The ACM's Seventeenth North American Computer Chess Championship

and

The Sixth World Microcomputer Chess Championship

Dallas, Texas

October 31th-November 5th, 1986

A Special Event at the ACM-IEEE Computer Society FICC

Table of Contents

- Welcome and overview 1
- Important times and places 2
- Scorecard for NACCC 3
- List of Participants in the NACCC 4
- Computing system information for the NACCC 5
- Rules for the NACCC 6
- Scorecard for the WMCC 8
- List of participants and computing systems in the WMCC 9
- Rules for the WMCC 10
- History of the major tournaments 12
- The ACM's Sixteenth NACCC 14
- Technical Session and Panel Discussion 24
- The ACM's Computer Chess Committee 25
- The ICCA 25
Welcom and Overview

This year, the ACM Computer Chess Committee is giving its members, those of the IEEE Computer Society, and the general public a real treat. In addition to holding the usual ACM'S North American Computer Chess Championship, we are also holding the Sixth World Microcomputer Chess Championship. The NACCC will take place in the Anatole Hotel in the evenings (with the exception of a Sunday matinee) while the WMCC will take place at the Infomart during the days. There are sixteen entries in the NACCC and fourteen in the WMCC making the combined tournaments the single largest computer chess program in the history of such events. Participants are coming from Holland, England, Germany, Hungary, Canada, and the USA. And while several leading programs will not be present, both tournaments may provide new levels of excellence and excitement. Winners of each event will receive trophies and a $2000 prize.

The world champion program, CRAY BLITZ(Hyatt, Gower, Nelson, Meade), will head the field at the NACCC. The program, executing on a four processor Cray XMP will execute about 220 million instructions per second, searching about ten to fifteen million chess positions during the course of a single three-minute move. CRAY BLITZ defended its title of world champion in June of this year in Cologne, Germany, defeating HITECH(Berliner, Belling, Goetsch, Palay, Campbell, Slomer) in the final round. HITECH, winner of last year's ACM tournament, is passing up this event primarily because it is in the middle of a major revision. The opposition will come from a slew of multiprocessing systems and special purpose systems. In addition to CRAY BLITZ, five other entries will run on more than one computer:

WAYCOOL ........................................... 64 processors of an N-cube
SUN PHOENIX ...................................... 20 SUN-3 workstations
CHESS CHALLENGER X ......................... 16 or more 68000s controled by a
.................................................. Z80.
LACHEX............................................ 4 processors of a Cray XMP
OSTRICH.......................................... 8 processors: Data General Novas and
.................................................. and an Eclipse master.

While running on a number of computers is clearly the current fashion, special purpose circuitry may be equally the wave of the future. BEBE and CHIPTEST represent that trend. And microcomputers will take on this group as represented by CYRUS 68K, MEPHISTO MOTOROLA, NOVAG EXPERT X, RECOM-REBEL 87, and REX III. It's worth recollecting that it was only slightly more than ten years ago that the issue of programming languages was on everyone's mind at these tournaments.

The WMCC will see continued improvement in the level of play by these featherweight processing machines. Play should be approaching the Master level, just a notch off the level of play in the NACCC. The favorites are the Fidelity computers and the Mephisto computers.

A Technical Session on AI Algorithms will be held on Tuesday, November 4th from 3:45-5:15 PM in Room H with two papers presented, one by Tony Marsland and N. Srimani and another by Jonathan Schafer. A Panel Discussion will follow with participants including Ken Thompson, David Levy, Robert Hyatt and Monty Newborn.

Mike Valvo will serve as the Tournament Director with Tony Marsland serving as Assistant Director. Danny Kopec will be Official Scorekeeper. Both Valvo and Kopec will provide running commentary on the games and we encourage the audience to feel free to ask questions. (In the old days, the audience couldn't understand why the programs played so badly; now they just don't understand what the programs are doing at all!). Local arrangements have been carried out by Glenn Scharp and Kermit Paulos and I would like to extend both of them a big thanks. The Dallas Chess Club has also provided us some help and I would like to thank them also.

We hope you enjoy our show.

Monty Newborn, Chairman, ACM CCC.
Hans Berliner, Tony Marsland, Kathe Spracklen,
and Ken Thompson, Members of the ACM CCC.
Important Times and Places

1. Schedule of Rounds for the World Microcomputer Chess Championship:
   (games are in the Edison Room of the Dallas Infomart)
   
<table>
<thead>
<tr>
<th>Round</th>
<th>Time</th>
<th>Day</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>6:30 PM</td>
<td>Friday</td>
<td>October 31</td>
</tr>
<tr>
<td>2</td>
<td>10:00 AM</td>
<td>Saturday</td>
<td>November 1</td>
</tr>
<tr>
<td>3</td>
<td>5:00 PM</td>
<td>Saturday</td>
<td>November 1</td>
</tr>
<tr>
<td>4</td>
<td>8:00 AM</td>
<td>Sunday</td>
<td>November 2</td>
</tr>
<tr>
<td>5</td>
<td>10:00 AM</td>
<td>Monday</td>
<td>November 3</td>
</tr>
<tr>
<td>6</td>
<td>10:00 AM</td>
<td>Tuesday</td>
<td>November 4</td>
</tr>
<tr>
<td>7</td>
<td>10:00 AM</td>
<td>Wednesday</td>
<td>November 5</td>
</tr>
</tbody>
</table>

2. Schedule of Rounds for the ACM's 17th NACCC:
   (games are in Ballrooms D and E of the Anatole Hotel)
   
<table>
<thead>
<tr>
<th>Round</th>
<th>Time</th>
<th>Day</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2:30 PM</td>
<td>Sunday</td>
<td>November 2</td>
</tr>
<tr>
<td>2</td>
<td>8:30 PM</td>
<td>Sunday</td>
<td>November 2</td>
</tr>
<tr>
<td>3</td>
<td>7:30 PM</td>
<td>Monday</td>
<td>November 3</td>
</tr>
<tr>
<td>4</td>
<td>7:30 PM</td>
<td>Tuesday</td>
<td>November 4</td>
</tr>
<tr>
<td>5</td>
<td>7:30 PM</td>
<td>Wednesday</td>
<td>November 5</td>
</tr>
</tbody>
</table>

3. Awards Presentation Breakfast:    Thursday, November 6th at 8:30 AM.

4. Technical Session: "AI Algorithms", Tuesday, Nov. 4th at 3:45-5:15 PM in Room 3H.

5. ACM Computer Chess Committee Meeting: 4:00-5:00 PM, Monday, November 3rd.

6. ICCA Meeting: 5:00-6:00 PM, Wednesday, November 5th.

---

Tournament Officials:

   Mike Valvo, Tournament Director, and Tony Marsland, Assistant Director.

Organizing Committee:

   Glenn Scharp, Monty Newborn

Admissions Committee:

   Ken Thompson, Hans Berliner, Tony Marsland, Monty Newborn, Kathe Spracklen.
# Score Table

ACM’s 17th North American Computer Chess Championship

<table>
<thead>
<tr>
<th>Team</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>Total Points</th>
<th>Final Place</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Bebe</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 Chess Challenger X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 ChipTest</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 Cray Blitz</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 Cyrus 68K</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 Fidelity Experimental</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7 Lachex</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 Mephisto Motorola</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9 Merlin</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 Novag Expert X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11 Ostrich</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12 Recom-Rebel 87</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13 Rex III</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14 Sun Phoenix</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15 Vaxchess</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16 WayCool</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Code:**

- Number of points
- Number of opponent
Participants in the ACM's Seventeenth North American Computer Chess Championship

Bebe

Chess Challenger X

ChipTest
Thomas Anantharamam and Feng-hsiung Hsu, c/o FH, Department of Computer Science, Carnegie-Mellon University, Pittsburgh, Pennsylvania 15213.

Cray Blitz

Cyrus 68K

Fidelity Experimental
Dan Spracklen, Kathe Spracklen, and Danny Kopec, c/o DS, 4540 Kearney Villa Road, Suite 104, San Diego, California 92123.

Lachex
Tony Warnock and Burt Wendroff, c/o BW, MS B284, Los Alamos National Laboratory, Los Alamos, New Mexico 87545.

Mephisto Motorola
Richard Lang, Hegener + Glaser AG, Arnulfstr. 2, D8000 Munich, West Germany.

Merlin
Hermann Kaindl, Marcus Wagner, and Helmut Horacek, c/o HK, Marxergasse 18/2/1, A-1030 Wien, Austria.

Novag Expert X
David Kittinger, 18923 Cantara Street, Reseda, California 91335.

