

UNIVERSITY OF ILLINOIS
DIGITAL COMPUTER LABORATORY

Library Routine A 6 - 15^h

TITLE: Floating Decimal Routine and Auxiliaries (SADOI and DOI -
Separate Version for Each)

TEMPORARY STORAGE: 0, 1, 2 and space 557 - 1023 used by routines.

PURPOSE: To make available on a single tape Library Routine A 1
and its auxiliaries for use with a set of interpretive
orders.

ENTRY: Two methods of entry are possible:
(1) If the set of interpretive orders has no directive,
entry to Library Routine A 1 consists simply of transferring
control to the left hand side of fixed location 428 by
the order 26 428N. In this case the interpretive orders
will be read in and stored in locations starting at 430;
the control transfer will then cause the interpretive
orders to be obeyed in the order in which they occur.
(2) If the programmer wishes to place his interpretive
orders elsewhere in the memory, he must precede them by
a directive and the standard entry use of Library Routine A 1.

DESCRIPTION OF THE PROGRAM

The following routines are included: A 1, A 3, RA 1, TA 1,
SA 2, TA 2, SA 3. These are stored in locations defined
by parameters S 3 - SK. (See below.) The constant-listing
auxiliary XA 1 is placed in locations beginning at 944 and
the sum check at 902.

The parameters S 3 through SK are preset by the program and
need not concern the programmer. For entry to auxiliaries,
refer to the corresponding routines. Space available for
the programmer depends on the entry. If the entry is made
by method (1), interpretive orders will occupy locations
starting at 430 and locations up to 556 are available for
them.

So the programmer can use locations unoccupied by interpretive orders together with locations from 3 to 429 for any purpose he wishes. By the other method of entry, locations 3 to 556 are completely at the programmer's disposal.

ACCURACY

All routines have the same accuracy, for a given number, as the floating decimal routine.

PRESET PARAMETERS

<u>Parameter</u>	<u>Address</u>	<u>Referring To</u>
S3, 1S3	557, 558	Floating accumulator
S4	559	Library Routine A 1 Floating Decimal
S5	727	Library Routine A 3 Number Conversion Routine
S6	754	Library Routine RA 1 Square Root Auxiliary
S7	770	Library Routine TA 1 Sine Auxiliary
S8	796	Library Routine SA2 Exponential Auxiliary
S9	822	Library Routine SA 3 Natural Logarithm Auxiliary
SK	852	Library Routine TA 2 Arc Tangent Auxiliary

THE SADOI-DRUM VERSION OF A 6

Like other subroutines on the drum, A6 is called for by a modified directive, (A6) 00nK. Regardless of the value of n the subroutines comprising A6 are stored in the same locations indicated previously for the Tape-D. O. I. version of A6.

When A6 is called, SADOI automatically presets the parameters in 3 to 10, and the subroutines comprising A6 are then inserted, followed by the two words

428 22 428F

50 428F

429 26 S4

83 430F

The computer then stops on a 2410J (sexadecimal) order. It should be noted that the drum version of A6 does not contain XA 1, the Constant Listing Auxiliary.

A choice is then available:

(1) White switch over the 2410J order. The assembled program is then placed in Williams Memory and a drum bootstrap start begins automatically. When the white switch is used and the first character on the tape is "O" the D.O.I. is placed in 999-1023 of the Williams Memory and tape input is resumed. This choice permits use of the Constant Listing Auxiliary (Routine XA 1) which will work only with D.O.I. and not with SADOI. It (Routine XA 1) should be placed on the tape so that it will be read in by the D.O.I. after use of the white switch. (See B below)

(2) Black switch to execute the 2410J order. SADOI automatically receives the directive 00 430K. Tape input begins and words of the program are stored, beginning at 430, until a new directive is received.

A. Normally, for use with the black switch when the XA 1 is not desired, the program tape is made up in the following manner:

J

Title

1-hole delay

KOK (to obtain SADOI)

(A6) 00 K

Program (with or without directive)

24 999N

26 428N A1 will begin interpreting at 430.

B. Make up of the program tape for use with the white switch when the Constant Listing Auxiliary is desired:

J

Title

1-hole delay

KOK

(A6) 00 K

Directive (preferably 00 944K)

Constant Listing Auxiliary

Directive (preferably 00 430K)

Program

24 999N) With 00 430K directive. If other directive
26 428N) is used a new entry to A 1 must be written
so it will begin interpreting properly.

