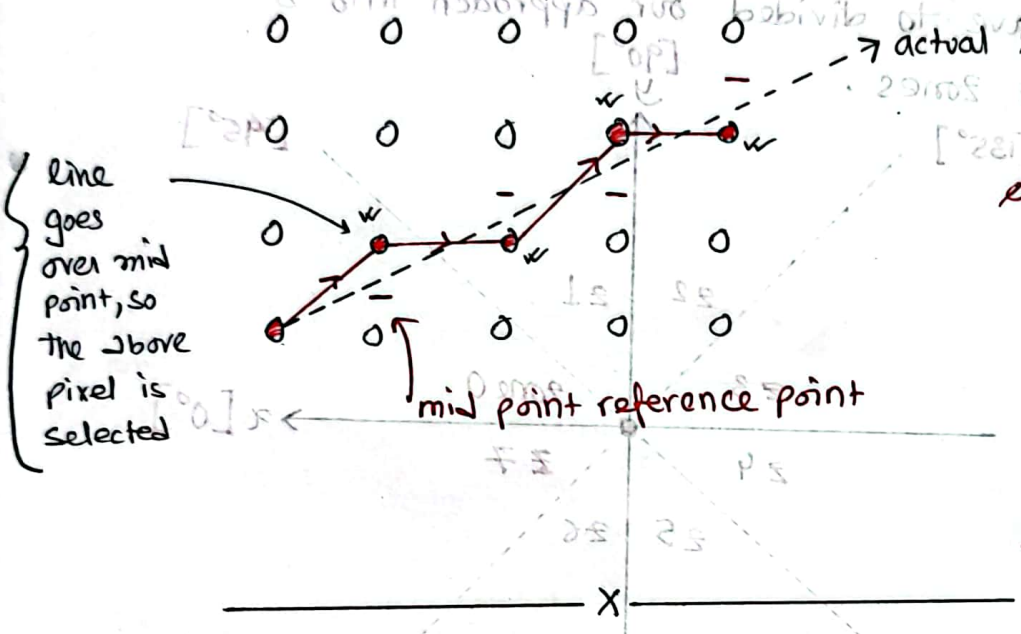
QUIZ 1 (DDA)

(MIDPOINT LINE DRAWING ALGORITHM)

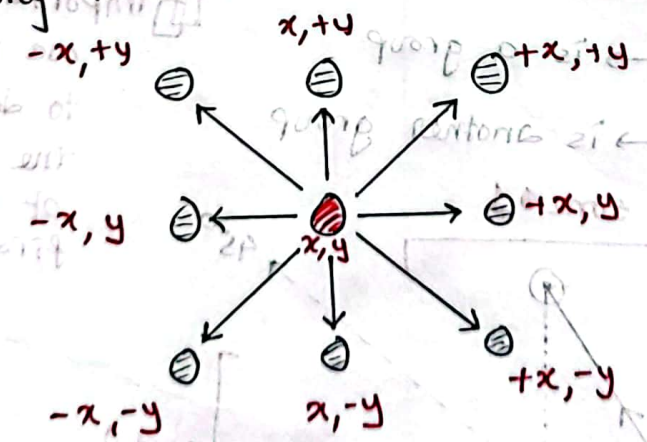
LECTURE 3

Bresenham's Algorithm.