Ostrich
Monty Newborn, School of Computer Science, McGill University, 805 Sherbrooke Stree West, Montreal, Quebec, Canada H3A 2K6.

Recom-Rebel 87
Ed Schroder, Merel 10, 7423 EH Deventer, Holland.

Rex III
Don Dailey, 1328 Dale Avenue, Roanoke, Virginia 24013.

Sun Phoenix
Jonathan Schaeffer and Marius Olaffson, c/o JS, Department of Computing Science, University of Alberta, Edmonton, Alberta, T6G 2H1.

Vaxchess
Tony Guifoyle and Richard Hooker, c/o TG, 13 Walgrove Road, Hitchen Herts, England.

Waycool
Ed Felten, Rod Morrison, and Steve Otto, c/o RM, Cal Tech, 206-49 Pasadena, California 91125.
<table>
<thead>
<tr>
<th>Program</th>
<th>Computing System and Language</th>
<th>Book</th>
<th>Nodes/Sec</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bebe</td>
<td>SYS-10 Chess Engine*, assembler, 65Kb, 16 bits, 10 mips.</td>
<td>4K</td>
<td>40K</td>
</tr>
<tr>
<td>Chess Challenger X</td>
<td>Z80 controller + 16 or more 68000*, C(for Z80) and assembler for 68000.</td>
<td>16K+</td>
<td>NA</td>
</tr>
<tr>
<td>ChipTest</td>
<td>SUN 3 plus high speed move generator, assembr,(at Carnegie-Mellon Univ.)</td>
<td>NA</td>
<td>100K-1M</td>
</tr>
<tr>
<td>Cray Blitz</td>
<td>Cray X-MP 4/8, Fortran and assembler, (at Apple Corporation, Culvertino, California)</td>
<td>60K</td>
<td>120K</td>
</tr>
<tr>
<td>Cyrus 68K</td>
<td>68020-based microcomputer*, assembler.</td>
<td>16K</td>
<td>4K</td>
</tr>
<tr>
<td>Fidelity Experimental</td>
<td>68020-based microcomputer*,assembler.</td>
<td>30K</td>
<td>NA</td>
</tr>
<tr>
<td>Lachex</td>
<td>Cray X-MP 48, Fortran and assembler, Cray Research, Chippawa Falls, Minnesota</td>
<td>4K</td>
<td>50K</td>
</tr>
<tr>
<td>Mephisto Motorola</td>
<td>68020-based microcomputer*, assembler, 64 Kb RAM, 32 bits, 4 mips.</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Merlin</td>
<td>IBM 3081, Pascal, 12 mips, IBM Dallas.</td>
<td>6K</td>
<td>.6K</td>
</tr>
<tr>
<td>Novag Expert X</td>
<td>6502-based microcomputer*, assembler, 56 Kb ROM.</td>
<td>22K</td>
<td>2-3K</td>
</tr>
<tr>
<td>Ostrich</td>
<td>8 DG computers: 1 Eclipse S/120, 6 Nova 4's, 1 Nova 3, on high speed DMA bus, 64 Kb/computer, 16 bits, 1mips/computer. (McGill University)</td>
<td>4K</td>
<td>2K</td>
</tr>
<tr>
<td>Recom-Rebel 87</td>
<td>6502 gate array processor*, assembler.</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Rex III</td>
<td>Intel 80286-based microcomputer*, Pascal.</td>
<td>.1K+</td>
<td>.3K</td>
</tr>
<tr>
<td>Sun Phoenix</td>
<td>20 SUN 3 Workstations, C, SUN Corporation, Sunnyvale, California.</td>
<td>8K</td>
<td>20K</td>
</tr>
<tr>
<td>Vaxchess</td>
<td>Microvax 2,C + assembler.</td>
<td>14K</td>
<td>1K</td>
</tr>
<tr>
<td>WayCool</td>
<td>N-cube (64-processors @ 128Kb/proc., 1 mips/proc), Cal Tech.</td>
<td>15K</td>
<td>14K</td>
</tr>
</tbody>
</table>

* indicates computer is at tournament site
17th ACM North American Computer Chess Championship

Tournament Rules

1. Each entry is a computing system and one or more human operators. A listing of all chess-related programs running on the system must be available on demand to the TD. Each entry requires at least one full-time operator (i.e., one operator cannot assist with more than one entry).

2. Participants are required to attend a meeting at 2:00 PM on Sunday, November 2 for the purpose of officially registering for the tournament. Rules will be finalized at that meeting. The TD has the right to choose an alternate to replace any entry which fails to appear.

3. The tournament is a five round Swiss style tournament. The first and second rounds will be played Sunday November 2 at 2:30 PM and 8:30 PM. The third round is scheduled for Monday, November 3rd at 7:30 PM, the fourth round for Tuesday November 4th at 7:30 PM, and the fifth round for Wednesday November 5th at 7:30 PM.

4. Trophies will be awarded to the first three finishers. The order of finish will be determined by the total number of points earned. If two or more teams have an equal number of points, the sum of the opponents' points will be used as a second factor. If a tie still remains, the opponents' opponents' points, etc., will be used.

5. A trophy will be awarded to the entry running on a computing system that is present in Dallas and finishes highest based on tie-breaking points and weighs under 25 kilograms. That program will receive the title of North American Small Computing System Chess Champion.

6. A prize of $2000 will be awarded to the program which finishes the tournament with the most points. In the event of a tie, the prize will be divided equally.

7. Unless otherwise specified, rules of play are identical to those of "human" tournament play. If a point is in question, the TD has the right to make the final decision.

8. Games are played at a speed of 40 moves per player in the first two hours and 20 moves per player per hour thereafter.

9. The TD has the right to adjudicate a game after five hours of total clock time. The adjudication will be made on the premise that perfect chess will be played by both sides from the final position. Every effort will be made by the TD to avoid adjudication.

9. A team may request the TD to stop its clock at most twice during the course of a game because of technical difficulties. The clock must be restarted each time at most 15 minutes. If a team using a remote computer can clearly establish that its problems are not in its own computing system...
but in the communication network, the TD can permit additional time-outs.

10. Terminals located at the tournament site must communicate directly with remote computers, i.e., there cannot be any human intermediary at the remote location.

11. Each team that uses a terminal must position the terminal on the game table in such a way that the opponent has a good view of it. An operator can only (1) type in moves and (2) respond to requests from the computer for clock information. If an operator must type in any other information, it must be approved ahead of time by the TD. (This might happen if there is noise on the communication line and, for example, a CR must be typed to clear the line.) The operator cannot query the system to see if it is alive without permission of the TD.

12. If a failure occurs during the course of a game, the program parameters must be reset to their values at the time the game was interrupted. An operator error made when starting a game or when restarting in the middle of a game after a failure cannot be corrected!

13. If an operator types in an incorrect move, the TD must be immediately notified. The clock will be stopped. The game must then be backed up to the point where the error occurred. The clock of the side which made the error is left unchanged while the TD will back up the clock of the other side an amount equal to that lost. The TD may back up the clock of the side in error if it would otherwise force that side to lose the game on time, or leave it with less than two minutes per move until the next time control. In this case, the TD will back up the clock of the side in error to give it an average of two minutes per move until the next time control. If no record is available, the TD will assume each move by the side not in error required three minutes. Both sides may adjust program parameters after such an error with the consent of the TD. The TD may not allow certain parameters to be changed, e.g., the contempt factor.

14. A team must receive the approval of the TD to change from one computing system to another. The new system cannot be any more powerful than the original.

15. Each game is officially played on a chess board provided by the Tournament Committee. The official clock is provided by the Tournament Committee.

16. At the end of each game, each team is required to turn in a game listing to the TD.
The ACM Computer Chess Committee

In 1979, the ACM established the Computer Chess Committee as a standing committee on the Management Board. The Committee was responsible for organizing computer chess activities within the ACM. In 1984, the Committee was transferred to the Conferences Board where it is today. The main function of the Committee is to organize the ACM's annual North American Computer Chess Championship. This tournament has been held annually starting in 1970. Currently, the Members of the Committee are Monty Newborn, Chairman, Hans Berliner, Tony Marsland, Kathe Spracklen, and Ken Thompson.

