COMPUTATION CENTER
Massachusetts Institute of Technology
Cambridge 39, Massachusetts

TO: FMS Users
FROM: Judith Spall
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SUBJECT: Computation Center Version of Fortran-Fap Monitor System.

The following is a list of differences between the 7090/7094 FORTRAN Programming Systems FORTRAN II Programming and the FORTRAN Monitor System in existence at the M.I.T. Computation Center.

1. The DATE control card may be included with any program deck, but it will be ignored since dating compilations and assemblies is automatically done.

2. The PRINT statement in a FORTRAN compilation will cause output to be written on logical tape 2. If sense switch 5 is down, output from a PRINT or WRITE OUTPUT TAPE 2 statement will be on-line and off-line. (The input-output subroutines are modified for these changes in the PRINT, READ, and PUNCH statements.)

3. The READ statement in a FORTRAN compilation will cause input to be read from logical tape 4. If sense switch 3 is down, input from a READ or READ INPUT TAPE 4 statement is read from the on-line reader.

4. The PUNCH statement in a FORTRAN compilation will cause output on logical tape 3 unless sense switch 4 is down, in which case the on-line punch will be used in addition to tape 3.

5. The format for the Center I.D. card is as follows where each field is separated by a comma and spaces are allowed.

   a. An asterisk in column 1.

   b. Field 1 - The problem number and programmer number separated by a dash (minus sign).

   c. Field 2 - The programming system FMS, DYN, etc.

   d. Field 3 - The word DEBUG, TEST, or RESULT. The terms are defined as follows: a run to test the program for coding errors; to test the theory, principle, method or procedure underlying the computer program; to obtain results from a debugged and tested program, respectively.

(The following four fields may contain text. Everything except the first integer in the field will be ignored.)

e. Field 4 - An integer indicating the estimated total running time in minutes.

f. Field 5 - An integer indicating, in minutes, the maximum running time the job should be allowed.

g. Field 6 - An integer indicating the maximum number of lines (records) the user's program will write with a WRITE OUTPUT TAPE or PRINT statement. This number should include any breakpoint post-mortems or output from the DEBUG PACKAGE. (This does not include any compiler or assembly output.)

h. Field 7 - An integer indicating the maximum number of cards (records) written by a PUNCH statement.

Note that fields 6 and 7 must be less than or equal to 32767.

6. The physical tapes and channels used by the FMS system and their corresponding logical tape numbers to be used in FORTRAN programs are:

physical	Logical	Function
A1	1	FMS System.
A2	4	Input.
A3	2	Printed Output.
A4	8	Fortran/FAP Intermediate and User Scratch or Primary Chain Tape.
B1	5	Monitor Chain Intermediate and User Scratch.
B2	6	Fortran/FAP Intermediate and Monitor Intermediate for Presetting MAD Program Common or Secondary Chain Tape or PDUMP.
B3	7	Fortran/FAP Intermediate and Secondary Chain or User Scratch.
B4	3	Punched Output.
A5	9	User Tape.
B5	10	User Tape.
A6	11	User Tape.
B6	12	User Tape.

Physical	Logical	Function
B10	13	Library Tape.
A10	14	DYNAMO System.

7. The minus sign in a FORTRAN compilation (not data) may be either an 8-4 punch or an eleven punch, but it is still good practice to use the eleven punch character.

8. Every FORTRAN main program is compiled with the instruction TSX $ .SETUP,4 and, therefore every FORTRAN main program must be compiled at the Computation Center. The subprogram .SETUP initializes for (FPT), the floating-point trap subprogram, (F2PM), the FORTRAN II post-mortem subprogram and MITMR, the interval timer subprogram. See CC-193 for a description of MITMR. See CC-167 for a description of (F2PM).

9. The statement IF(SENSE SWITCH i)n,n should only be used for i = 1 or 2, however, it is preferred that the statement not be used at all.

10. Octal correction cards, as described in CC-176, are acceptable to the FORTRAN Monitor System except when chain links are used.

