Assignment No 3

Problem Statement:
Implement Bresenham's circle drawing algorithm to draw any object. The object should be displayed in all the quadrants with respect to center and radius

Objective:
To understand the basic concepts of circle drawing.

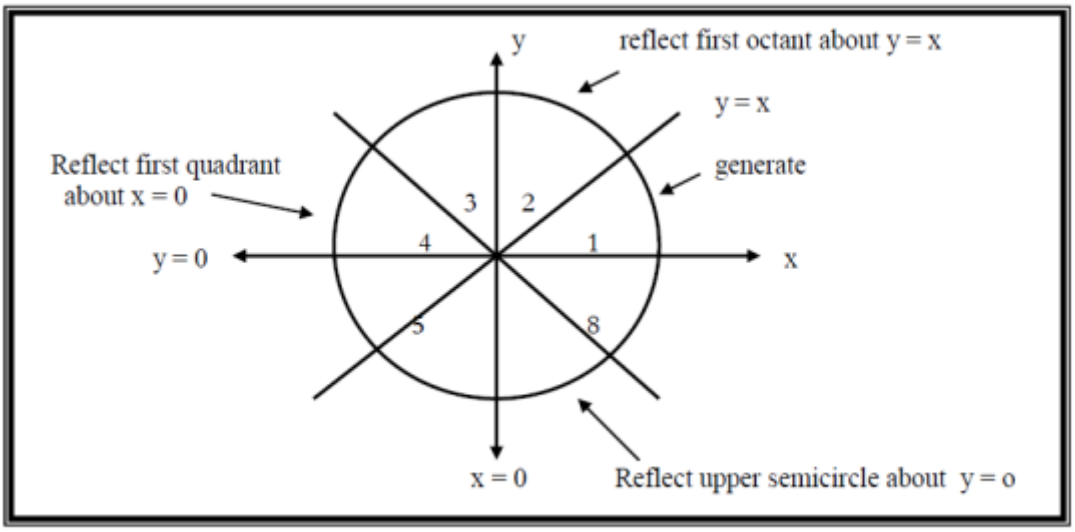
Outcome:
To implement the basic concept of circle drawing using Bresenham's algorithm.

CO Relevance: CO2

PO/PSOs Relevance: PO1, PO2, PO5, PO6

Theory Concepts:

One of the most efficient and easiest to draw circle is by using Bresenham's circle drawing algorithm. To begin, note that only one octant of the circle is need to be generated. The other parts can be obtained by successive reflections. If the first octant (0 to 45) is generated, the second octant can be obtained by reflection through the line y=x to yield the first quadrant. The results in the first quadrant are reflected through the line x=0 to obtain those in the second quadrant

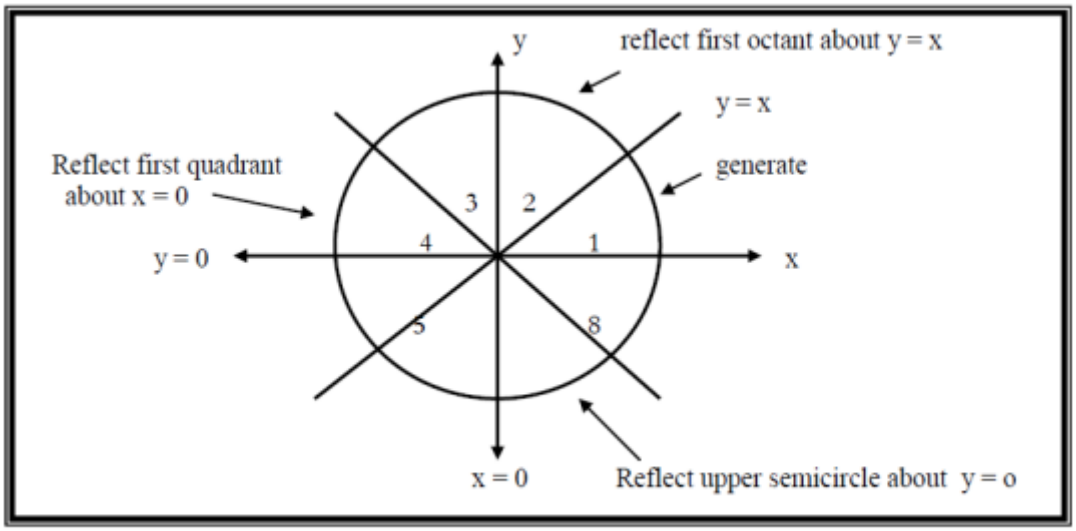


Generation of a complete circle from the fist octant

The combined result in the upper semicircle are reflected through the line y=0 to complete the circle. Bresenham`s Algorithm is consider the first quadrant of an origin- centered circle. If the algorithm begins

at x=0 , y=r, then for clockwise generation of the circle y is a monotonically decreasing function of x in the first quadrant. Here the clockwise generation starting at x=0, y=r is chosen. The center of the circle is (0,0).

We cannot display a continuous arc on the raster display. Instead, we have to choose the nearest pixel position to complete the arc. From the following illustration, you can see that we have put the pixel at (X, Y) location and now need to decide where to put the next pixel: at N (X+1, Y) or at S (X+1, Y-1).



Generation of a complete circle from the fist octant

This can be decided by the decision parameter p.

- If p <= 0, then N(X+1, Y) is to be chosen as next pixel.
- If p > 0, then S(X+1, Y-1) is to be chosen as the next pixel.

Algorithm:

Step-1: Input radius r and circle center (Xc, Yc)
obtained the first point (X_0,Y_0) =(0,r)
Step-2: Calculate the initial value of decision parameter as **P_0= 3-2r**
Step-3: At each X_k position, starting at k=0, perform, the following test:
If Pk < 0, the next point is (Xk+1,Yk)
Pk+1= Pk+ 4Xk+6
Otherwise the next point is (Xk+1,Yk-1)
Pk+1=Pk+4(Xk-Yk)+10
Step-4: Determine the symmetry points in other seven octant
Step-5: Move each pixel position (X,Y) into circular path X=X+XC and Y=Y+YC
Step-6: Repeat step 3 to 5 until X Y

Output:

(Execute the program and attach the printout here)

Conclusion:

In this way we have studied that how to draw a circle using Bresenham's circle drawing algorithm.

Viva Questions:

1. Draw a moving Car using the Bresenham's algorithm
2. Draw a raining scene using DDA algorithm.
3. Draw a raining scene using Bresenham's algorithm.
4. Draw a dancing doll using Bresenham's Circle drawing algorithm.

Date:	
Marks obtained:	
Sign of course coordinator:	
Name of course Coordinator :	