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Course - BCA Section - A Semester - 6

University Roll No - 1121004 Subject - Computer Graphics [PBC-602]

Question :- Write an algorithm and program to implement DDA LINE DRAWING ALGORITM.

Sol :- ALGORITHM :-

- Starting coordinates = (x_0, y_0) Given :
- Ending coordinates = (x_n, y_n)

The points generation using DDA Algorithm involves the following steps -

Step-01 - Calculate Δx, Δy and M from the given input. We know that the slope of a straight line M is given as

These parameters are calculated as -

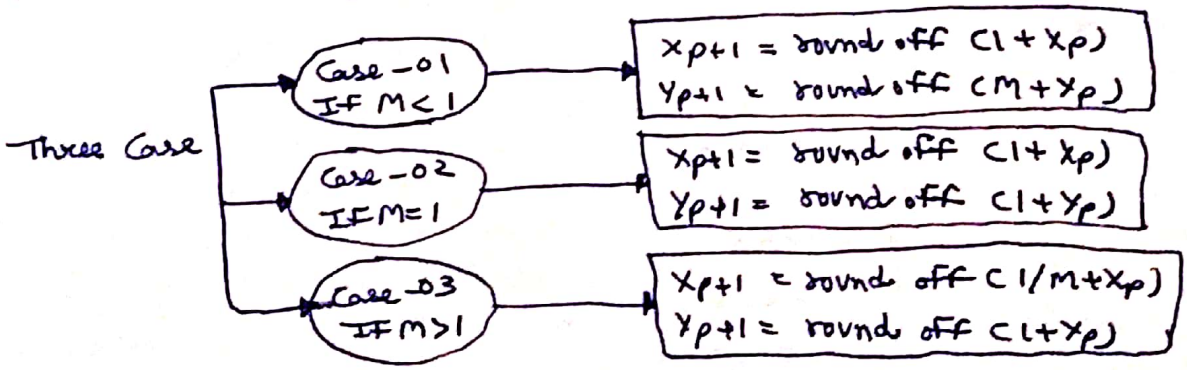
- $\Delta x = x_n - x_0$
- $\Delta y = y_n - y_0$
- $M = \Delta y / \Delta x \Rightarrow M = \frac{y_n - y_0}{x_n - x_0}$

Step-02 - Find the number of steps or points in between the starting and ending coordinates.

```
if (absolute (Δx) > absolute (Δy))
  steps = absolute (Δx);
else
  steps = absolute (Δy);
```

Step-03 - Suppose the current point is (x_p, y_p) and the next point is (x_{p+1}, y_{p+1})

Find the next by following the below three cases :-



Step-04 - Keep repeating step-03 until the end point is reached or the number of generated new points (including the starting and ending points) equals to the steps count.

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CODE :-

```
#include <stdio.h>
#include <graphics.h>
int main()
{
    int rou (float num)
    {
        return num < 0 ? num - 0.5 : num + 0.5;
    }
    int x1 = 100, x2 = 250, y1 = 100, y2 = 250, step;
    int gd = DETECT, gm;
    float x, y, m;
    int dx = x2 - x1;
    int dy = y2 - y1;
    m = dy / dx;
    if (dx > dy)
        step = dx;
    else
        step = dy;
    initgraph (&gd, &gm, " ");
    outtextxy (x1, y1, "A");
    outtextxy (x2, y2, "B");
    putpixel (x1, y1, RED);
    x = x1, y = y1;
    while (step > 0)
    {
        if (m < 1)
        {
            x = x + 1;
            y = y + m;
        }
        if (m >= 1)
        {
            x = x + 1/m;
            y = y + 1;
        }
        putpixel (rou(x), rou(y), RED);
        step--;
    }
    getch();
    return 0;
}
```

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