May 21, 1957

File Memo: STRETCH

Subject: Computer Operation - Multi-program Control

Floyd E. Johnston, Applied Science Representative - Los Alamos, has hit upon a technique of making multiprogramming seem more plausible and workable to the skeptic. His technique is education. Enclosed is his flow chart that shows how three problems might well look if multi-programmed.

His flow chart is not peculiar to STRETCH and may well find interest to those outside the STRETCH program. For that reason it is being distributed to them.

Jack C. Gibson

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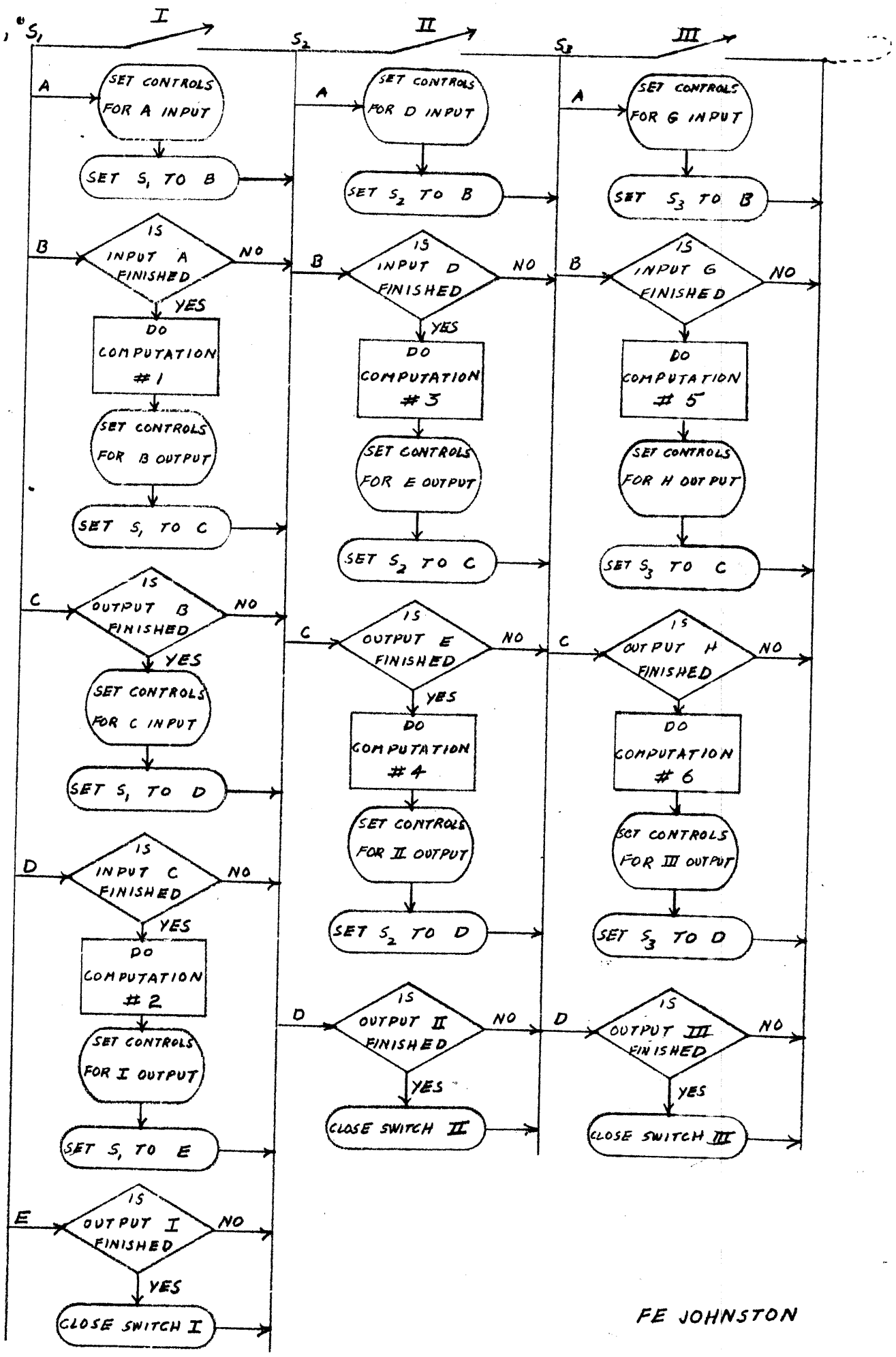
JCG/jv
Enc.

MULTI PROGRAM CONTROL

If more than one program is to be operating at one time in a machine, a simple method of expressing the control must be devised. In this example the flow chart shows the control of three programs. The lines S_i represent switches within the master control. The switches I, II etc. represent shorting switches for S_1, S_2 etc. The master program would create these switches as they are needed.

Any program must be written in Logical Sections and each section capable of running in any section of memory. The program will be read in from tape with the number of I/O tapes it requires and the blocks of storage it needs.

Problem I	Problem II	Problem III
A input	D input	G input
Compute 1	Compute 3	Compute 5
B output	E output	H output
C input	Compute 4	Compute 6
Compute 2	Output II	Output III
Output I		


S1
I
S2
II
S3
III
A
SET CONTROLS FOR A INPUT
SET S1 TO B
B
IS INPUT A FINISHED
NO
YES
DO COMPUTATION #1
SET CONTROLS FOR B OUTPUT
SET S1 TO C
C
IS OUTPUT B FINISHED
NO
YES
SET CONTROLS FOR C INPUT
SET S1 TO D
D
IS INPUT C FINISHED
NO
YES
DO COMPUTATION #2
SET CONTROLS FOR I OUTPUT
SET S1 TO E
E
IS OUTPUT I FINISHED
NO
YES
CLOSE SWITCH I
A
SET CONTROLS FOR D INPUT
SET S2 TO B
B
IS INPUT D FINISHED
NO
YES
DO COMPUTATION #3
SET CONTROLS FOR E OUTPUT
SET S2 TO C
C
IS OUTPUT E FINISHED
NO
YES
DO COMPUTATION #4
SET CONTROLS FOR II OUTPUT
SET S2 TO D
D
IS OUTPUT II FINISHED
NO
YES
CLOSE SWITCH II
A
SET CONTROLS FOR G INPUT
SET S3 TO B
B
IS INPUT G FINISHED
NO
YES
DO COMPUTATION #5
SET CONTROLS FOR H OUTPUT
SET S3 TO C
C
IS OUTPUT H FINISHED
NO
YES
DO COMPUTATION #6
SET CONTROLS FOR III OUTPUT
SET S3 TO D
D
IS OUTPUT III FINISHED
NO
YES
CLOSE SWITCH III

FE JOHNSTON