the hour and 1/2 hour with chimes at the 1/4 & 3/4 hour, (if you have the sound files).					
Published by Daniel Campau			Time (DeskTop Clock) Home Page			

 Up To 2000	Version 1.00a			No Registration Required		
	23-Jul-98	272K	Win 95/98/NT	Freeware	Never Expires	No Install
	2 min at 28.8K		1 min at 56K		<1 min at ISDN 128K	
	A very small application that tells you the number of days remaining to the year 2000.					
Published by Albani iperCreation			Up To 2000 Home Page			

 WinActivity for Windows	Version 2.0			Online Registration Not Yet Available		
	07-Jul-98	2,200K	Win 95/98/NT	Shareware \$19.00	Expiration Unknown	Install & Uninstall
	14 min at 28.8K		5 min at 56K		2 min at ISDN 128K	
	Keep track on the time you spend working on various projects, surfing on the web or just playing games. Generate & print reports and graphs or publish your reports on your intranet/internet site.					
	Published by Pitrinec Software			WinActivity for Windows Home Page		

 Clock	Version 3.5			Online Registration Not Yet Available		
	02-Jul-98	1,880K	Win 95/98	Shareware \$3.48	Expiration Unknown	Install & Uninstall
	12 min at 28.8K		4 min at 56K		2 min at ISDN 128K	
	A clock that displays the date and/or time at the user's will. The user can also change the font, background color, and foreground color. Another option is to set an alarm to go off at a certain time. All of the attributes are saved.					
	Published by FlameDagger Programming			Clock Home Page		

 Days	Version 1.0			No Registration Required		
	21-Jun-98	122K	Win 95/98/NT	Freeware	Never Expires	No Install
	1 min at 28.8K		<1 min at 56K		<1 min at ISDN 128K	
	Calculates the number of days between any two user selected dates. Uses a graphical calendar for date selection.					
	Published by Matt Billenstein			Days Home Page		

 YATS32	Version 6.7			Online Registration Not Yet Available		
	20-Jun-98	841K	Win 95/98/NT	Shareware \$25.00	Expiration Unknown	Install Unknown
	5 min at 28.8K		2 min at 56K		1 min at ISDN 128K	
	YATS32 (Yet Another Time Synchronizer) is a time synchronization application. YATS32 allows you to synchronize your system clock to any number of time servers available on any TCP/IP network such as the Internet or your corporate UNIX network. A large list of international Internet time servers is provided in the Help file. Multiple servers and time protocols are supported. Connections via HTTP proxy server are also supported for some time protocols.					
	Published by Dillobits Software			YATS32 Home Page		

 PBXAlarm	Version 0.9b			No Registration Required		
	16-Jun-98	1,660K	Win 95/98/NT	Freeware	Never Expires	Install & Uninstall
	10 min at 28.8K		4 min at 56K		2 min at ISDN 128K	
	Uses your home PBX to alarm you. It works like this: You set the time you want it to call you, you tell it which extension to call, and once this time arrives it triggers a dial-up event, calling the extension you specified using your modem.					
	Published by Rapid Developments			PBXAlarm Home Page		

 Count98!	Version 1.0.98			No Registration Required		
	09-Jun-98	1,495K	Win 95/98/NT	Freeware	Never Expires	Install & Uninstall
	9 min at 28.8K		3 min at 56K		2 min at ISDN 128K	
	This is a countdown to Windows98. Developed by Ricky Girgiani.					
	Published by Ricky Girgiani			Count98! Home Page		

 CLOX 2000	Version 1.0			Online Registration Not Yet Available		
	02-Jun-98	2,913K	Win 95/98/NT	Shareware \$10.00	Expiration Unknown	Install & Uninstall
	18 min at 28.8K		6 min at 56K		3 min at ISDN 128K	
	<p>Latest version of this exceptional world clocks program with analogue and digital timezone clocks. Internet features include the ability to automatically set the time via the internet, newflashes and more. CLOX 2000 is super-accurate and includes an animated world daylight map, an alarm clock and calendar. Full online help is provided making it really easy to use.</p> <p>Published by Mirage Audio Visual Media</p>					
			CLOX 2000 Home Page			