11. High density (800 bits/inch or 556 bits/inch) will be the normal tape operating mode. An FMS control card has been added to the system whereby programmers may specify their tapes to be low density (200 bits/inch). The following control card may appear in the program deck after the * XEQ, but before any binary decks.

Column 1: *

Column 7-72: SET DENSITY LOW (i, i...i)

where the logical tapes i are set to low density. Only tapes 9, 10, 11 and 12 which correspond to A5, B5, A6, B6 respectively, in the Computation Center (IOU) table, may be set to low density.

12. There are 132 characters available per printed line for off-line equipment only. Note that this is twelve more spaces than are mentioned in the manual.

13. There is an additional program control character "-", an 11 punch, which causes triple space.

14. Three program control characters have been added especially for DYNAMO users. They should be used only by programmers who do not wish to go to a new page after 60 lines. In other words, printing may occur through the perforation marks of a page. The special characters are "/" for single space, "S" for double space, and "T" for triple space.

15. The additional features of the DEBUG PACKAGE may be used in FORTRAN programs. It is discussed in the FORTRAN II Operations Manual, C28-6066-4. When using the DEBUG PACKAGE, no more than 1000 lines of printed output may be obtained. Logical tape 2, corresponding to physical tape A3, must be the output tape. Note that DEBUG can be used with double precision and complex arithmetic, but may not work properly.

16. The program control characters A-R should not be used.

17. A new format called the G format is available. If the prefix, tag and address of a word are zero, the variable will be printed or punched as an integer (I format); otherwise the word is assumed to be floating point.

If the quantity is less than 10^{-1} or greater than $10^{(d+1)}$, where d (the number of decimal places desired) is less than 10, the E conversion is used; otherwise the F conversion is used. The form of the G format is

G w.d.

where w is the field width and d is the number of decimal places to be printed if any. Note that the G format is available for output only.

18. One-ply paper printed under program control is the normal mode for printed output. An FMS control card has been added to the system whereby programmers may change the normal mode. The following control card may appear in the program deck after the *XEQ card, but before any FAP, MAD, FORTRAN, or binary decks.

Column 1: *

Columns 7-72: DEAR OPERATOR ()

where the message to the operator is enclosed in brackets.

This message is written on output tape 2 twenty times followed by an end of file which causes the IBM 1401 to stop so that the operator can read the message and take necessary action. At the end of the job another end of file is written on output tape 2 so that the IBM 1401 will terminate again and the normal printing mode can be restored.

19. The statements WRITE DRUM and READ DRUM cannot be used on the 7094.

20. The statement IF QUOTIENT OVERFLOW and IF ACCUMULATOR OVERFLOW will not test the AC and MQ lights. They test a register in upper core and this test is automatic with the MIT version of (FPT). Therefore, these statements are of no value in a program executed at the Computation Center.

21. No control cards can follow the DEBUG cards except the *CHAIN and *DATA control cards.

22. The DEBUG facility cannot be used for PRINT, PUNCH, and READ statements.

23. The following control cards should not be used:

* LIBE
* PAUSE
* CARDS ROW
* CARDS COLUMN
* PRINT
* IØP

24. The "END" card must not be used with arguments.

25. For a listing of the subprograms on the library tape, programmers should request "Abstracts of FMS Subprograms" and/or "MIT FMS Library Listing" in Room 26-058.

26. Built-in functions for double precision and complex arithmetic cannot appear on an F card.

27. Programmers need not use the control card * PACK in front of FORTRAN and FAP subprograms as packed output is automatically produced.

28. When labeling of binary decks is done with the * LABEL card, only alphanumeric characters can be used.

29. Programs which use the scope must be submitted as non-standard FMS.

30. Preceding any punched output and each FORTRAN subprogram are cards known as flip cards to aid in the identification of each users output. When these cards are reversed, the pattern of holes forms six block characters. Since these cards are ignored by the loader it is a good idea to leave them in the deck, reversed or not.