Assignment 6

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Performance Date:
Submission Date:

Problem Statement:

Write c++ program to draw a given pattern. Use DDA line and Bresenham circle drawing algorithm

Theory:

Line is a basic element in graphics to draw a line you need 2 end points b/w which you can draw a line. Digital differential Analyser (DDA) line drawing algorithm is the simplest line drawing algorithm.

Bresenham's circle drawing algorithm is used to determine the next pixel of screen to be illuminated while drawing a circle by determining the closest nearby pixel.

Algorithm:

I DDA Line Algorithm:

1. Read start & end points (x_1, y_1) & (x_2, y_2).
2. Calculate $dx = x_2 - x_1$, $dy = y_2 - y_1$
3. If $abs(dx) >= abs(dy)$
   then $step = abs(dx)$
   else: $step = abs(dy)$.
4. $x_{inc} = \frac{dx}{step}$ $y_{inc} = \frac{dy}{step}$
5. $x = x_1$, $y = y_1$
   setpixel(x_1, y_1)
6. $i = 0$
   while $(i < step)$.
   { $x = x_1 + x_{inc}$; $y = y_1 + y_{inc}$
   setpixel(x, y) $i++$}

Stop

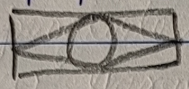
Bresenham's Circle Drawing algorithm:

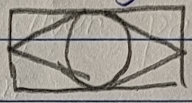
1. Read (x, y) as centre of circle.
2. Read radius of circle (r).
3. Initialize $x=0, y=r$.
4. Initialize decision parameter : $p=3-2r$.
5. do {

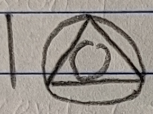
```
setpixel (centx+x, centy+y, colourname)
if(p<0),
  p = p+4x+6.
else
  p = p+4(x-y)+10
    y--;}
  x++
} while(x<y)
setpixel (centx + x, centy - y, colourname)
setpixel (centx + y, centy - x, colourname)
setpixel (centx+y, centy+x, colourname)
setpixel (centx+x, centy+y, colourname)
setpixel (centx-x, centy+y, colourname)
setpixel (centx-y, centy+x, colourname)
setpixel (centx-y, centy-x, colourname)
setpixel (centx-x, centy-y, colourname)
```

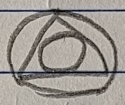
Test Cases:

Input	Exp O/P	Actual O/P	Result
$x_1 = 100, y_1 = 200$ $x_2 = 300, 400$ $r = 50$	Line is drawn properly	line is drawn properly	Pass









Conclusion:

We successfully implemented Bresenham's line drawing algorithm, circle drawing algorithm & DDA line algorithm.