

The Mid-Point Circle Algorithm

MID-POINT CIRCLE ALGORITHM

- Input radius r and circle centre (x_c, y_c) , then set the coordinates for the first point on the circumference of a circle centred on the origin as:

$$(x_0, y_0) = (0, r)$$

- Calculate the initial value of the decision parameter as:
- $p_0 = \frac{5}{4} - r$ OR simply $p_0 = 1 - r$
- Starting with $k = 0$ at each position x_k , perform the following test. If $p_k < 0$, the next point along the circle centred on $(0, 0)$ is (x_{k+1}, y_k) and:

$$p_{k+1} = p_k + 2x_{k+1} + 1$$

The Mid-Point Circle Algorithm (cont...)

Otherwise the next point along the circle is (x_k+1, y_k-1) and:

$$p_{k+1} = p_k + 2x_{k+1} + 1 - 2y_{k+1}$$

4. Determine symmetry points in the other seven octants
5. Move each calculated pixel position (x, y) onto the circular path centred at (x_c, y_c) to plot the coordinate values:

$$x = x + x_c \quad y = y + y_c$$

6. Repeat steps 3 to 5 if $x \geq y$ false