

* Integrity: (1) Data integrity
(2) System
↳ Tools

* Availability: Tools

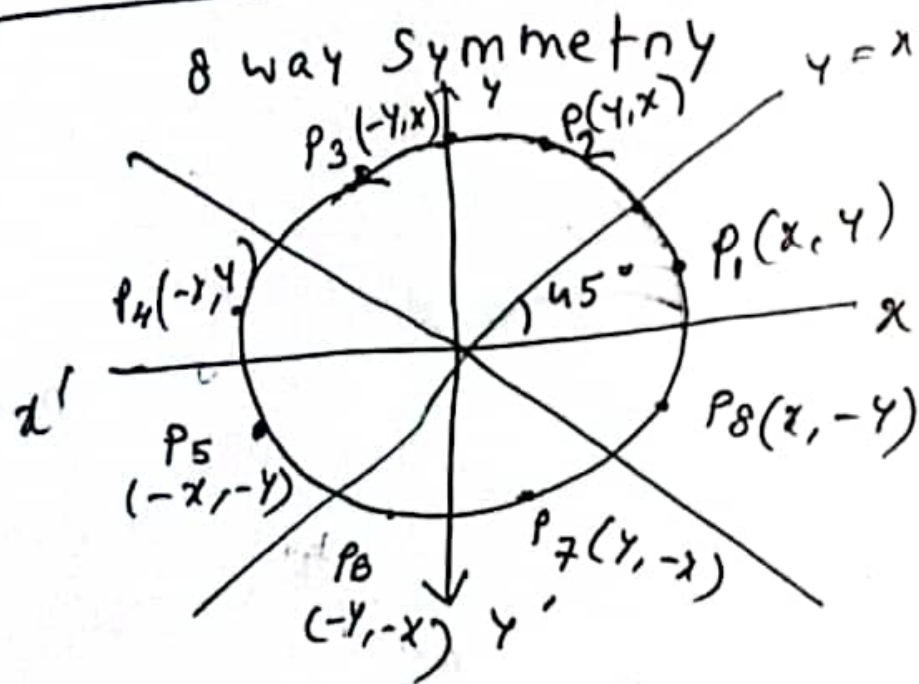
* Additional security properties: (3)

* Security Attacks (2 type)

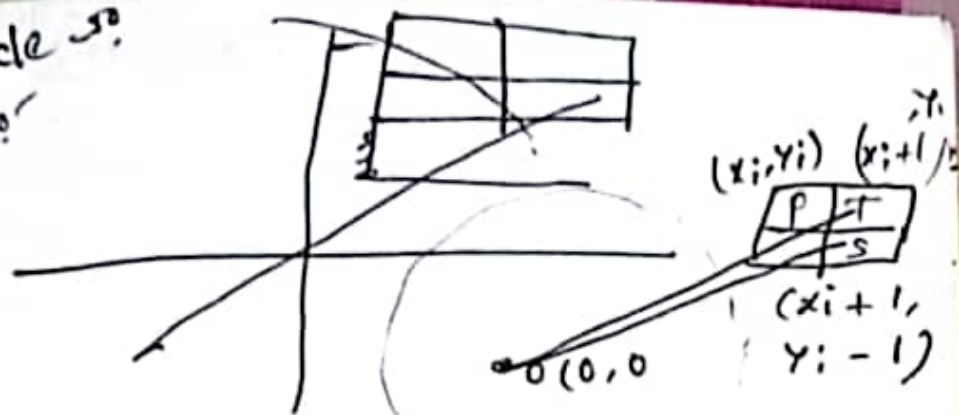
CGI

11.2.24

Scan converting Circle



5 circle 30
3100



3)

Bresenham's circle algo
incremental circle algo

24

$$D(T) = (x_i + 1)^2 + y_i^2 - r^2 \text{ (pos)}$$

$$D(S) = (x_i + 1)^2 + (y_i - 1)^2 - r^2 \text{ (neg)}$$

decision variable, $d_i = D(T) + D(S)$

$$d_i < 0 \rightarrow T \quad d_i \geq 0 \rightarrow S$$

$$\rightarrow d_i = (x_i + 1)^2 + y_i^2 - r^2 + (x_i + 1)^2 + (y_i - 1)^2 - r^2$$

$$= 2(x_i + 1)^2 + y_i^2 + (y_i - 1)^2 - 2r^2 \quad \text{--- (I)}$$

The next decision variable,

$$d_{i+1} = 2(x_{i+1} + 1)^2 + y_{i+1}^2 + (y_{i+1} - 1)^2 - 2r^2 \quad \text{--- (II)}$$

$$\textcircled{ii} - \textcircled{i} \rightarrow d_{i+1} - d_i = 2(x_{i+1} + 1)^{\sim} \\ + y_{i+1}^{\sim} + (y_{i+1} - 1)^{\sim} - 2(x_i + 1)^{\sim} \\ - y_i^{\sim} - (y_i - 1)^{\sim}$$

As $x_{i+1} = x_i + 2$

$$\rightarrow d_{i+1} - d_i = 2(x_i + 2)^{\sim} + y_{i+1}^{\sim} + (y_{i+1} - 1)^{\sim} \\ - 2(x_i + 1)^{\sim} - y_i^{\sim} - (y_i - 1)^{\sim} \\ = 4x_i + 2(y_{i+1}^{\sim} - y_i^{\sim}) - 2(y_{i+1} - y_i) \\ + 6 - \textcircled{v}$$

If T is chosen, $y_{i+1} = y_i$

$$\textcircled{v} \rightarrow d_{i+1} = d_i + 4x_i + 6$$

If S is chosen, $y_{i+1} = y_i - 1$

$$\textcircled{v} \rightarrow d_{i+1} = d_i + 2(y_{i+1}^{\sim} - y_i^{\sim}) \\ - 2[(y_i - 1) - y_i] + 6 \\ = d_i + 4x_i + 2[-2y_i + 1] + 2 + 6 \\ = d_i + 4(x_i - y_i) + 10$$

$$d_{i+1} = \begin{cases} d_i + 4x_i + 6 & \text{if } d_i < 0 \\ d_i + 4(x_i - y_i) + 10 & \text{if } d_i \geq 0 \end{cases}$$

$$d_1 = 2(x_1 + 1)^{\sim} + y_1^{\sim} + (y_1 - 1)^{\sim} - 2r^{\sim}$$

$$\hookrightarrow p(x_1, y_1) \rightarrow = 2 + r^{\sim} + (r-1)^{\sim} - 2r^{\sim}$$

$$= (0, r) = 2 + \cancel{2r^{\sim}} - 2r + 1 - \cancel{2r^{\sim}}$$

$$= 3 - 2r$$

while ($x \neq y$)