पार्थ

Page No.

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Computer Graphics & Multimedia

Assignment

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Q Draw a circle having radius $r = 10$ centered at $(0, 0)$ using mid-point circle algorithm.

A

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

$R = 10$

$x_0 = 0$

$y_0 = R = 10$

$P_0 = 1 - r$

$= 1 - 10 = -9$

$P_0 < 0$

$P_0 >= 0$

$x_{k+1} = x_k + 1$

$y_{k+1} = y_k - 1$

$P_{k+1} = P_k - 2y_{k+1} + 2x_{k+1} + 1$

$\therefore x_{k+1} = x_k + 1 = 0 + 1 = 1$

$y_{k+1} = y_k = 10$

$P_{k+1} = P_k + 2 \times x_{k+1} + 1 = -9 + (2 \times 1) + 1 = -6$

Repeat until $x_{k+1} >= y_{k+1}$

P_k	P_{k+1}	(x_{k+1}, y_{k+1})
—	—	(0, 10)
-9	-6	(1, 10)
-6	-1	(2, 10)
-1	6	(3, 10)
6	-3	(4, 9)
-3	8	(5, 9)
8	5	(6, 8)
⋮	⋮	⋮

These are points for quadrant 1 quadrant 2 values are calculated by mirror effect

Rest quadrant points are generated by just changing the signs as per convention

Points are:

$Q_1(x, y)$	$Q_2(x, y)$	$Q_3(x, y)$	$Q_4(x, y)$
(0, 10)	(0, 10)	(0, -10)	(0, 10)
(1, 10)	(-1, 10)	(-1, 10)	(1, -10)
(2, 10)	(-2, 10)	(-2, -10)	(2, -10)
(3, 10)	(-3, 10)	(-3, -10)	(3, -10)
(4, 9)	(-4, 9)	(-4, -9)	(4, -9)
(5, 9)	(-5, 9)	(-5, -9)	(5, -9)
(6, 8)	(-6, 8)	(-1, -8)	(6, -8)
(8, 6)	(-8, 6)	(-8, -6)	(8, -6)
(9, 5)	(-9, 5)	(-9, -5)	(9, -5)
(10, 3)	(-10, 3)	(-10, -3)	(10, -3)
(10, 2)	(-10, 2)	(-10, -2)	(10, -2)
(10, 1)	(-10, 1)	(-10, -1)	(10, -1)
(10, 0)	(-10, 0)	(-10, 0)	(10, 0)