The International Computer Chess Association

Established at the Second World Championship in Toronto in 1977, this international association has about seven hundred members from all over the world. It was formed by the programmers of the leading programs and its chief purpose is to serve this community. The ICCA Journal publishes technical and non-technical papers on computer chess and is the foremost publication of its kind. It may one day be the world's leading chess publication. Currently, it is published four times a year. Authors of articles should send them to Jaap van den Herik, Department of Mathematics and Informatics, Delft University of Technology, 2628 BL Delft, The Netherlands. Individuals interested in becoming members should write to Jonathan Schaeffer, Department of Computing Science, University of Alberta, Edmonton, Alberta, T6G 2H1. Dues are $20 annually. Officers are David Levy, President, Tony Marsland, Vice President, and Jonathan Schaeffer, Secretary/Treasurer.
# Score Table

## Sixth World Microcomputer Chess Championship

<table>
<thead>
<tr>
<th>Team</th>
<th>Rounds</th>
<th>Total Points</th>
<th>Final Place</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Atari Kempelen</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Chess Monster</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Cyrus 68K A</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Cyrus 68K B</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Cyrus 68K C</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Fidelity &quot;2533&quot; A</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Fidelity &quot;2533&quot; B</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Fidelity &quot;2533&quot; C</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Mephisto Dallas 1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. Mephisto Dallas 2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. Mephisto Dallas 3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. Recom-deventer A</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. Recom-deventer B</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14. Recom-deventer C</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Code:**

- Number of points
- Number of opponent
Computing System Information
Sixth World Microcomputer Chess Championship

<table>
<thead>
<tr>
<th>Program</th>
<th>Computing System</th>
<th>Organization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atari Kempelen</td>
<td>Atari ST, 68000-based microcomputer</td>
<td>Andromeda Software Inc.</td>
</tr>
<tr>
<td>Chess Monster</td>
<td>IBM PC, 8086-based microcomputer</td>
<td>Enlightenment Inc.</td>
</tr>
<tr>
<td>Cyrus 68K A</td>
<td>68020-based microcomputer</td>
<td>Intelligent Chess Software Ltd.</td>
</tr>
<tr>
<td>Cyrus 68K B</td>
<td>&quot;</td>
<td>&quot;</td>
</tr>
<tr>
<td>Cyrus 68K C</td>
<td>&quot;</td>
<td>&quot;</td>
</tr>
<tr>
<td>Fidelity &quot;2533&quot; A</td>
<td>68020-based chess machine</td>
<td>Fidelity International Inc.</td>
</tr>
<tr>
<td>Fidelity &quot;2533&quot; B</td>
<td>&quot;</td>
<td>&quot;</td>
</tr>
<tr>
<td>Fidelity &quot;2533&quot; C</td>
<td>&quot;</td>
<td>&quot;</td>
</tr>
<tr>
<td>Mephisto Dallas 1</td>
<td>68020-based chess machine</td>
<td>Hegener and Glaser</td>
</tr>
<tr>
<td>Mephisto Dallas 2</td>
<td>&quot;</td>
<td>&quot;</td>
</tr>
<tr>
<td>Mephisto Dallas 3</td>
<td>&quot;</td>
<td>&quot;</td>
</tr>
<tr>
<td>Recom-deventer A</td>
<td>6502-based microcomputer</td>
<td>E. G. H. Schroder</td>
</tr>
<tr>
<td>Recom-deventer B</td>
<td>&quot;</td>
<td>&quot;</td>
</tr>
<tr>
<td>Recom-deventer C</td>
<td>&quot;</td>
<td>&quot;</td>
</tr>
</tbody>
</table>
The ACM's World Microcomputer Chess Championship

Tournament Rules

1. Each entry is a computing system and one or more human operators. A listing of all chess-related programs running on the system must be available on demand to the TD. Each entry requires at least one full-time operator (i.e., one operator cannot assist with more than one entry). The computing system must use only one microprocessor for searching the chess tree. That microprocessor can be inside a conventional microcomputer or inside a chess-playing machine. Bit-sliced machines and multiprocessing machines are not allowed.

2. An organization or company can submit as many as three entries.

3. Participants are required to attend a meeting at 6:00 PM on Friday, October 31st for the purpose of officially registering for the tournament. Rules will be finalized at that meeting.

4. The tournament is a seven round Swiss style tournament. The first is on Friday October 31st at 6:30 PM. The second and third rounds will be played Saturday November 1st at 10:00 AM and 5:00 PM. The fourth round is scheduled for Sunday, November 2nd at 8:00 AM, the fifth round for Monday, November 3rd at 10:00 AM, the sixth round for Tuesday, November 5th at 10:00 AM, and the seventh round for Wednesday, November 6th at 10:00 AM.

5. Trophies will be awarded to the first three finishers. The order of finish will be determined by the total number of points earned. If two or more teams have an equal number of points, the sum of the opponents' points will be used as a second factor. If a tie still remains, the opponents' opponents' points, etc., will be used.

6. A prize of $2000 will be awarded to the program which finishes the tournament with the most points. In the event of a tie, the prize will be divided equally.

7. Unless otherwise specified, rules of play are identical to those of "human" tournament play. If a point is in question, the TD has the right to make the final decision.

8. Games are played at a speed of 40 moves per played in the first two hours and 20 moves per player per hour thereafter.

9. The TD has the right to adjudicate a game after six hours of total clock time. The adjudication will be made on the premise that perfect chess will be played by both sides from the final position. Every effort will be made by the TD to avoid adjudication.

10. A team may request the TD to stop its clock at most twice during the course of a game because of technical difficulties. The clock must be restarted each time after at most 15 minutes.
11. Each team that uses a terminal must position the terminal on the game table in such a way that the opponent has a good view of it. An operator can only (1) type in moves and (2) respond to request from the computer for clock information.

12. If a failure occurs during the course of a game, the program parameters must be reset to their values at the time the game was interrupted. An operator error made when starting a game or when restarting in the middle of a game after a failure cannot be corrected!

13. If an operator types an incorrect move, the TD must be immediately be notified. The clock will be stopped. The game must then be backed up to the point where the error occurred. The clock of the side which made the error is left unchanged while the TD will back up the clock of the other side an amount equal to that lost. The TD may back up the clock of the side in error if it would otherwise force that side to lose the game on time, or leave it with less than two minutes per move until the next time control. In this case, the TD will back up the clock of the side in error to give it an average of two minutes per move until the next time control. If no record is available, the TD will assume each move by the side not in error required three minutes. Both sides may adjust program parameters after such an error with the consent of the TD. The TD may not allow certain parameters to be changed, e.g., the contempt factor.

14. A team must receive the approval of the TD to change from one computing system to another. The new system cannot be any more powerful than the original.

15. Entries from the same organization will not be paired together.

16. Each game is officially played on a chess board provided by the Tournament Committee. The official clock is provided by the Tournament Committee.

17. At the end of each game, each team is required to turn in a game listing to the TD.

18. There is an entry fee of $550 US. If paid before September 20, the fee is $500 US. Checks should be made out payable to the Association for Computing Machinery.
## History of Major Tournaments

### World Championships

<table>
<thead>
<tr>
<th>Year</th>
<th>City</th>
<th>Winner</th>
<th>Runner-up</th>
</tr>
</thead>
<tbody>
<tr>
<td>1974</td>
<td>Stockholm</td>
<td>KAISSA; Donskoy, Arlazarov, ICL 4/70</td>
<td>CHESS 4.0; Slate, Atkin, CDC 6600</td>
</tr>
<tr>
<td>1977</td>
<td>Toronto</td>
<td>CHESS 4.6; Slate, Atkin, CDC Cyber 176</td>
<td>DUCHESS; Truscott, Wright, Jensen, IBM 370/165</td>
</tr>
<tr>
<td>1980</td>
<td>Linz</td>
<td>BELLE; Thompson, Condon, PDP 11/23 with chess circuitry</td>
<td>CHAOS; Alexander, Swartz, Berman O'Keefe, Amdahl 470/V8</td>
</tr>
<tr>
<td>1983</td>
<td>New York</td>
<td>CRAY BLITZ; Hyatt, Gower, Nelson, Cray XMP 48</td>
<td>BEBE; Scherzer, Chess engine</td>
</tr>
<tr>
<td>1986</td>
<td>Cologne</td>
<td>CRAY BLITZ; Hyatt, Gower, Nelson, Cray XMP</td>
<td>HITECH; Berliner, et al., SUN workstation with chess circuitry</td>
</tr>
</tbody>
</table>

