Lab Assignment 4: Circle Drawing Algorithm

Objective:

To study and Implement Midpoint circle algorithm given the points of the centre and the radius.

Reference:

1. Xiang and Plastock , “Schaum's Outline Computer Graphics”, Second Edition

Prerequisite:

Knowledge of:

- Midpoint circle Algorithm

Academic Honesty:

All work that you do toward fulfillment of this course's expectations must be your own unless collaboration is explicitly allowed (e.g., by some problem set or the final project). Viewing or copying another individual's work (even if left by a printer, stored in an executable directory, or accidentally shared in the course's virtual classroom) or lifting material from a book, magazine, website, or other source—even in part—and presenting it as your own constitutes academic dishonesty, as does showing or giving your work, even in part, to another student.

Similarly is dual submission academic dishonesty: you may not submit the same or similar work to this course that you have submitted or will submit to another. Nor may you provide or make available your or other students' solutions to individuals who take or may take this course in the future.

You are welcome to discuss the course's material with others in order to better understand it. You may even discuss problem sets with classmates, but you may not share code. You may also turn to the Web for instruction beyond the course's lectures and sections, for references, and for solutions to technical difficulties, but not for outright solutions to problems on projects. However, failure to cite (as with comments) the origin of any code or technique that you do discover outside of the course's lectures and sections (even while respecting these constraints) and then integrate into your own work may be considered academic dishonesty.

All forms of academic dishonesty are dealt with harshly.

Problem Description:

You have to design a program which will take input the coordinates of the center of the circle as well as the radius. Like following,

Enter the coordinates of the center:

X-coordinate = 350
Y-coordinate = 250
Enter the radius: 50

After that you have to draw the circle with the supplied coordinates and radius.

Algorithm: Midpoint circle algorithm

1. Input radius r and circle center (x_0,y_0), and obtain the first point on the circumference of a circle centered on the origin as(x_0,y_0)= (0 , r)
2. Calculate the initial value of the decision parameter as$p_0 = 5 / 4 – r$
3. At each X_k position , starting at k=0, perform the following test: If pk < 0 , the next point along the circle centered on (0,0) is $(X_k + 1 ,Y_k)$ and $pk+1 = pk + 2 X_{k+1} + 1$ Otherwise ,the next point along the circle is $(X_k + 1, Y_k -1)$ and $pk+1 = pk + 2 X_{k+1} + 1 – 2Y_{k+1}$ Where $2 X_{k+1} = 2x_k + 2$ and
$2Y_{k+1} = 2 y_k-2$.
4. Determine symmetry points in the other seven octants
5. Move each calculated pixel position (x,y) onto the circular path centered on (x_0,y_0) and plot the coordinate values: $x = x + x_c$, $y = y + y_c$
6. Repeat step 3 through 5 until x>= y

Evaluation Policy:

Your code will be evaluated along the following axes.
Correctness. To what extent is your code consistent with our specifications and free of bugs?
Design. To what extent is your code written well (i.e., clearly, efficiently, elegantly, and/or logically)?
Style. To what extent is your code readable (commented and indented with variables aptly named)?

In Lab Assignment:

1. Implement the given midpoint circle algorithm.