 Whatime	Version 2.0			No Registration Required		
	31-May-98	17K	Win 95/98/NT	Freeware	Never Expires	Install & Uninstall
	<1 min at 28.8K		<1 min at 56K		<1 min at ISDN 128K	
	<p>A must have for those with international friends, business, or family. This program allows you to see what time it is in any time zone, without hogging precious desktop space. It simply puts an entry on your task bar that contains the user specified label, and applies the desired hour and minute shift to the current time. This small download will work fine on any computer with VB 5.0 runtimes present. If you do not have these runtimes, you can download the full program with runtimes at the homepage. Most computers have these runtimes already installed, so the small download should be fine. The new version has the ability to start automatically with any preset configuration. Enjoy! Requires the VB 5.0 Runtimes.</p> <p>Published by Andrew Baker</p>					
			Whatime Home Page			

 Clock-O-Matic	Version 1.0			Register Now		
	28-May-98	539K	Win 95	Shareware \$10.00	Expiration Unknown	Install
	3 min at 28.8K		1 min at 56K		1 min at ISDN 128K	
	<p>Inspired by the technological marvel that sits by your bedside, Clock-O-Matic is simply the most advanced alarm clock available. It's mission - to protect absent minded computer geeks from tardiness.</p> <p>Published by SIARCG!</p>					
			Clock-O-Matic Home Page			

 TimeManager	Version 1.01			No Registration Required		
	26-May-98	293K	Win 95/98/NT	Freeware	Never Expires	No Install
	2 min at 28.8K		1 min at 56K		<1 min at ISDN 128K	
	<p>Controls and displays Time and TimeZone absolutely! The first Program which brings light into the darkness of the windows time management!</p> <p>Published by Martin Bachem</p>					
			No Home Page Available			

 InnaMinute	Version 1.0			Online Registration Not Yet Available		
	25-May-98	14K	Win 95/98/NT	Shareware \$10.00	Never Expires	No Install
	<1 min at 28.8K		<1 min at 56K		<1 min at ISDN 128K	
	<p>Most timers have way too many features. Need to turn off the oven in five minutes? Need to stop surfing an hour from now? Click, click. InnaMinute waits in the tray to remind you without complicated dials, options, parameters or fuss. Put it in your StartUp folder!</p> <p>Published by Ed Halley</p>					
			InnaMinute Home Page			

 3D Hand Clock	Version 1.0			Online Registration Not Yet Available		
	21-May-98	1,489K	Win 95/98	Shareware \$10.68	Expires after 14 Days	Install
	9 min at 28.8K		3 min at 56K		2 min at ISDN 128K	
	A colorful hand clock that rotates, moves, bounces, and hops in 3D space. Some options for this screen saver include: Color cycling, movement types, color schemes, video mode selection, and password protection.					
Published by Spectrum Software			3D Hand Clock Home Page			

 The One Dollar Clock	Version 1.0			Online Registration Not Yet Available		
	30-Apr-98	688K	Win 95/98/NT	Shareware \$1.00	Expiration Unknown	No Install
	4 min at 28.8K		2 min at 56K		1 min at ISDN 128K	
	Displays the the time and the day of the week in a user specified format.					
Published by D. Ferrell			The One Dollar Clock Home Page			

 UsageLogger	Version 1.1			Online Registration Not Yet Available		
	26-Apr-98	1,985K	Win 95/98	Shareware \$10.00	Expires after 30 Days	Install & Uninstall
	12 min at 28.8K		4 min at 56K		2 min at ISDN 128K	
	A Time Management program which logs the amount of time the "computer" is used, i.e., by making the user "login", and recording the login/logout times. There can be two definable "time zones" a "normal" and an "emergency" time. The "emergency" time is defined as the time in which the computer is "not meant" to be used, thus so it can be logged and/or protected. Features include: Customizable emergency "time zone", Graphical views of last few "usage times", cumulative values for total emergency/normal usage.					
Published by Armada Technologies			UsageLogger Home Page			

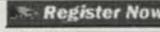
 TimeEzy :Global Clock	Version 1.02			Register Now		
	22-Apr-98	222K	Win 95/98/NT	Shareware \$19.95	Expires after 30 Days	Install
	1 min at 28.8K		<1 min at 56K		<1 min at ISDN 128K	
	Intelligent Global Clock for Win 95 and NT 4.0. An exceptionally easy to use utility which offers point'n'click access to timezones around the world. Takes Daylight Savings Time into account wherever and whenever appropriate.					
Published by RealEzy PC Utilities			TimeEzy :Global Clock Home Page			

