

UNIVERSITY OF ILLINOIS

DIGITAL COMPUTER

Routine 02 - 143

TITLE

Plot Axes and Points on the Cathode Ray Tube When
the Coordinates are Given as Fractions (SADOI Only)

TYPE

Closed with one program parameter

NUMBER OF WORDS

29

TEMPORARY STORAGE

0, 1, 2 for axes 0 for points

DURATION

0.80 seconds for axes

2.13 milliseconds for a point

PRESET PARAMETERS

8 3

3 00 mF 00 nF

m is the number of intervals to be formed along the y axis.

n is the number of intervals formed along the x axis.

These intervals are separated by markers which are
equally spaced along the axes. The origin of coordinates
is taken as the starting point for measuring the intervals.

DESCRIPTION

This subroutine is designed to allow a programmer to plot
a set of axes and then to follow with the plotting of
points when the coordinates of these points are given as
fractions.

The origin of coordinates, indicated by the intersection
of the axes, is determined with respect to the center of
the screen of the cathode ray tube. Two fractions y_0 ,
and x_0 must be supplied when the subroutine is entered
to plot axes. These fractions are the y and x coordinates
of the center of the screen with respect to the origin
of coordinates. These axes are plotted when y_0 is in
the accumulator, x_0 is in location r and the subroutine
is entered by

	50 rF
p	50 p
	26

The total range of the screen is given by

$- 1/2 < y_0, x_0 \leq + 1/2$. When $y_0 = x_0 = 1/2$ the origin of coordinates will appear in the lower left hand corner. When $y_0 = x_0 = 0$, the origin will appear in the center of the screen etc.

In order to plot a point the routine is entered by

	J0 tF
p	50 p
	26

The y coordinate of the point is in the accumulator and the x coordinate is in location t. Again, these coordinates are represented as fractions and are measured with respect to the previously plotted set of axes. Since the total range of the screen from left to right or from bottom to top is treated as a unit distance, the range of y and x is given by

$$- 1/2 + y_0 \leq y < 1/2 + y_0$$

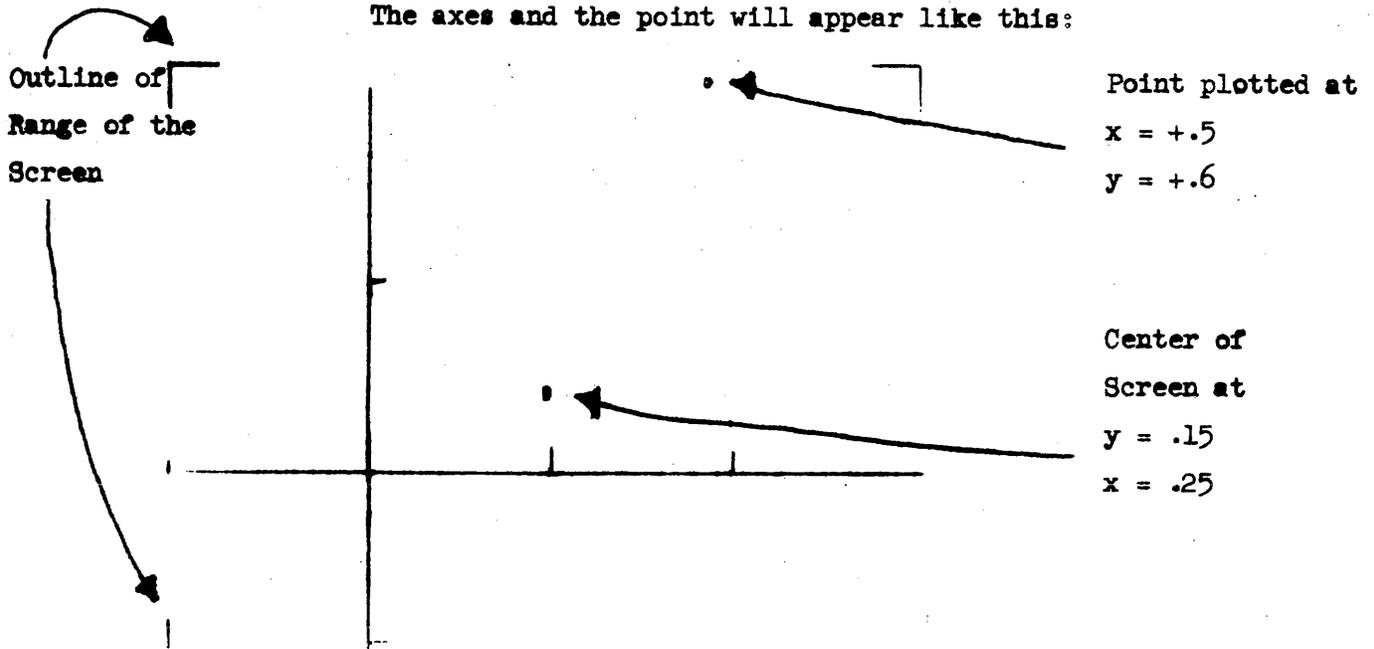
$$- 1/2 + x_0 \leq x < 1/2 + x_0$$

Outside of this range all points are plotted modulo 1.

EXAMPLE

Let $x_0 = +.25, y_0 = +.15, x = +.5, y = +.6, m = 3, n = 4$.

The axes and the point will appear like this:



LIMITATIONS

It is undesirable to make either y_0 or x_0 less than $-.45$ since the markers will then appear on the opposite side of the screen from the axes.

DATE <u>8/19/54</u> Rt. <u>12/19/58</u>
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APPROVED BY <u>J.P.Nash</u>

LOCATION	ORDER		NOTES
	00K		
	01 26K		
26	50 3F		Interlude
	00 42F		
27	40 565F		to form marker constant
	26 93F		
28	00 F		
	00 F		
	26 1469N		
	01 K		
	(02)		
0	40 F		
	K5 F		
1	36 13L		
	46 4L		Plot a point
2	42 9L		
	LJ F		
3	10 11L		
	40 F		
4	LJ F		
	10 12L		$x - x_0 + 1/2$
5	10 8F		
	32 6L		
6	10 10L		
	50 F		
7	JO 10L		
	S4 F		
8	00 1F		
	82 16F		
9	22 9L		
	22 F		
10	LL 2048F		
	00 F		JO constant
11	00 F		
	00 F		y_0

LOCATION	ORDER		NOTES	PAGE 2
12	00 F			
	00 F		x ₀	
13	42 26L			
	46 15L			
14	L5 F		Prepare to plot axes	
	40 11L			
15	L5 F			
	40 12L			
16	41 2F			
	26 18L			
17	L5 28L			
	L4 27L			
18	46 27L		Add marker constants	
	42 27L			
19	L0 27L			
	00 3F			
20	40 1F			
	00 20F			
21	J0 2F			
	50 21L		x axis	
22	26 L			
	L5 2F		y axis	
23	J0 1F			
	50 23L			
24	26 L			
	19 6F			
25	L4 2F			
	40 2F		Step axis marker	
26	36 17L			
	22 F			
27	00 F		Marker counter	
	00 F		Skip last word	
	01 29K			