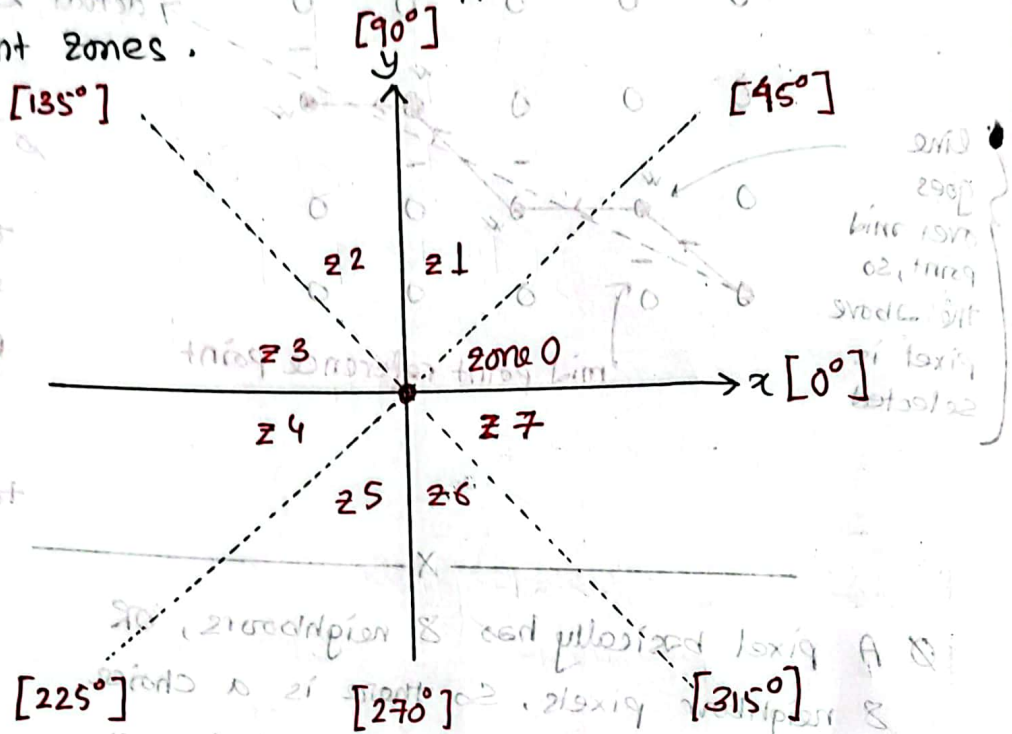
- The algorithm determines if the line is selecting the pixel (above or below) OR (left or right) to the mid point.

- A pixel basically has 8 neighbours, OR 8 neighbour pixels. So there is a choice of 8 pixels based on the line that goes in any direction.



STEP 1 : (of MPL) → Finding the zone.

Since a line can be drawn in any direction we'll have to divided our approach into 8 different zones.

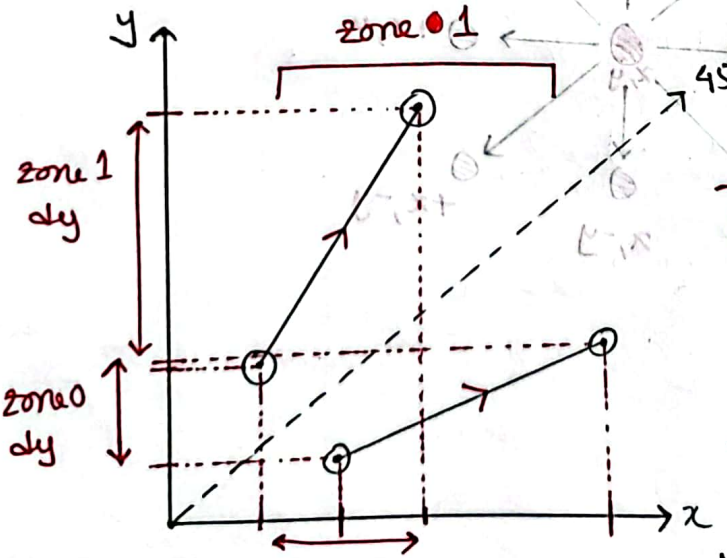


Group (0° to 90°)

$0 \leq \theta < 45°$ → is a group

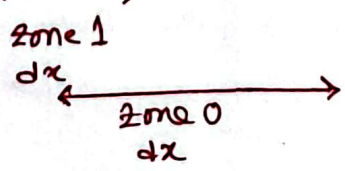
$45° \leq \theta < 90°$ → is another group

Important :→ we need to determine the zone of the line first.



$dy = y_2 - y_1$

$dx = x_2 - x_1$



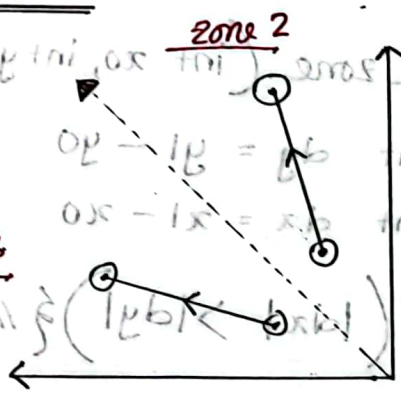
for zone 0 & 1 both dy & dx is positive

But,

zone 0 → $|dx| > |dy|$

zone 1 → $|dy| > |dx|$

Now, Group (90° — 180°)