 ClockIt	Version 1.3.5			No Registration Required		
	21-Apr-98	527K	Win 95/NT	Freeware	Never Expires	Install & Uninstall
	3 min at 28.8K		1 min at 56K		1 min at ISDN 128K	
	A timer that totals the time you spend working on a project. It supports multiple projects, it can be minimized to the system tray or set "Always on Top". You can view your log file in the program and increment/decrement the time displayed on the timer. This update fixes minor bugs in the program. Requires the VB 5.0 Runtimes.					
Published by Richard Gelinas			ClockIt Home Page			

 GetTime	Version 2.13p3				Online Registration Not Yet Available	
	13-Apr-98	206K	Win 95/98/NT	Shareware \$15.00	Never Expires	Install & Uninstall
	1 min at 28.8K		<1 min at 56K		<1 min at ISDN 128K	
	<p>Would you like to have all the computers on your network synchronized to a common time source? Now you can with GetTime! GetTime runs unobtrusively on Windows 95/NT machines, quietly updating the system clock with a central time source (in this case, another computer on the network). You don't need access to the Internet. However, if you do have access to the Internet, then you can have all the computers on your network synchronized to one of several time servers on the Internet.</p>					
Published by Ken Salter			GetTime Home Page			

 Global Dialing Assistant	Version 2.8.32					
	15-Nov-97	3,905K	Win 95/98/NT	Shareware \$29.00	Expiration Unknown	Install & Uninstall
	24 min at 28.8K		9 min at 56K		4 min at ISDN 128K	
	<p>Integrates three powerful International Business Tools into one easy-to-use money-saving package. First, the Animated World Time Clock allows you to see at a glance where it is daytime and nighttime around the world as well as the current date and time of key locations you choose. Next, the International Dialing Guide gives you quick access to information on over 1,600 cities worldwide (including dialing access codes, current date/time, and high/medium/low-cost calling periods) that will help you maximize the value of your calls. Additionally, you can reduce costly mistakes when setting up conference calls with the Conference Calculator that automatically converts between your local date/time and that of any other location you choose.</p>					
Published by Strategic Information Systems			Global Dialing Assistant Home Page			

 TrayTime	Version 1.5					
	17-Oct-97	774K	Win 95/98	Shareware \$8.00	Expires after 30 Days	Install & Uninstall
	5 min at 28.8K		2 min at 56K		1 min at ISDN 128K	
	<p>A secondary time zone tray clock. It sits beside the standard tray clock in the Windows 95 taskbar/tray area and displays another time zone's time. Very handy for people working together over different time zones, an absolute must for everybody involved with international trade or with friends overseas.</p>					
Published by Christensen Software			TrayTime Home Page			

 MouseClock	Version 1.0					
	15-Aug-97	500K	Win 95/98/NT	Shareware \$10.00	Expiration Unknown	Install & Uninstall
	3 min at 28.8K		1 min at 56K		1 min at ISDN 128K	
	<p>MouseClock is the only cursor enhancement you'll ever need! MouseClock virtually becomes part of your mouse pointer. It stays out of the way, while providing you with the current time and free system resources. MouseClock also features a rate clock and supports 24-hour format. Imagine having all this information right in front of you when you need it. In a professional that gets paid hourly? Why not keep your rates straight with the MouseClock rate clock? MouseClock can stay on top, or be put behind other Windows when you no longer require its use. Easy to use and fully configurable. Another very handy utility from AMF.</p>					
Published by AMF			MouseClock Home Page			

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< 1970

IBM

Date: January 6, 1959
From: F. R. Holt, Jr.
Department: Applied Programming
Location: DPDHC

To:

Department:

Location:

Miss C. M. Maer
Commercial Systems Development
WHQ

CC:

Subject and/or Reference:

Conversion of Calendar dates to days
of the Year

I saw a request in Sales Currents for information on the subject application, and I've worked out a formula which may be of some help. The formula is:

$$N = 30.6M + D - K$$

where:

N is the result of the computation. The integer portion of N, without rounding, is the day of the year.

M is the number of the month, from 1 to 12.

D is the day of the month

K is a constant whose value depends upon the month.

When M = 1 or 2; K = 30.