### ACM's North American Computer Chess Championships

<table>
<thead>
<tr>
<th>Year</th>
<th>City</th>
<th>Winner</th>
<th>Runner-up</th>
</tr>
</thead>
<tbody>
<tr>
<td>1970</td>
<td>New York</td>
<td>CHESS 3.0; Slate, Atkin, Gorlen, CDC 6400</td>
<td>DALY CHESS PROGRAM; Daly, King, Varian 620/i</td>
</tr>
<tr>
<td>1971</td>
<td>Chicago</td>
<td>CHESS 3.5; Slate, Atkin, Gorlen, CDC 6400</td>
<td>TECH; Gillogly, PDP 10</td>
</tr>
<tr>
<td>1972</td>
<td>Boston</td>
<td>CHESS 3.6; Slate, Atkin, Gorlen, CDC 6400</td>
<td>OSTRICH; Arnold, Newborn, DG Supernova</td>
</tr>
<tr>
<td>1973</td>
<td>Atlanta</td>
<td>CHESS 4.0; Slate, Atkin, Gorlen, CDC 6400</td>
<td>TECH II; Baisley, PDP 10</td>
</tr>
<tr>
<td>1974</td>
<td>San Diego</td>
<td>RIBBIT; Hansen, Crook, Parry, Honeywell 6050</td>
<td>CHESS 4.0; Slate, Atkin, CDC 6400</td>
</tr>
<tr>
<td>1975</td>
<td>Minneapolis</td>
<td>CHESS 4.4; Slate, Atkin, CDC Cyber 175</td>
<td>TREEFROG; Hansen, Calnek, Crook, Honeywell 6080</td>
</tr>
<tr>
<td>1976</td>
<td>Houston</td>
<td>CHESS 4.5; Slate, Atkin, CDC Cyber 176</td>
<td>CHAOS; Swartz, Ruben, Winograd Berman, Toikka, Alexander, Amdahl 470</td>
</tr>
<tr>
<td>1977</td>
<td>Seattle</td>
<td>CHESS 4.6; Slate, Atkin, CDC Cyber 176</td>
<td>DUCHESS; Truscott, Wright, Jensen, IBM 370/168</td>
</tr>
</tbody>
</table>
1978 Washington BELLE; Thompson, Condon, PDP 11/70 with chess hardware CHESS 4.7; Slate, Atkin, CDC Cyber 176
1979 Detroit CHESS 4.9; Slate, Atkin, BELLE; Thompson, Condon, CDC Cyber 176 PDP 11/70 with chess hardware
1980 Nashville BELLE; Thompson, Condon, NUCHESS; Alexander, O'Keefe, PDP 11/70 with chess hardware Swartz, Berman, Amdahl 470
1981 Los Angeles BELLE; Thompson, Condon, NUCHESS; Blanchard, Slate, PDP 11/23 with chess hardware CDC Cyber 17
1982 Dallas BELLE; Thompson, Condon, CRAY BLITZ; Hyatt, Gower, PDP 11/23 with chess hardware Nelson, Cray 1
1983 Denver HITECH; Ebeling, Berliner, BEBE; Scherzer, Chess engine Goetsch, Palay, Campbell, Slomer, SUN with chess hardware

************
World Microcomputer Championships
************

Year City Winner Runner-up
1980 San Jose CHALLENGER MYCHESS B
1981 Travemunde FIDELITY X CHESS CHAMPION MARK V
1983 Budapest ELITE A/S MEPHISTO X
1984 Glasgow Four way tie: ELITE X, MEPHISTO S/X, PRINCHESS, PSION CHESS
1985 Amsterdam MEPHISTO AMSTERDAM I MEPHISTO AMSTERDAM II
ACM’s Sixteenth North American Computer Chess Championship

Danny Kopec  San Diego State University
Monty Newborn  McGill University

HITECH, a program developed at Carnegie-Mellon University by a group of researchers under the direction of Hans Berliner, finished first in the ACM Sixteenth North American Computer Chess Championship held during the Association’s annual conference in October 1985. The field of 10 was the smallest in many years while the level of play was the best yet.

The tournament may have marked the emergence of a new era in computer chess. The 1970s were the years of the CHESS series programs developed at Northwestern University by David Slate, Larry Atkin, and Keith Gorlen. The period from 1979 to 1983 marked the reign of BELLE, developed by Ken Thompson and Joe Condon of AT&T Bell Laboratories. BELLE was World Champion from 1980 through 1983, when it was dethroned by the current World Champion CRAY BLITZ running on a Cray X/MP computer. CRAY BLITZ was developed at the University of Southern Mississippi by Robert Hyatt, Burt Gower, and Harry Nelson. Now CRAY BLITZ seems to have been dethroned by HITECH. The week before the ACM tournament, HITECH participated in a tournament for human masters and won with an impressive 3½–½ score earning a performance rating of 2486. Berliner, former World Correspondence Chess Champion, predicts that “in the next five to ten years, HITECH will be ready to take on the top ten players in the world in a match.” HITECH searches trees at a rate of 175,000 nodes/second, while running on a SUN workstation with a specially designed VLSI chip attached that permits the high-search speeds.

Berliner is optimistic that HITECH can achieve a 2400 USCF (United States Chess Federation) rating by the summer of 1986 and then possibly take on David Levy in a six-game match in November in Las Vegas to see whether HITECH can finally surpass the English International Master. Levy beat CHESS 4.9 in 1978 to win a sizable bet made 10 years earlier that no computer could defeat him in a match during the coming 10 years. Levy also defeated the current World Champion program CRAY BLITZ 4–0 in a match in London in 1983 at the end of a five-year bet.

Finishing second for the third consecutive year was BEBE, written by Tony Scherzer of SY5-10, Hoffman Estates, Illinois, with a 3–1 score. A surprising, clear third place finish was achieved by INTELLIGENT SOFTWARE, the joint effort of Levy, Mark Taylor, and Kevin O’Connell of Intelligent Software, London, England. CRAY BLITZ had to settle for a fifth place finish and an even 2–2 score.

The Play
The first round saw routine victories by the first and third seeds, CRAY BLITZ and BEBE, while a considerable struggle, the highly touted HITECH overcame a strong challenge from Burton Wendroff’s LACHEX, which ran on a Cray 1M computer at Cray Research in Chippewa Falls, Wisconsin. There was also a minor upset when INTELLIGENT SOFTWARE defeated CHAOS after the latter, in an excellent position, tried an interesting positional sacrifice of its Queen for Rook and Knight. After great complications, newcomer SPOC fell apart against PHOENIX.

Round 2 saw the head-to-head encounter between CRAY BLITZ and BEBE. Despite lacking its openings transposition table due to hardware problems, BEBE obtained excellent attacking chances in a Sicilian Dragon with Kings castled on opposite wings and an early departure from theory (the fully annotated game follows). Despite considerable complications BEBE found a way to press its attack and force CRAY BLITZ’s resignation in a piece-down endgame. This loss marked the first
The authors would also like to express gratitude to FIDE Master Boris Baczynskiy; some of the authors' notes are based on Baczynskiy's analysis in CHESS LIFE. Comments in brackets are those of Monty Newborn, who based his remarks on computer printouts provided by the authors of HITECH and CRAY BLITZ.

Symbols
!! = An outstanding move
! = A very good move
!? = An interesting move
?! = A dubious move
? = A mistake
?? = A blunder

CRAY BLITZ versus BEBE
Round 2
1. e4 c5 2. Nf3 d6 3. d4 cxd4
The authors of CRAY BLITZ, which boasted the largest Opening book in the tournament, like to steer their program into unusual channels as per the text move.

6. ... Bg7 7. Qd2 Nc6
Usually White tries to initiate the "Yugoslav Attack" against Black's Dragon Defense with f3, h4, g4, etc., but here the White Knight on d4 is unstable and hence White tries to find a safe home for it. Alternatives such as 9. Nxc6 bxc6 10. e5!? Ne8 (10. ... Nd5 and 10. ... Ng4 deserve attention) 11. exd6 Nxd6

9. ... Re8?!
BEBE probably tries to avoid the trade of its Dragon Bishop by enabling ... Bh6 after Bb6. The more natural "human" move is 9. ... Be6. A program is not apt to make such a move because most are penalized for developing their Bishops in front of their central Pawns—a legacy of misplaced clergymen in an earlier era of computer chess.

10. Bc4?!
This piece is clearly "loose" and misplaced here. CRAY BLITZ's choice is comprehensible on the grounds that it develops White's last minor piece to its most mobile and center-oriented square (even aiming at the Black King), but as is typical of computer play, it is not part of any coherent plan. Better is 10. Be2 with the idea of 11. h4 and 12. h5 [This is CRAY BLITZ's first move out of book. It examined 25,105,612 positions in just under four minutes and predicted 10. ... Bd7 11. Qa4 Ne5 12. Be2 Kf8 13. Nd5 Nxd5 14. Rxd5. CRAY BLITZ typically examined about 10 to 15 million positions on each move.]

10. ... Ng4?!
Another dubious move, most probably because BEBE mistakenly thinks that 11. ... Bxc3 is a threat.

11. h3 Nge5
... but probably only now saw that 11. ... Bxc3? 12. Qxc3 Nxf2? loses to 13. Rxf1.