for zone 2 & 3

$dx = -ve$

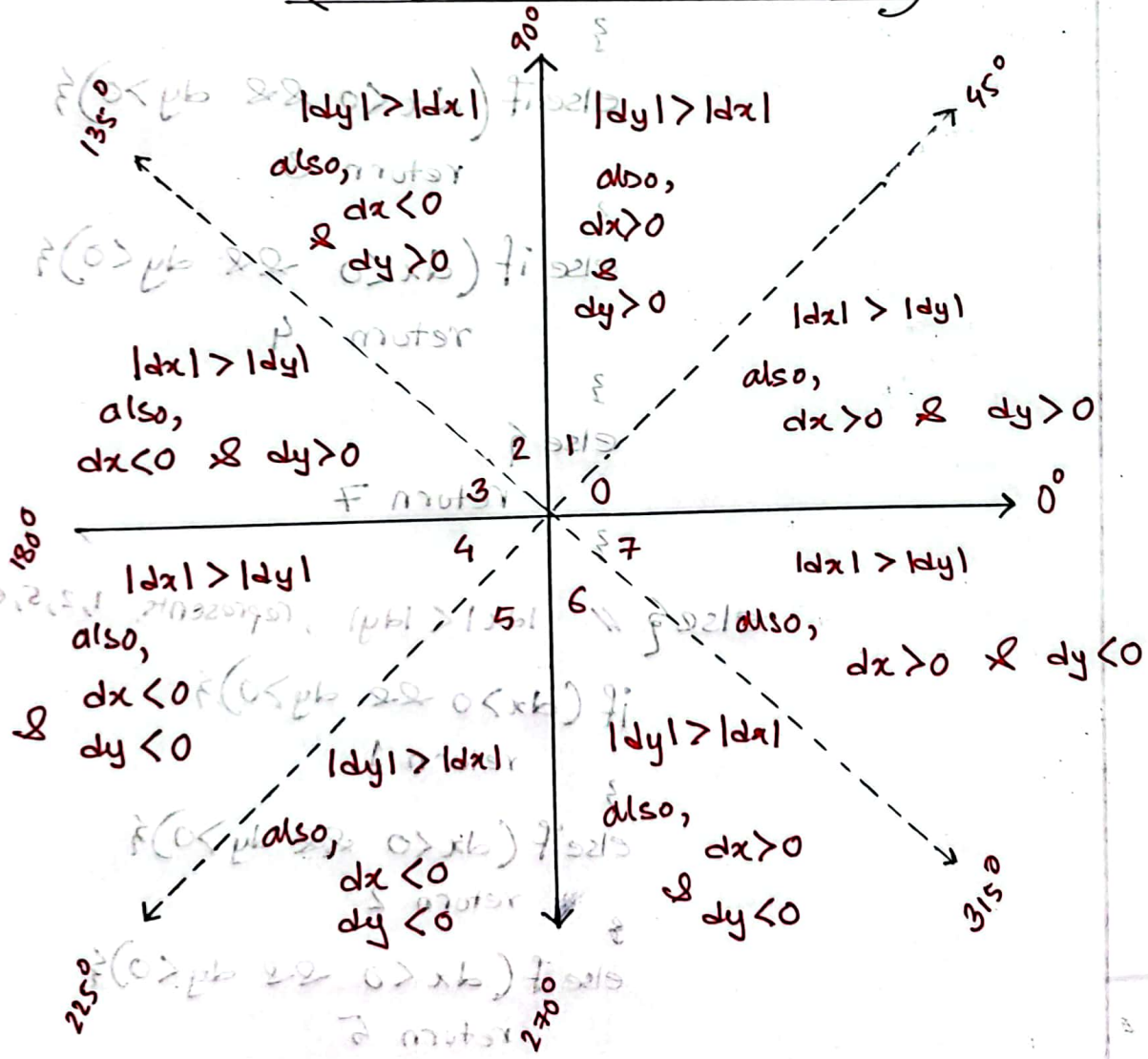
$dy = +ve$

But,

zone 2 → $|dy| > |dx|$

zone 3 → $|dx| > |dy|$

(Putting it all into Perspective)



Pseudo Code :

```
int find_zone (int x0, int y0, int x1, int y1) {
    int dy = y1 - y0
    int dx = x1 - x0
    if (|dx| > |dy|) { // represents zone 0,3,4,7
        if (dx > 0 && dy > 0) {
            return 0
        }
        else if (dx < 0 && dy > 0) {
            return 3
        }
        else if (dx < 0 && dy < 0) {
            return 4
        }
        else {
            return 7
        }
    }
    else { // |dx| < |dy| , represents 1,2,5,6
        if (dx > 0 && dy > 0) {
            return 1
        }
        else if (dx < 0 && dy > 0) {
            return 2
        }
        else if (dx < 0 && dy < 0) {
            return 5
        }
        else {
            return 6
        }
    }
}
```