Problem Statement

Write a program that uses the Midpoint Circle Drawing Algorithm to draw a circle in a graphics window. The user should provide the center coordinates and the radius of the circle as input. The program must compute all points on the circle using the Midpoint Circle Drawing Algorithm and display them using the graphics library.

Background Theory

The Midpoint Circle Drawing Algorithm is a fundamental algorithm in computer graphics used to draw circles using only integer arithmetic, making it both efficient and suitable for real-time rendering systems. Unlike traditional methods that rely on floating-point calculations and trigonometric functions to determine the positions of circle points, this algorithm simplifies the process through the use of a decision parameter.

The core idea behind the algorithm is based on the symmetry of the circle. Since a circle is symmetric about its center, it is sufficient to compute the points for one-eighth (an octant) of the circle and reflect those points into the remaining seven octants. This significantly reduces the computational workload.