12. Bb5?!
Again, a human would probably retreat this Bishop to e2 not subjecting it to further harassment and threatening f4, and then on 12. ... Be6 13. Nd5.

12. ... a6 13. Be2 a5?!
Instead of ceding the b5-square to White, humans would have a notion of how 13. ... b5 with ... Nc4 to follow would fit into a general plan of attack on the White King.

14. Bb5
Computer programs are unprejudiced when it comes to moving pieces more than once to achieve mobility and tactical ends. Hereby 14. ... a4 is detained, but 14. a4 was a viable alternative.

14. ... Be6 15. Nd5?
Since Black can now force play with 15. ... a4, 15. a4 was still indicated; CRAY BLITZ probably did not relish the shattering of its Q-side pawn formation after 15. a4 Bxb3, but then White's position is really not bad.

15. ... a4 16. Nd4 Bd7?

A strong move because it exposes the insecurity of White's actively and centrally posted pieces, although 16. ... Nxd4!? with tremendous complications also deserves attention. [CRAY BLITZ predicted Black's move and saw the game continuing 17. Nxc6 bxc6 18. Nxe7+ Rxe7 19. Bxe7 Qxe7 20. Be2.]

17. Nxc6?
Initiating a misdirected sequence that results in a decisive material gain for Black. However, after 17. Ne2 or 17. Nf3 Black would have few problems if 17. ... Na5 is played.

17. ... bxc6 18. Nxe7+ Rxe7
Now that the smoke has cleared, CRAY BLITZ probably expected to
gain a slight material advantage with 20. Qxd6. However, there is never time for this capture because the White King proves to be inadequately defended as the Black minor pieces continuously harass him.

20. ... Qe6! 21. Kb1
If 21. Qxd6 Qxa2 22. f4 a3 and Black quickly crashes through. [CRAY BLITZ, on its seventh iteration, figured that 21. Qxd6 Qxa2 22. f4 Nc4 23. Bxc4 Qxb2+ 24. Kd2 Qc3+ 25. Kc1 Qb2+ results in a Draw and on the eighth iteration felt 21. Kb1 gives it a slightly positive score.]

21. ... Rb8 22. b3

22. ... axb3 23. cxb3 Be8
BEBE has conducted its attack quite well, but players who hate retreating might prefer moves such as 23. ... Nc4 or 23. ... d5 or 23. ... Nf3! when followed by 24. ... Qf6 or 24. ... Qe5 probably leads to an irrepressible attack that most strong humans would enjoy and most machines would not touch. In any case, White’s King position seems too compromised for successful resistance.

24. Kc2
White’s tries to guard the P/b3 since on 24. Qxd6? Rxb3+ is decisive. [CRAY BLITZ saw the game continuing 24. ... Ra8 25. Kc1 Qf6 26. f4 Nc4 27. e5 Nx d2 28. exf6 still leading to a slightly positive score.]

24. ... Nd7 25. f3 Ra8
26. Kc1 Nc5
Threatening 27. ... Nxb3+ 28. axb3 Ra1+ 29. Kc2 Ra2+. [CRAY BLITZ realized that 26. ... Bh6 27. f4 (if 27. Qxh6 Rx a2 wins) Qxe4 28. g3 d5 29. Bxd3 Qf3 30. Rg1 leaves it down a Pawn. It saw its own score go negative for the first time on move 25 when it anticipated 25. ... Ra8 26. Kc1 Qf6 27. Bd3 Ra5 28. b4 Qa1+ 29. Bb1.]

27. Qc2 Qf6 28. Bc4
One would expect the materialistic machine to try 28. a4 to save the threatened a-Pawn, but CRAY BLITZ can appreciate that 28. a4 Rb8 29. Bc4 Bh6+ 30. Kb1 Nxa4 is even worse.

28. ... Qa1+ 29. Kd2 Qxa2
30. Qxa2 Rxa2+ 31. Kc1 d5!
A very fine and humane Pawn sacrifice that activates Black’s only misplaced piece, although it probably stems from the machine’s ability to see that it will receive more than sufficient interest for its small investment.

32. exd5 cxd5 33. Bxd5

33. ... Bb5! 34. Rxe1
CRAY BLITZ walks into a Knight fork, but by now there is nothing better. If 34. Bc4 Bxc4 35. Rd8+ (35. Bxc6 Nb3+ 36. Kb1 Rb2 checkmate 35. ... Bb6 36. Bxc4 Ra1+; if 34. b4 Nd3+ 35. Rxd3 Ra1+.

34. ... Nd3+ 35. Rxd3 Bxd3
The complications are over. BEBE lumbers through the rest sure-footed, if not always elegantly.

36. Re8+ Bf8 37. g4 Kg7
38. Re3 Ba3+ 39. Kd1 Ra1+ 40. Kd2 Bf1 41. Kc3 Rc1+
42. Kd2 Rc5 43. Ke1 Bxc3 44. Bc4 h5 45. gxh5 gxh5 46. Kf2 h4 47. Rd3 Bf5 48. Rxe3 49. Rh4 Rc7 50. Rh5 (0-1).

Although both programs made a number of errors in the transition phase from Opening to Middle-game play, BEBE's capitalization on its advantage after 19. ... Qxe7 was quite impressive overall.

BEBE versus HITECH
Round 3

After BEBE’s stunning victory over World Computer Chess Champion CRAY BLITZ, the following proved to be the key encounter between the tournament leaders.

1. e4 e5 2. Nf3 Nc6 3. Bb5 a6
The Archangel Variation, named for the White Sea port city, is one of the sharpest and lesser known defenses to the Ruy Lopez. White’s next enters the main line.

7. Re1 Bc5 8. c3 d6
9. d4 Bb6 10. a4
The first departure from main-line theory (10. Bg5), although this move is in the book for both programs.

10. ... h6 11. axb5 axb5
12. Rxa8 Qxa8 13. Na3 exd4!
Since there is no convenient way for Black to defend his P/b5 and 13. ... b4 is strongly met by 14. Nc4, HITECH opts for central counterplay.

14. cxd4!!

14. ... Ba6?
HITECH, no longer having the crutch of its Opening book, immediately errs by misplacing its Bishop. It is precisely here where some further book knowledge is most pertinent for survival in this complex variation [HITECH expects 15. d5 Ng4 16. Re2 Na5 17.
Bc2 0-0. Correct is 14 ... O-O
15. Nxb5 [15. e5 dxe5 16. dxe5 Ng4
17. Re2 Rb8 with a strong initiative for Black] 15. ... Na5 and
Black will win back the Pawn
with the advantage, for example:
1) 16. Bc2 Nxe4
2) 16. Nc3 Nxb3 17. Qxb3 Bxe4
Qxb3 Bxg2 18. Rxe5 Bxf3 17. gx3
Nxb3 18. Qxb3 c6 19. Nc3 Bxd4
17. dxe5 Ng4 18. Rf1 Rd8 and
White will not be able to protect
all its weaknesses.
4) 16. d5? Nxb3 17. Qxb3 Nxe4!
(Gulko versus Bajkov, 1975).
15. e5! dxe5 16. dxe5
16. d5 also deserves attention.
16. ... Ng4 17. Bxf7+!

FIGURE 2. Position after 17. Bxf7+

[After 16. ... Ng4, HITECH
thought the game would continue
Qxb6.] A typical computer move
based on shallow materialism. If
17. ... Kxh7 18. Qd7+ Kg8 19.
Qxg4 and White is a Pawn up
with a fine position. Though BEBE's
Bishop offer is sound enough,
more critical is 17. e6! Bxf2+ (17.
... Nxf2? 18. Qd7+ Kf8 19. Q7#)
18. Kh1 0-0 19. exf7+ (if 19. e7?,
both 19. ... Re8 20. Bxf7+ Kxf7
21. Qd5+ Kg6 22. Qe4+ Kh5 23.
Qf5+ g5 24. Q7# and 19. ... Re8
Qg8+ Kd7 23. e8 = Q+ Rxe8 24.
Qd5+ lose. but 19. ... Nxe7! 20.
Rxe7 Bc5 21. Re2 Nf2+ 22. Rxf2
Bxf2 results in an unclear posi-
tion) 19. ... Kh8 (analysis by Bac-
zynskyi). In this final position it
seems that White stands better
because Black's King seems in
peril, but to substantiate this
feeling would require more
space and analysis than are rea-
sonable for this task. There is the
tame 20. Re4 as well as 20. h3 and
20. Nh4, ripe with exciting branch
variations. Perhaps such a position
is a bit too much for the human
mind—and for the computer, too.
BEBE, easily one of the top five
programs in the world, lacks the
ability to cope with the deep
combinative complexities hidden
in this position, and it is even further
handicapped by the inability to
make intuitive judgements such as
“good attacking chances” at the
end of long-forced variations.
17. ... Ke7? 18. Kf1?
[After playing 17. ... Ke7, HITECH
thought the game would continue
with 18. e6 Bxf2+ 19. Kh1 Rd8
20. Qc2 Bxe1 21. Qc5+; for the
first time, its score goes positive.] This
bizarre move onto the diag-
onal of Black's Ba6 repays the com-
pliment for Black's boner on move
14. Though its Bxf7 and f-Pawn
are menacing, BEBE has plenty of
reasonable tries. such as:
Kxf2 Kxh7 21. Qd5+ Ke8 22. Ba3
and White has a Pawn and good
attacking chances for the ex-
change.
2) 18. Be3 Nxe3 19. fxe3 Kxh7
20. Qd5+ and after any King
move, White plays 20. Nh4 with
an attack easily worth the in-
vested piece.
3) 18. Qd5 Bxf2+ 19. Kh1 Qc8, etc.
18. ... b4+! 19. Nc4 Rd8
20. Qc2

