

UNIVERSITY OF ILLINOIS

DIGITAL COMPUTER

LIBRARY ROUTINE P 19 - 252

By C.W. Gear

TITLE: Output for the Data Plotter (DOI or SADOI)
TYPE: Closed subroutine
NUMBER OF WORDS: 44
TEMPORARY STORAGE: 0, 1, 2
TIME: About 1.5 m-secs + punch time
PURPOSE: This code will help the programmer prepare his output for the data plotter.
USE: In order to output a number of coordinates of points with either the x--or the y-coordinates the same, the following information is required:
 n - the location containing the first of these coordinates.
 p - the number of points to be plotted.
 There are two types of entries, each with a number of variants.

<p>(a)</p> <table style="border-collapse: collapse; margin-left: 40px;"> <tr> <td style="border-right: 1px solid black; padding: 5px;">loc q</td> <td style="padding: 5px;">5V nF</td> </tr> <tr> <td style="border-right: 1px solid black; padding: 5px;"></td> <td style="padding: 5px;">50 qF</td> </tr> <tr> <td style="border-top: 1px solid black; border-right: 1px solid black; padding: 5px;">q + 1</td> <td style="border-top: 1px solid black; padding: 5px;">26 (P19)</td> </tr> <tr> <td style="border-right: 1px solid black; padding: 5px;"></td> <td style="padding: 5px;">0c pF</td> </tr> </table>	loc q	5V nF		50 qF	q + 1	26 (P19)		0c pF	<p>(b)</p> <table style="border-collapse: collapse; margin-left: 40px;"> <tr> <td style="border-right: 1px solid black; padding: 5px;">loc q</td> <td style="padding: 5px;">JV nF</td> </tr> <tr> <td style="border-right: 1px solid black; padding: 5px;"></td> <td style="padding: 5px;">50 qF</td> </tr> <tr> <td style="border-top: 1px solid black; border-right: 1px solid black; padding: 5px;">q + 1</td> <td style="border-top: 1px solid black; padding: 5px;">26 (P19)</td> </tr> <tr> <td style="border-right: 1px solid black; padding: 5px;"></td> <td style="padding: 5px;">0c pF</td> </tr> </table>	loc q	JV nF		50 qF	q + 1	26 (P19)		0c pF
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	50 qF																
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Control is returned to the left side of location q + 2.
 Entry (a) is for use with the pen, or when the character plotted by the machine is to remain fixed for each point plotted in one entry.

Entry (b) is for use when it is desired to plot each of the successive p points with a different symbol. The character wheel of the data-plotter has 6 symbols, labeled 0 - 5. c specifies the symbol which is to be plotted first. Subsequently the symbols are used in rotation; i.e. if one started with symbol 4, then 4, 5, 0, 1, 2, ..., etc. would be used in that order. The six symbols available are (in order):



With both of these entries the variant digit V is

interpreted as follows:

<u>V</u>	<u>Operation.</u>
0	Location n holds the x-coordinate, locations n + 1, ..., n + p hold the y-coordinates. Each coordinate is punched correctly rounded to 4 digits (- 1 is punched as - .9999), and after each y-coordinate the data plotter will plot a point with that y-coordinate and the first x-coordinate in location n.
2	As for V = 0, except that the first x coordinate from location n is not punched. This results in p points being plotted with x-coordinates equal to the <u>last</u> x specified.
4	As for V = 0, except that the roles of x and y are interchanged. i.e. y is in location n, and the x's are in locations n + 1, ..., n + p.
6	As for V = 2, except that the roles of x and y are interchanged.

EXAMPLE:

To plot the coordinates of the square $(\frac{1}{4}, \frac{1}{4})$; $(\frac{1}{4}, \frac{1}{2})$; $(\frac{1}{2}, \frac{1}{2})$; $(\frac{1}{2}, \frac{1}{4})$, the first and the third points to use symbol 5, and the second and the fourth points to use symbol 0.

Assume locations 500-502 hold $\frac{1}{4}, \frac{1}{4}, \frac{1}{2}$. The program would be:

```

(0) J0 500F
    50 (0)
-----
    26 (P19)
    05 2F
-----
(1) J6 501F
    50 (1)
-----
    26 (P19)
    05 1F
-----
(2) J2 500F
    50 (2)
-----
    26 (P19)
    00 1F
-----

```

and the output would be:
(as printed on a teletype)

```

J + 2500
L5F + 2500N
LOF + 5000N
L5J + 5000N
LOF + 2500N

```

LOCATION	ORDER		NOTES
	00 K(P19)		
0	K5 F		
	42 2L		
1	46 17L		n
	41 F		
2	S5 F	4	n + p + 1
	L5 F	0	q + 1
3	00 20F		
	L4 17L		
4	46 2L		
	L0 17L		
5	10 32F		
	42 F		c in location 0
6	S1 834F		"J"
	36 8L		If T = 5, make location 0 negative
7	L5 2L		
	40 F		
8	S5 898F		"F"
	00 17F		If V = 0 or 2
9	40 1F		
	32 41L		Set for x followed by y
10	L5 6L		For V = 4 or 6
	46 38L		Set for y followed by x
11	L5 8L		
	46 16L		
12	F5 2L	(43)	
	42 31L		Plant link q + 2
13	L5 1F		
	00 1F		
14	36 15L		
	26 28L		
15	F5 23L		If V = 0 or 4, print A
	42 27L		
16	92 F	11, 42	"J" or "F"
	50 770F		Waste

LOCATION	ORDER	NOTES	PAGE 2
17	L5 F 40 1F	1, 30(38)	n, n + 1, ..., n + p
18	32 19L 92 706F		"- " sign
19	26 20L 92 642F	(18)	"+ " sign
20	L7 1F L4 40L	(19)	Round to 4 places
21	36 22L FO 40L		Correct <u>+ 1</u>
22	40 1F 19 3F	(21)	Prepare count
23	50 1F 40 2F	(27)	
24	75 39L 00 37F		$x 5 x 2^{-2}$
25	82 4F 10 40F		Print, $x 2^{-36}$
26	L5 2F L4 2F		Count until 2F < 0
27	32 23L 92 F	15, 28	Delay or "N"
28	L5 16L 42 27L	(14)	Plant "N"
29	L5 17L L4 22L		Increase 17L
30	46 17L L0 2L		Test for n + p + 1
31	36 32L 26 F	12	Link q + 2
32	92 131F L5 F	(31)	If location 0 negative, skip
33	36 34L 26 38L		
34	00 32F L4 41L	(33)	Punch Lc

LOCATION	ORDER		NOTES
35	82 8F F5 F		
36	F0 39L 32 37L		$c' \rightarrow c + 1$
37	F4 39L 42 F	(36)	
38	92 F 26 17L	10, (33), 43	"F" or "J" Loop
39	00 F 00 5F		5×2^{-39}
40	00 26F 36 3631F		$\frac{1}{2} \times 10^{-4}$
41	10 F 15 6L	(9)	
42	46 16L 15 8L		
43	46 38L 26 12L		

DATE	January 15, 1959
CODED BY	C. W. Gear
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Lgr