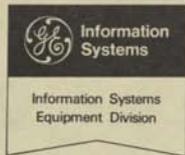
When M = 3 through 12; K = 32.3.

The above values of K are for a non-leap year. For a leap year, the value remains the same for M = 1 or 2, and is changed to 31.3 for M = 3 through 12.

frh/ep

F. R. Holt, Jr.

GENERAL ELECTRIC



DIAL COMM 8*433 4967 DATE July 16, 1968 MAIL ZONE C-85

DEPT. • **Medium Systems Department**

ADDRESS • **Phoenix, Arizona**

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SUBJECT •

P.T. MEMO # 25
Method of Representing the Date

R.W. Bemer
O F F I C E

1. I would like to suggest another possibility for representing the date:

FISCAL YEAR FISCAL WEEK FISCAL DAY

Representation:

Fiscal Year - Last two digits
Fiscal Week - Two digits (01-09 for first 9 weeks)
Fiscal Day - One digit (Monday = 1)

I believe that all of these terms are "well-defined." The composite will be called "The Fiscal Date."

2. **Some of the advantages**
 - A. Preserves descending sequence.
 - B. Preserves notion of "day of week."
 - C. Extendable to hours, minutes, seconds.
 - D. Permits manipulation of fractions of a year in a consistent manner.
 - E. Implicity contains the definition of Fiscal Month and Fiscal Quarter.
3. I believe some thought should be given to associated human factors problems. Specifically, how do you write the date, i.e. with or without separators and how do you say such numbers?

Suggest using the "blank character" between each entity:

68 28 5

for easy reading.

We would say it: *Gregorian*

1) Give the Fiscal Date, (Fiscal Day of Year)
 2) Divide by 7 to get the quotient and remainder.
 3) In the above remainder, algebraically add the value of *Gregorian*

4. For appending hours and minutes, it is suggested that a colon separator be used.

Noon, for example, would be

68 28 5:1200

5. There is no particular problem in converting from this date form to day of year.

The formula is

$$\text{Day of Year} = \text{FW} * 7 + \text{FD} + \text{K} - 7$$

One must carry a different K around in his head for each FY (e.g., K = 0 for 1968) but I do not envision this as any great burden.

The reason this formula is suggested rather than

$$\text{DOY} = (\text{FW}-1) * 7 + \text{FD} + \text{K}$$

is

- a. The FW is already "written down" and it is easy to multiply by seven rather than either mentally or physically writing down FW-1 and then multiplying by seven.
 - b. Rather than the annual factor being "K", it will resolve into "(K-7)." Then one subtracts off this entity from FD to get a number to add to FW * 7.
6. The conversion from Fiscal Date to the Gregorian Date, and from the Gregorian Date to Fiscal Date, must take place through a table of 12 values, whose origin is different for each FY.

a. Fiscal to Gregorian

- 1) Given the Fiscal Date, compute Day of Year.
- 2) Divide Day of Year by 30. The resulting quotient plus one is the Gregorian month.
- 3) To the above remainder, algebraically add the value of ADJ corresponding to the quotient to get Gregorian Day.

Quotient	Adjustment (for 1968)
1	-1
2	+1
3	0
4	0
5	-1
6	-1
7	-2
8	-3
9	-3
10	-4
11	-4
12	-5

Example:

FD = 68 28 5

DOY = 194

$$\begin{array}{r}
 6 = \text{quotient} \\
 30 \overline{)194} \\
 \underline{180} \\
 14 = \text{remainder}
 \end{array}$$

Quotient + 1 = Gregorian Month Number

$$6 + 1 = 7 \hat{=} \text{July}$$

Remainder + ADJ = Day of Month

$$14 - 2 = 12 = \text{12th day}$$

68 28 5 Fiscal Date = July 12, 1968 Gregorian Date

b. Gregorian to Fiscal

- 1) Subtract one from the Gregorian Month number and multiply by 30.
- 2) Add Gregorian Day number to the above product.
- 3) Algebraically subtract ADJ corresponding to Gregorian Month number to the above sum.

This yields Day of Year.

- 4) Divide DOY by 7 and add 1 to get FW.
- 5) To the remainder of the above division, add K (K = 0 for 1968) to get FD.