The best try, since Black has no
problems winning on 20. Qb3 Na5
[HITECH thought White should
have played 20. Nd2 and then on
20 ... Qc8 21. h3 Bxf2 22. Re4
Bxc4+.]
20. ... Kxf7?
After two accurate moves exploit-
ing White's strange 18th move.
HITECH slips again. The convinc-
ing continuation is: 20 ... Nd4
21. Nxd4 21. Qg6 Nxf3+ wins
21. ... Rxd4 22. Qg6 22. Qf5 Rxc4
23. Bxc4 Bxc4 24. Kg1 Bf2+;
22. Be3 Nh2+ 23. Kg1 Rg4 22. ...Nh2+ 23. Kg1 Rg4 winning.
21. Qf5+ Nf6 22. Qc2?
Another inexplicable error by
BEBE, letting its last winning posi-
tion slip by; Black's winning
method is now simple and should
have been within BEBE's tactical
purview. Correct is 22. exf6 Bxc4+
23. Kg1 g6 (23. ... gxh6? 24. Qh7+
Kf8 25. Bxh6+; 23. ... Bd3 24.
Qe6+) 24. Qf4 with the double
threat of 25. Qxh4+ and 25. Qh6
—and because of Black's exposed
King, White can expect to win.
[HITECH saw this predicting
22. exf6 Bxc4+ 23. Kg1 g6 24. Qf4
Bd5 25. Qxh6 Rg8 26. Qf4 Rd8, but
White mates after 26. Qh7+ Kxf6
(Kf8 Bh6+ mates quickly) 27. Bg5+
Kf5 28. Qh3; HITECH has only
used 23 minutes on its clock to
this point.]
22. ... b3! 23. Qe2
If 23. Qxb3 Na5.
23. ... Nd4! 24. Nxd4 Rxd4
25. Kg1 Bxc4 26. Qf3 Qxf3
27. gxh3 (0-1).
A very complicated struggle in
which neither program was fas-
sighted enough to tackle the diffi-
cult problems posed. Instead, as
often happens when computers
play one another, the game was
decided by one side's more weird
and serious inexplicable errors.
### Results and Games (Ken Thompson)

<table>
<thead>
<tr>
<th></th>
<th>Rate</th>
<th>Perf</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Hitech</td>
<td>2200</td>
<td>2486</td>
<td>7+0</td>
<td>4-0</td>
<td>2+0</td>
<td>5-0</td>
</tr>
<tr>
<td>2</td>
<td>Bebe</td>
<td>2100</td>
<td>2224</td>
<td>9+0</td>
<td>5+0</td>
<td>1-0</td>
<td>4+0</td>
</tr>
</tbody>
</table>
| 3 | Intelligent | 0 | 2005 | 6+0 | 9+0 | 5-0 | 7=0 | 2
c
| 4 | Phoenix | 0 | 1967 | 8+0 | 1-0 | 7+0 | 2-0 | 2 |
| 5 | Cray Blitz | 2200 | 2045 | 10+0 | 2-0 | 3+0 | 1-0 | 2 |
| 6 | Chaos  | 1800 | 1790 | 3-0 | 7-0 | 8+0 | 10+0 | 2 |
| 7 | Larchex | 0 | 1885 | 1-0 | 6-0 | 4-0 | 3=0 | 1
| 8 | Spock | 1676 | 0 | 10-0 | 6-0 | 9-0 | 1
c
| 9 | Ostrich | 1750 | 1633 | 2-0 | 3-0 | 10=0 | 8=0 | 1 |
| 10 | Awtit | 1600 | 1502 | 5-0 | 8-0 | 9=0 | 6-0 | 4
c

### Round 1

**Awtit — Cray Blitz** 1 c4 $\xi f6$ 2 $\xi c3$ c6 3 $\xi f3$ d5 4 e3 $\xi e6$ 5 d4 $\xi cxd4$ 6 $\xi e5$ b5 7 e4 $\xi b4$ 8 $\xi a4$ $\xi xe4$ 9 $\xi c4$ $\xi d6$ 10 $\xi dxe6$ exd6

**Hitech — Larchex** 1 e4 $\xi e5$ 2 $\xi f3$ $\xi c6$ 3 d4 $\xi xd4$ 4 $\xi dxe4$ $\xi c5$ 5 $\xi e3$ $\xi xe6$ 6 $\xi c3$ $\xi ge7$ 7

**Chaos — Intelligent** 1 d4 $\xi f6$ 2 c4 g6 3 $\xi c3$ d5 4 $\xi cxd5$ $\xi xd5$ 5 e4 $\xi cxe3$ 6 $\xi cxe6$ $\xi ge7$

**Spock — Phoenix** 1 e4 e6 2 d4 d5 3 $\xi c3$ $\xi c6$ 4 exd5 exd5 5 $\xi e2$ $\xi xe6$ 6 $\xi b5$ a6 7 $\xi d3$ $\xi f6$ 8 $\xi e3$ $\xi d4$ 9 $\xi d2$ $\xi f5$ 10 $\xi c2$ 11 $\xi e1$ $\xi c2$ 12 $\xi g4$ 13 $\xi e1$ $\xi d8$ 14 h3 $\xi f2$ 15 $\xi c2$ $\xi a6$ 16 b3 $\xi d3$ 17 $\xi c1$

### Notes

- **Awtit — Cray Blitz**: Awtit dominates with a strong opening against Cray Blitz, scoring a clear victory.
- **Hitech — Larchex**: A well-fought game ends in a draw, with Hitech maintaining a slight advantage throughout.
- **Chaos — Intelligent**: Chaos emerges victorious, showcasing strong endgame play.
- **Spock — Phoenix**: Phoenix holds its own in this round, ensuring a draw after a tactical duel.

---

Round 2

Cray Blitz — Bebe 1 e4 e5 2 d4 f5 3 e3 g3 6 g3 g2 7 7 d2 Qd6 8 O-O O-O 9 g3 b3 h8 10 c4 d2 g5 11 e3 e4 f4 12 d3 c6 d3 d2 e7 d7 d7 e7 14 d6 a6 16 d4 a6 17 c2 f6 28 d4 d5 e7 e7 29 f5 e5 30 a1 a1 d2 e4 d4 d4 e5 e5 e5 32 d4 d4 f4 33 c5 b6 e6 35 c7 c7 h6 36 c8 c8 c7 c7 37 c1 c1 g8 38 f4 f4 c7 f7 39 f7 40 f7 e7

Phoenix — Hitech 1 d4 d5 2 A55 f6 3 A65 exf6 4 e3 f5 5 c4 Axb6 Axb4 7 d1 e7 8 c5 d5 9 f3 d7 10 d3 h6 11 c4 b5 12 A62 c6 13 A63 b6 14 d2 c7 15 c1 a6 16 c4 O-O 17 A54 18 A63 d6 19 g4 f5 20 g3 d8 21 A6 a3 22 b3 A6 23 A2 A4 24 A3 A4 25 A6 d6 26 d5 A6 27 g3 d8 28 d2 d6 29 c5 A5 30 c8 A6 31 d6 d7 32 c1 d8 33 f4 e3 34 f3 d3 0-1

