THE IBM 7030 FORTRAN SYSTEM

The IBM Mathematical FORmula TRANslating System, 7030 FORTRAN, is an automatic coding system for the IBM 7030 Data Processing System. More precisely, it is a 7030 program which accepts a source program written in the FORTRAN language, closely resembling the ordinary language of mathematics, and which produces a machine language object program ready to be run on a 7030.

7030 FORTRAN therefore, in effect transforms the IBM 7030 into a machine with which communication can be made in a language more concise and more familiar than the 7030 machine language itself. The result is a substantial reduction in the training required to program, as well as in the time consumed in writing programs and eliminating errors from them.

Among the features which characterize the 7030 FORTRAN system are the following:

Source Machines

7030 FORTRAN must be used in conjunction with the Master Control Program (Bulletin J22-6559). It fits the minimum machine configuration described in Bulletin J28-6126.

Scope of Applicability

The FORTRAN language is intended to provide facilities for expressing any problem of numerical computation. In particular, problems containing large sets of formulas and many variables can be dealt with easily, and any variable may have up to three independent subscripts.

The language of FORTRAN may be expanded by the use of subprograms. These subprograms may be written in FORTRAN language, and may be called by other FORTRAN programs, as well as subprograms. The language may be expanded by the use of subprograms to any desired depth.

Inclusion of Library Routines

Pre-written routines to evaluate functions of any number of arguments can be made available for incorporation into object programs by the use of any of several different facilities provided for this purpose.

Object Program

The object program produced by 7030 FORTRAN is designed to run under supervision of the Master Control Program which controls the input and output of all FORTRAN object programs. Therefore, the object machine must be large enough to contain both the object program and the Master Control Program. Object programs which are too large for the 7030 on which they are used must be subdivided by the user.

Provision for Input and Output

Certain statements in the FORTRAN language cause the inclusion in the object program of the necessary input and output routines. Those which deal with decimal information include conversion to or from the internal machine language, and permit considerable freedom of format in the input and output data.

Nature of FORTRAN Arithmetic

Arithmetic in an object program will generally be performed with single-precision floating point numbers. These numbers provide about 15 decimal digits of precision, and may be zero or have magnitudes between approximately 10^{-1024} and 10^{1024}. Fixed point arithmetic for integers is also provided.

Compatibility

FORTRAN programs written for other machines may be compiled without change on the 7030, as long as they use only the FORTRAN II language described in 709/7090 Reference Manual, C28-6054-2. Like 709/7090 FORTRAN, the only method in which machine language may be introduced is through the use of machine language subprograms. These are in relocatable binary form, having been converted from symbolic form by the STRAP assembly program. Subprograms in relocatable binary form may also be compiled from source language programs consisting of either macro instructions on the one hand or FORTRAN statements on the other.

To use an object program produced by 7030 FORTRAN, certain control cards must be added. These control cards dealing with Input and Output will be described more fully at a later date. They will provide the communication link between the object program and the system monitor.

Extensions

All extensions approved for inclusion in 709/7090 FORTRAN language will be considered for inclusion in 7030 FORTRAN.