Example:

Given July 12th, 1968

$$\text{DOY} = 180 + 12 - (-2) = 194$$

$$\text{FW} = Q \left[\frac{194}{7} \right] + 1 = 27 + 1 = 28$$

$$\text{FD} = \text{Remainder} + K = 5$$

$$\text{Hence } \text{FD} = 68 \ 28 \ 5$$

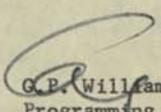
7. There is no question that carrying around a different table for each year is a nuisance. Clearly though, the table "pattern" does not change (except for one value in leap year) and all that must be remembered is the K value (origin shift) required for each Fiscal Year.
8. The continued use of Fiscal Dates would probably submerge the idea of "monthness" as we now know it. We can already see signs of this in such procedures as

"We get paid on even FW's."

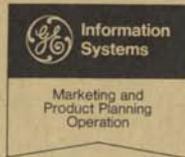
I suspect that such notions as

$$\text{FW}(\text{mod } 4) \equiv 0$$

would start cropping up all over the place.


G. P. Williams
Programming Technology Engineer

GENERAL  ELECTRIC



DIAL COMM • 8*223-1873

DATE • February 7, 1969

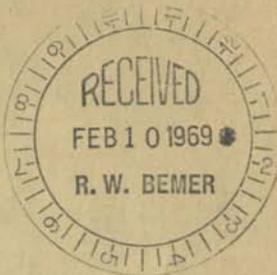
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SUBJECT •

Mr. R. W. Bemer
Manager - Systems & Software Engineering Integration
Engineering & Manufacturing Integration Opn. - AD&RPD
Mail Drop C-80
Phoenix



Dear Bob:

Your USASI Trip Report - X3 meeting covered by your letter of January 27, gives me the opportunity to express my strong conviction on a subject which Logan Cowles and others in EMIO have been trying to push on me on the basis that I was out of step with the rest of the world. Please refer to item 5, page 3 "Writing of Dates". I now see from your minutes that the unorthodox writing of dates by year/month/day is not a world-wide accepted standard for correspondence forms and abbreviations.

I have no objection to the computer industry finding it convenient to use this method in the machine-readable form, but I honestly believe that if our already criticized industry tries to cram this standard down every citizens personal life, we are going to create more adverse reflections on our industry's image than is justified.

I can visualize as you have stated that there may be some instances of difficulty in transcribing human-to-human correspondence to machine form, but I think this is a small price to pay for letting us poor mortals enjoy our habits of many centuries in our normal business and personal lives.

I urge you, therefore, not to take the stand that you have reported in your minutes.

J. H. Sweeney

/mb

3409

1969 February 17

M2

Engineering and Manufacturing
Integration Operation

L. B. Cowles

Mr. J. H. Sweeney, Manager
Marketing and Product Planning Operation

Thank you for the opportunity to clarify the situation on the writing of dates, as follows:

1. There are no ISO standards; these are only recommendations. Furthermore, a matter of this importance might take several years for a recommendation to be agreed by the country members. What we have reported (and it's true) is that the day-month-year form (which is used by parts of the USA) has been rejected and a new vote is in process for the year-month-day form.
2. I assume that your position makes you acutely aware of the problem of reaching international agreements, yet (if I understand you correctly) you would propose that the habit of part of the USA (dissimilar to the Department of Defense and the Armed Services) should be exported to the rest of the world. I believe you would have as little success as you would in re-exporting our system of measurement to the 90 percent of the world that is metric.
3. Or you may feel that in this matter we could go our separate ways for human usage. I think this will be impossible, particularly if the American Bankers Association preprints checks in this form. Even today the form familiar to you is outdated in many aspects. Maintaining dual forms for human and machine work implies constant reconversion for humans affected by machines, as we all are.
4. Perhaps you have never been detained in quarantine, as I was because the European health officer insisted that my smallpox vaccination had expired.
5. You spoke of enjoying our habits. If you wish I can get you a list of secretaries that have been asked to use this new form and their comments regarding how difficult it was to change those habits. I do agree that a proper public relations campaign is necessary.

Mr. J. H. Sweeney

2

1969 February 17

6. Finally, I would recommend a book called The Dynamics of Change. One of the major theses here, with which I cannot disagree, is that the rate of change increased so much in the last 20 years that we are untrained to accommodate it. A couple of pages here will give you the flavor.

R. W. Bemer

po