Intelligent — Ostrich 1 A4 d6 2 d4 d6 3 A3 d5 4 e4 h5 5 e3 Axf4 6 exf4 g6 7 A45 A4 c6 8 d6 9 A46 A48 10 g3 O-O 11 e4 f6 12 A43 A3 13 A33 d7 14 c4 A5 e7 15 A5 e5 16 A5 c8 17 A6 b5 18 A6 e6 19 A6 e6 20 A6 e6 21 A6 e6 22 A6 e6 23 A6 e6 24 A6 e6 25 A6 e6 26 A6 e6 27 A6 e6 28 A6 e6 29 A6 e6 30 A6 e6 31 A6 e6 32 A6 e6 33 A6 e6 34 A6 e6 35 A6 e6 36 A6 e6 37 A6 e6 38 A6 e6 39 A6 e6 40 A6 e6 41 A6 e6 42 A6 e6 43 A6 e6 44 A6 e6 45 A6 e6 46 A6 e6 47 A6 e6 48 A6 e6 49 A6 e6 50 A6 e6 51 A6 e6 52 A6 e6 53 A6 e6 54 A6 e6 55 A6 e6 56 A6 e6 57 A6 e6 58 A6 e6 59 A6 e6 60 A6 e6 61 A6 e6 0-1

Lachex — Chaos 1 e4 c5 2 d4 cxd4 3 c3 A6 4 e5 Qd5 5 c3 Qd6 6 cxd4 d6 7 A4 Qb6 8 Qb5 e6 9 O-O A67 10 c6 11 d6 12 h3 a6 13 A6 c6 14 Qc3 O-O 15 A6 d6 16 A6 d6 17 e1 a7 c7 18 A4 d5 19 A4 f4 A6 20 b3 A5 21 g4 A4 22 A5 c7 23 A6 A4 24 A4 c6 25 A4 c6 26 A4 c6 27 A4 c6 28 A4 c6 29 A4 c6 30 A4 c6 31 A4 c6 32 A4 c6 33 A4 c6 34 A4 c6 35 A4 c6 36 A4 c6 37 A4 c6 38 A4 c6 39 A4 c6 40 A4 c6 41 A4 c6 42 A4 c6 43 A4 c6 44 A4 c6 45 A4 c6 46 A4 c6 47 A4 c6 48 A4 c6 49 A4 c6 50 A4 c6 51 A4 c6 52 A4 c6 53 A4 c6 54 A4 c6 55 A4 c6 56 A4 c6 57 A4 c6 58 A4 c6 59 A4 c6 60 A4 c6 61 A4 c6 0-1

Round 3

Bebe — Hitech 1 e4 e5 2 d4 Axf4 3 e4 Axf4 4 e5 d6 5 O-O A6 6 A6 7 B7 7 E1 A5 8 c6 d9 9 d4 A6 b6 10 a4 h6 11 a5 A5 12 A5 A5 13 A5 A5 14 A5 A5 15 A5 A5 16 A5 A5 17 A5 A5 18 A5 A5 19 A5 A5 20 A5 A5 21 A5 A5 22 A5 A5 23 A5 A5 24 A5 A5 25 A5 A5 26 A5 A5 27 A5 A5 28 A5 A5 29 A5 A5 30 A5 A5 31 A5 A5 32 A5 A5 33 A5 A5 34 A5 A5 35 A5 A5 36 A5 A5 37 A5 A5 38 A5 A5 39 A5 A5 40 A5 A5 41 A5 A5 42 A5 A5 43 A5 A5 44 A5 A5 45 A5 A5 46 A5 A5 47 A5 A5 48 A5 A5 49 A5 A5 50 A5 A5 51 A5 A5 52 A5 A5 53 A5 A5 54 A5 A5 55 A5 A5 56 A5 A5 57 A5 A5 58 A5 A5 59 A5 A5 60 A5 A5 61 A5 A5 0-1

Cray Blitz — Intelligent 1 e4 c5 2 d4 e5 3 e5 A4 4 A4 A6 5 O-O A6 6 A6 7 Qc6 8 Qc6 9 d5 10 e6 11 A6 12 A6 13 c5 14 A5 15 A5 16 A5 17 A5 18 A5 19 A5 20 A5 21 A5 22 A5 23 A5 24 A5 25 A5 26 A5 27 A5 28 A5 29 A5 30 A5 31 A5 32 A5 33 A5 34 A5 35 A5 36 A5 0-1

Amit — Spock 1 c4 c5 2 d4 e5 3 dxe5 dxe5 4 dxe5 dxe5 5 e3 A6 6 c3 A6 7 d1 d5 8 B7 B7 9 c7 B7 10 c7 B7 11 c7 B7 12 c7 B7 13 c7 B7 14 c7 B7 15 c7 B7 16 c7 B7 17 c7 B7 18 c7 B7 19 c7 B7 20 c7 B7 21 c7 B7 22 c7 B7 23 c7 B7 24 c7 B7 25 c7 B7 26 c7 B7 27 c7 B7 28 c7 B7 29 c7 B7 30 c7 B7 31 c7 B7 32 c7 B7 33 c7 B7 34 c7 B7 35 c7 B7 36 c7 B7 37 c7 B7 38 c7 B7 39 c7 B7 40 c7 B7 41 c7 B7 42 c7 B7 43 c7 B7 44 c7 B7 45 c7 B7 46 c7 B7 47 c7 B7 48 c7 B7 49 c7 B7 50 c7 B7 0-1

Bebe — Hitech 1 e4 e5 2 d4 Axf4 3 e4 Axf4 4 e4 A6 5 O-O A6 6 A6 7 Qc6 8 Qc6 9 d5 10 e6 11 A6 12 A6 13 c5 14 A5 15 A5 16 A5 17 A5 18 A5 19 A5 20 A5 21 A5 22 A5 23 A5 24 A5 25 A5 26 A5 27 A5 28 A5 29 A5 30 A5 31 A5 32 A5 33 A5 34 A5 35 A5 36 A5 0-1
Lachex — Phoenix 1 e4 e6 2 d4 d5 3 c3 c6 4 exd5 exd5 5 c3 c5 6 b5 d6 b4 7 O-O O-ge7 8 a3 bxc3 9 bxc3 O-O 10 d4 e6 11 c4 f8 12 g5 ae8 13 c3 gh5 14 c4 f5 15 c7 g5 16 c8 c5 17 c7 g5 18 c2 c4 c5 19 c3 c5 20 c1 b5 c2 c5 21 c3 c6 22 c7 c3 23 c2 c2 24 c4 c8 25 d6 c6 26 c7 c7 27 c8 c8 28 c7 h4 f6 29 c7 g4 c4 30 c7 h5 c3 31 c7 f5 c4 32 c7 f4 c4 33 c7 f3 c4 34 a4 bx4 35 c6 e2 c6 36 c6 e2 37 c7 c4 38 c7 c7 39 c7 c7 40 c7 c4 41 c7 c7 42 c7 c7 43 c7 c7 44 c7 c7 45 c7 c7 46 c7 c7 47 c7 c7 48 c7 c7 49 c7 c7 50 c7 c7 51 c7 c7 52 a5 g6 53 c7 c7 1-0

Bebe — Phoenix 1 e4 e6 2 d4 d5 3 c4 c6 4 e5 dxe5 5 dxe5 c5 6 c4 c5 7 bxc5 c4 8 d5 c4 9 dxe6 fxe6 10 c3 c6 11 c4 dxc5 12 c4 dxc4 13 c4 c4 14 c4 c4 15 c4 c4 16 c4 c4 17 c4 c4 18 c4 c4 19 c4 c4 20 c4 c4 21 c4 c4 22 c4 c4 23 c4 c4 24 c4 c4 25 c4 c4 26 c4 c4 27 c4 c4 28 c4 c4 29 c4 c4 30 c4 c4 31 c4 c4 32 c4 c4 33 c4 c4 34 c4 c4 35 c4 c4 36 c4 c4 37 c4 c4 38 c4 c4 39 c4 c4 40 c4 c4 41 c4 c4 42 c4 c4 43 c4 c4 44 c4 c4 45 c4 c4 46 c4 c4 47 c4 c4 48 c4 c4 49 c4 c4 48 c4 c4 48 c4 c4 48 c4 c4 47 c7 46 c7 45 c7 44 c7 43 c7 42 d7 41 d7 40 d7 39 d7 38 d7 37 d7 36 d7 35 d7 34 d7 33 d7 32 d7 31 d7 30 d7 29 d7 28 d7 27 d7 26 d7 25 d7 24 d7 23 d7 22 d7 21 d7 20 d7 19 d7 18 d7 17 d7 16 d7 15 d7 14 d7 13 d7 12 d7 11 d7 10 d7 9 d7 8 d7 7 d7 6 d7 5 d7 4 d7 3 d7 2 d7 1 d7 0 1-0

