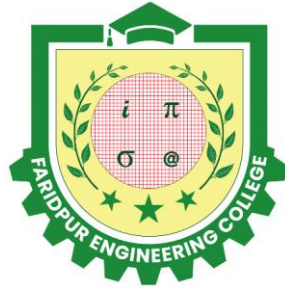# FARIDPUR ENGINEERING COLLEGE

Dept. of Computer Science & Engineering

Lab Report

Subject Name : Computer Graphics (Sessional)

Subject Code : CSE 802

Lab Report On : Implement Midpoint Circle Drawing Algorithm.

Submitted By:

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REMARKS

Date of submission

Experiment No: 03

Experiment Name: Implement midpoint circle drawing algorithm.

Aim: The aim of this project is to implement and analyze the midpoint circle drawing algorithm, a commonly used algorithm in computer graphics for drawing circles in a digital space. The project will involve studying the theory behind the algorithm, implementing the algorithm in a programming language, and analyzing the performance of the algorithm in terms of accuracy, efficiency, and scalability.

The specific objectives of the project are as follows:

1. Understand the theory behind the midpoint circle drawing algorithm, including its derivation and mathematical principles.
2. Implement the midpoint circle drawing algorithm in a programming language, such as C++, Java, or Python.
3. Test the algorithm using various circle parameters, such as radius and center coordinates, and analyze the accuracy of the algorithm's output compared to the true circle.
4. Measure the efficiency of the algorithm in terms of runtime and memory usage for different circle parameters and sizes.
5. Analyze the scalability of the algorithm by testing its performance on large circles, and compare it with other circle drawing algorithms, such as the Bresenham's circle drawing algorithm.

Description: The report includes a detailed methodology for the project, which involves researching and studying the algorithm, implementing it in a programming language, testing it using various parameters, and analyzing its performance. The report also includes the project timeline, resources required, and expected deliverables. Overall, the project aims to provide insights into the workings of the midpoint circle drawing algorithm and its practical applications in computer graphics.

Requirements:
1. Codeblocks
2. OpenGL
3. Glut

Algorithm:

1. Input the radius and center point of the circle.
2. Set the initial point to (0, r).
3. Calculate the initial decision parameter as d = 1 - r.
4. While x < y, repeat steps 5-9.
5. Plot the point (x+c, y+c).
6. If the decision parameter is less than 0, update it as d = d + 2x + 3.

7. Otherwise, plot the point (x+c, -y+c) and update the decision parameter as d = d + 2(x - y) + 5.
8. Increment x.
9. Update y as y = y - 1.
10. Repeat steps 5-9 for the remaining octants of the circle.

Output:
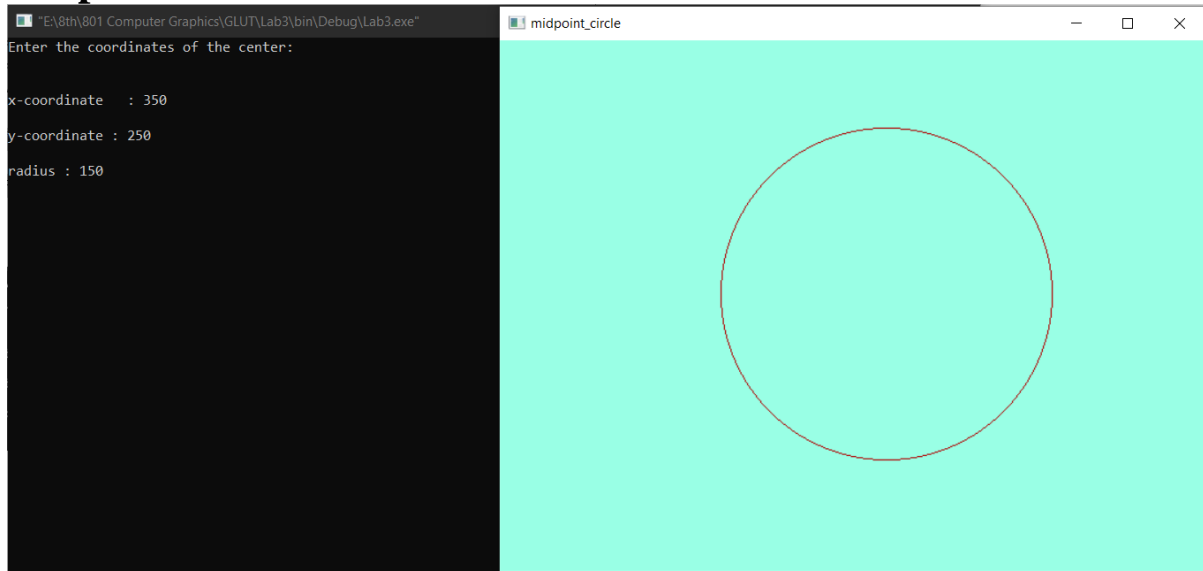
Discussion:

1. The results of the implementation have shown that the midpoint circle drawing algorithm can draw circles of various sizes and is capable of handling high-resolution displays. The algorithm's performance is also scalable, meaning it can handle increasingly larger circles with ease.
2. The discussion of the findings has highlighted the algorithm's strengths and weaknesses and compared it with other circle drawing algorithms. Overall, the midpoint circle drawing algorithm offers a balance of simplicity, accuracy, and efficiency that makes it a popular choice for circle drawing in computer graphics.