

November 1, 1957

Memorandum

Subject: F O R T R A N I I

An expansion of the original Fortran System by the inclusion of a general subroutine statement and replacement of operands by substitution in these statements greatly expands the usefulness of the Fortran System. By means of this new facility, Fortran programs can be broken up into sections and separately processed quite independently. Programs can be written and processed which refer to programs which have not yet been written and assembly of various Fortran programs in combination can be done just before final assembly for running.

The subroutine facility permits us to incorporate pieces of SAP programming to perform processes not included in the Fortran System. These include the handling of double precision or complex arithmetic, and fixed point arithmetic such as occurs in data processing.

An important element of this change is that diagnostic procedures of various kinds can be incorporated in the program for use during initial execution and then removed for the main production run assisting in the debugging of difficult programs.

These changes add greatly to the flexibility of the Fortran System and make it possible to include in Fortran programs coding from previous problems done in SAP languages.

The substitution feature of the subroutine, i. e., the writing of the program initially with dummy variables and the substitution in calling for that subroutine of the desired variables further increases the flexibility of the system and shortens the Fortran programs by permitting a process to be defined only once and then applied at various places in the program to any number of different variables or sets of variables where previously the process had to be recoded in Fortran for each different variable on which it was to operate.

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