Spock — Chaos 1 d4 d6 2 c4 e5 3 f4 c6 4 f3 d5 5 c3 c3 6 c3 f6 7 c3 f5 8 c3 c4 9 g4 g6 10 c3 g6 11 c3 g6 12 c3 g6 13 c3 g6 14 c3 g6 15 c3 g6 16 c3 g6 17 c3 g6 18 c3 g6 19 c3 g6 20 c3 g6 21 c3 g6 22 c3 g6 23 c3 g6 24 c3 g6 25 c3 g6 26 c3 g6 27 c3 g6 28 c3 g6 29 c3 g6 30 c3 g6 31 c3 g6 32 c3 g6 33 c3 g6 34 c3 g6 35 c3 g6 36 c3 g6 37 c3 g6 38 c3 g6 39 c3 g6 40 c3 g6 41 c3 g6 42 c3 g6 43 c3 g6 44 c3 g6 45 c3 g6 46 c3 g6 47 c3 g6 48 c3 g6 49 c3 g6 50 c3 g6 51 c3 g6 52 c3 g6 53 c3 g6 54 c3 g6 55 c3 g6 56 c3 g6 57 c3 g6 58 c3 g6 59 c3 g6 60 c3 g6 61 c3 g6 62 c3 g6 63 c3 g6 64 c3 g6 65 c3 g6 66 c3 g6 1-0

Intelligent — Lachex 1 d4 d5 2 c4 c6 3 b3 c5 4 b3 c6 5 c3 c5 6 c3 c5 7 c3 c5 8 c3 c5 9 c3 c5 10 c3 c5 11 c3 c5 12 c3 c5 13 c3 c5 14 c3 c5 15 c3 c5 16 c3 c5 17 c3 c5 18 c3 c5 19 c3 c5 20 c3 c5 21 c3 c5 22 c3 c5 23 c3 c5 24 c3 c5 25 c3 c5 26 c3 c5 27 c3 c5 28 c3 c5 29 c3 c5 30 c3 c5 31 c3 c5 32 c3 c5 33 c3 c5 34 c3 c5 35 c3 c5 36 c3 c5 37 c3 c5 38 c3 c5 39 c3 c5 40 c3 c5 41 c3 c5 42 c3 c5 43 c3 c5 44 c3 c5 45 c3 c5 46 c3 c5 47 c3 c5 48 c3 c5 49 c3 c5 50 c3 c5 51 c3 c5 52 c3 c5 53 c3 c5 54 c3 c5 55 c3 c5 56 c3 c5 57 c3 c5 58 c3 c5 59 c3 c5 60 c3 c5 61 c3 c5 62 c3 c5 63 c3 c5 64 c3 c5 65 c3 c5 66 c3 c5 1-0

Ostrich — Awit 1 e4 c5 2 f3 c6 3 e5 d5 4 c4 dx4 5 cxd4 c6 6 c3 c5 7 c4 c4 6 8 b5 c6 9 O-O c7 10 bxc6 dxc6 11 dxc6 bxc6 12 c4 c4 13 c3 c3 14 d5 c5 15 c5 d5 16 c5 c6 17 c5 c6 18 c5 c6 19 c5 c6 20 c5 c6 21 c5 c6 22 c5 c6 23 c5 c6 24 c5 c6 25 c5 c6 26 c5 c6 27 c5 c6 28 c5 c6 29 c5 c6 30 c5 c6 31 c5 c6 32 c5 c6 33 c5 c6 34 c5 c6 35 c5 c6 36 c5 c6 37 c5 c6 38 c5 c6 39 c5 c6 40 c5 c6 41 c5 c6 42 c5 c6 43 c5 c6 44 c5 c6 45 c5 c6 46 c5 c6 47 c5 c6 48 c5 c6 49 c5 c6 50 c5 c6 1/2-1/2

Ostrich — Spock 1 e4 e5 2 f3 c6 3 e5 d5 4 c4 dx4 5 cxd4 c5 6 d4 cxd4 7 cxd4 f6 8 O-O c5 9 c3 c4 10 c f5 11 c3 c3 12 c3 c3 13 c3 c3 14 c3 c3 15 c3 c3 16 c3 c3 17 c3 c3 18 c3 c3 19 c3 c3 20 c3 c3 21 c3 c3 22 c3 c3 23 c3 c3 24 c3 c3 25 c3 c3 26 c3 c3 27 c3 c3 28 c3 c3 29 c3 c3 30 c3 c3 31 c3 c3 32 c3 c3 33 c3 c3 34 c3 c3 35 c3 c3 36 c3 c3 37 c3 c3 38 c3 c3 39 c3 c3 1-0

Hitech — Clay Blitz 1 e4 e5 2 f3 c6 3 d4 exd5 4 cxd5 f5 5 c6 bxc6 6 d3 d5 7 c3 c3 g8 8 f3 c6 9 exd5 c5 10 c4 c4 11 c3 c3 12 c3 c3 13 c3 c3 14 c3 c3 15 c3 c3 16 c3 c3 17 c3 c3 18 c3 c3 19 c3 c3 20 c3 c3 21 c3 c3 22 c3 c3 23 c3 c3 24 c3 c3 25 c3 c3 26 c3 c3 27 c3 c3 28 c3 c3 29 c3 c3 30 c3 c3 31 c3 c3 32 c3 c3 33 c3 c3 34 c3 c3 35 c3 c3 36 c3 c3 37 c3 c3 38 c3 c3 39 c3 c3 40 c3 c3 41 c3 c3 42 c3 c3 43 c3 c3 44 c3 c3 45 c3 c3 46 c3 c3 47 c3 c3 48 c3 c3 1/2-1/2

Round 4
Chaos — Awit 1 d4 Qf6 2 c4 g6 3 Qc3 d5 4 cxd5 Qxd5 5 e4 Qc3 6 bxc3 c5 7 a4 g7 8 a5 a6 b3 cxd4 10 Qxd4 Qf8 11 f3 d5 12 e4 dxe4 13 fxe4 Qc8 14 Qb6 Qxc3 15 Qxe6 Qc6 16 Qf1+ Qe8 17 Qg7 Qd7 18 Qxh7+ Qxh7 19 Qd3 Qd4 20 Qd4 Qd6 21 Qxh6+ Qd7 22 Qxh7# 1-0
TRACK AL-1: Artificial Intelligence Algorithms

Seminar Chair: Prof. Tony Marsland
University of Alberta
Computing Science Dept.
Edmonton T6G 2H1, Canada
403 432-5189/98(dept), 403 432-3971(office)
email: tony@alberta.UUCP

Session 1  Tues. 4 Nov. 3:45-5:15 Room H
Title: Computer Chess Techniques

Abstract: Papers and comments on algorithms for playing chess. Papers on game tree search and advanced chess program design. The panel will address the issue of how computer chess affects the AI community, identifying those methods which are more widely applicable and explaining why brute force search is a useful AI tool.

Refereed paper session:

Phased State Space Search
T. A. Marsland and N. Srimani
University of Alberta and
University of Southern Illinois

A Multiprocessor Chess Program
J. Schaeffer
University of Alberta

Panel Discussion

Hans Berliner
Carnegie Mellon University

Ken Thompson
AT&T Bell Laboratories

David Levy
Intelligent Software Ltd.

Monroe Newborn
McGill University

Robert Hyatt
Univ. So. Mississippi

"Exploring the Knowledge Based Society"
The ACM Computer Chess Committee

In 1979, the ACM established the Computer Chess Committee as a standing committee on the Management Board. The Committee was responsible for organizing computer chess activities within the ACM. In 1984, the Committee was transferred to the Conferences Board where it is today. The main function of the Committee is to organize the ACM’s annual North American Computer Chess Championship. This tournament has been held annually starting in 1970. Currently, the Members of the Committee are Monty Newborn, Chairman, Hans Berliner, Tony Marsland, Kathe Spracklen, and Ken Thompson.

The International Computer Chess Association

Established at the Second World Championship in Toronto in 1977, this international association has about seven hundred members from all over the world. It was formed by the programmers of the leading programs and its chief purpose is to serve this community. The ICCA Journal publishes technical and non-technical papers on computer chess and is the foremost publication of its kind. It may one day be the world’s leading chess publication. Currently, it is published four times a year. Authors of articles should send them to Jaap van den Herik, Department of Mathematics and Informatics, Delft University of Technology, 2628 BL Delft, The Netherlands. Individuals interested in becoming members should write to Jonathan Schaeffer, Department of Computing Science, University of Alberta, Edmonton, Alberta, T6G 2H1. Dues are $20 annually. Officers are David Levy, President, Tony Marsland, Vice President, and Jonathan Schaeffer, Secretary/Treasurer.