USE OF LIBRARY ROUTINE D1 (95)

Locations from 900 onwards are available for the use of Library Routine D 1. It may be used by blocking orders in Library Routine A 1. If the fourth word (namely, 562) of A 1 is blocked, D 1 will print before each interpretive order is obeyed. The location of this interpretive order is given by the left hand address in location 561. The floating accumulator (557, 558) may be printed at this time. The interpretive order being obeyed appears on the left hand side of the accumulator. A typical specification might therefore be:

562 L Blocking order to 562
100 K Print 100 times
561 S6 Print location of interpretive order
900 S0 Print interpretive order being obeyed
557 S5 Print floating accumulator
558 SN Contents
428 N6 Start program (first method of entry)

Rt: 9/24/59

DATE	<u>11/11/54</u>
REVISED WRITEUP	<u>10/14/58</u>
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LOCATION	ORDER	NOTES	PAGE 1	A6
Sequence of instructions on tape for D.O.I. version of A6. Library Code XI - 18		D.O.I. Unrevised version 6/13/55		
	00 3K			
0	00 F			
	00 557F			
	00 900K			
0	F5 2L			
	40 2L			
1	L5 1016F			
	42 2F			
2	L5 2F			
	40 3F			
3	22 1014F			
	26 L			
	00 559K			
	26 900N	First location 559		
Library Code A1	26 900N	First location 727		
Library Code A3	26 900N	First location 754		
Library Code RA1	26 900N	First location 770		
Library Code TA1	26 900N	First location 796		
Library Code SA2	26 900N	First location 822		
Library Code SA3	26 900N	First location 852		
Library Code TA2	00 944K			
0	00 F			
	00 L	* The instructions between the #'s are those of Library Code XA1 prior to its revision.		

LOCATION	ORDER	NOTES	PAGE 2
1	L5 5L 40 1001F		
2	L5 6L 46 1004F		
3	46 1014F L5 3L		
4	22 1014 F 00 F		
5	26 3L 00 F		
6	00 L 26 1L 26 1M		
3	40 1L S3 F		
4	32 6L 22 1L		
5	L5 2L 40 F		
6	23 1002F 50 6L		
7	26 S4 88 F		
8	83 2L 83 9L		
9	L5 1L 40 1F		
10	L5 17L 42 5L		
11	42 12L 42 14L		
12	42 1F L3 F		
13	36 5L 26 14L		
14	L1 2L L4 F		

LOCATION	ORDER	NOTES	PAGE 3	A 6
15	40 F L3 F			
16	36 5L F5 5L			
17	22 10L 00 16F 00 428K	*		
0	22 L 50 L			
1	26 S4 8K F 00 900K	Entry to A1		
0	50 1L 24 999F	Load interpretive orders		
1	00 F 00 430F 00 902K			
0	81 40F 40 F	Sum check, prior to revision.		
1	L5 1F 10 3F			
2	S6 999F L4 2F			
3	40 1F F5 2L			
4	40 2L L0 9L			
5	36 1L L3 1F			
6	36 999F 92 137F			
7	L1 1F 82 40F			
8	93 145F FF F			

LOCATION	ORDER		NOTES	PAGE 4	A 6
9	36 999F L4 1025F				
10	00 F 26 L 26 1N FS 18NLEF49 26 900N				

LOCATION	ORDER	NOTES
SADOI - Drum version of A 6		
(A6)	FF	<p>This listing illustrates the form in which A 6 is written to be loaded on the drum by auxiliary library subroutine Y 4.</p> <p>The "FF" and the "OON" do not concern the programmer, they are directives to Y 4.</p>
	OO 3K	
0	OO F	
	OO 557F	
1	OO F	
	OO 559F	
2	OO F	
	OO 727F	
3	OO F	
	OO 754F	
4	OO F	
	OO 770F	
5	OO F	
	OO 796F	
6	OO F	
	OO 822F	
7	OO F	
	OO 852F	
	OO 600K	
0	L5 566F	
	40 319F	
1	L5 368F	
	42 86F	
2	26 269F	
	OO F	
3	L3 1023F	
	32 263F	
	26 1469N	
	OO 559K	
	OO M	
(A1)	FF	
	OO K	
Library Code A 1		

LOCATION	ORDER	NOTES
(A3)	OO N FF OO K Library Code A 3 OO N	
(RA1)	FF OO K Library Code RA1 OO N	
(TA1)	FF OO K Library Code TA 1 OO N	
(SA2)	FF OO K Library Code SA 2 OO N	
(SA3)	FF OO K Library Code SA 3 OO N	
(TA2)	FF OO K Library Code TA 2 OO N	
(A6)	FF OO 428K	
0	22 L	

LOCATION	ORDER	NOTES	PAGE 7 A 6
	50 L		
1	26 S4		
	83 430F		
	00 600K		
0	L5 570F		
	40 319F		
1	L5 368F		
	42 86F		
2	24 269F		
	L5 568F		
3	40 1023F		
	L5 569F		
4	40 1F		
	26 1008F		
5	85 11F		
	40 F		
6	00 F		
	26 1023F		
7	L3 1023F		
	32 320F		
	26 1469N		
	00 430K		
	00 N		