(RCA-551) Computer Graphics & Animation

ASSIGNMENT -2

Aim:

Write a program to implement Bresenham's Line drawing algorithm.

Bresenham's Line Algorithm:

Step1: Start Algorithm

Step2: Declare variable $x_1,x_2,y_1,y_2,d,i_1,i_2,dx,dy$

Step3: Enter value of x_1,y_1,x_2,y_2
Where $x_1,y_1$are coordinates of starting point
And x_2,y_2 are coordinates of Ending point

Step4: Calculate $dx = x_2-x_1$
Calculate $dy = y_2-y_1$
Calculate $i_1=2*dy$
Calculate $i_2=2*(dy-dx)$
Calculate $d=i_1-dx$

Step5: Consider (x, y) as starting point and x_{end}as maximum possible value of x.
If $dx < 0$
Then $x = x_2$
$y = y_2$
$x_{end}=x_1$
If $dx > 0$
Then $x = x_1$
$y = y_1$
$x_{end}=x_2$

Step6: Generate point at (x,y)coordinates.

Step7: Check if whole line is generated.
If $x > = x_{end}$
Stop.

Step8: Calculate co-ordinates of the next pixel
If $d < 0$
Then $d = d + i_1$
If $d \geq 0$
Then $d = d + i_2$
Increment $y = y + 1$

Step9: Increment $x = x + 1$

Step10: Draw a point of latest (x, y) coordinates

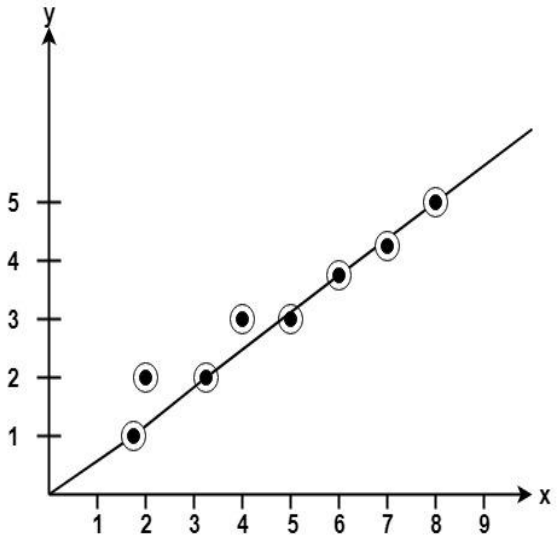
Step11: Go to step 7

Step12: End of Algorithm

Example: Starting and Ending position of the line are (1, 1) and (8, 5). Find intermediate points.

Solution: $x_1=1$
$y_1=1$
$x_2=8$
$y_2=5$
$dx= x_2-x_1=8-1=7$
$dy=y_2-y_1=5-1=4$
$I_1=2* \Delta y=2*4=8$
$I_2=2*(\Delta y-\Delta x)=2*(4-7)=-6$
$d = I_1-\Delta x=8-7=1$

x	Y	$d=d+I_1$ or I_2
1	1	$d+I_2=1+(-6)=-5$
2	2	$d+I_1=-5+8=3$
3	2	$d+I_2=3+(-6)=-3$
4	3	$d+I_1=-3+8=5$
5	3	$d+I_2=5+(-6)=-1$
6	4	$d+I_1=-1+8=7$
7	4	$d+I_2=7+(-6)=1$
8	5	



Program to implement Bresenham's Line Drawing Algorithm:

```
#include<stdio.h>
#include<conio.h>
#include<graphics.h>
void drawline(int x0, int y0, int x1, int y1)
{
    int dx, dy, p, x, y;
    dx=x1-x0;
    dy=y1-y0;
    x=x0;
        y=y0;
        p=2*dy-dx;
        while(x<x1)
        {
           if(p>=0)
           {
              putpixel(x,y,7);
              y=y+1;
              p=p+2*dy-2*dx;
           }
           else
           {
              putpixel(x,y,7);
              p=p+2*dy;}
              x=x+1;
           }
      }
      int main()
      {
         int gdriver=DETECT, gmode, error, x0, y0, x1, y1;
```

```
30.         initgraph(&gdriver, &gmode, "c:\\turboc3\\bgi");
31.         printf("Enter co-ordinates of first point: ");
32.         scanf("%d%d", &x0, &y0);
33.         printf("Enter co-ordinates of second point: ");
34.         scanf("%d%d", &x1, &y1);
35.         drawline(x0, y0, x1, y1);
36.         return 0;
37.         getch();
38.     }
```

Output: