**EXPERIMENT 02:- BRESENHAM'S ALGORITHM**

**Aim:** To implement Bresenham's algorithms for drawing a line segment between two given end points.

## Objective:

Draw a line using Bresenham's line algorithm that determines the points of an n-dimensional raster that should be selected to form a close approximation to a straight line between two points

## Theory:

In Bresenham's line algorithm pixel positions along the line path are obtained by determining the pixels i.e. nearer the line path at each step.

## Algorithm -

Step 1: Except the two end points of Line from User.

Step 2: Calculate the slope(m) of the required Line.

Step 3: Identify the value of slope(m).

If slope(m) is Less than 1 i.e: m < 1

Calculate the constants dx, dy, 2dy, and (2dy – 2dx) and get the first value for the decision parameter as -

p0 = 2dy − dx

Step 4: At each Xk along the line, starting at k = 0, perform the following test −

If pk < 0, the next point to plot is (xk + 1, yk) and

pk+1 = pk + 2dy

else

plot (xk + 1, yk + 1)

pk+1 = pk + 2dy − 2dx

Repeat step 4 (dx - 1) times.

If slope(m) is greater than or equal to 1 i.e: m >= 1

Calculate the constants dx, dy, 2dy, and (2dy – 2dx) and get the first value for the decision parameter as -

p0 = 2dx − dy

step 5: At each Yk along the line, starting at k = 0, perform the following test −

If pk < 0, the next point to plot is (xk, yk + 1) and

pk+1 = pk + 2dx

else

plot (xk + 1, yk + 1)

pk+1 = pk + 2dx − 2dy

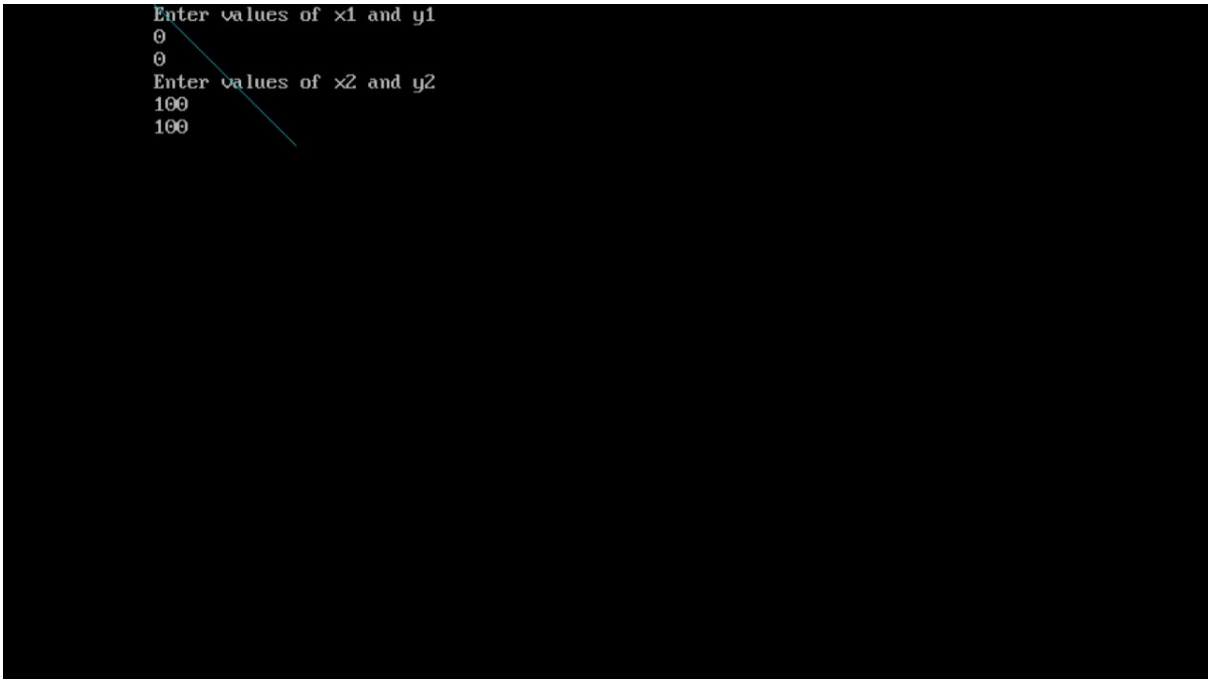
Repeat step 5 (dy - 1) times.
Exit.

## Program -

```
#include<iostream.h>
#include<conio.h>
#include<graphics.h>
#include<dos.h>
void bsline(int x,int y,int x2,int y2)
{
int dx,dy,p;
dx=x2-x;
dy=y2-x);
p=2*(dy)-(dx);
while(x<=x2)
{
if(p<0)
{
x=x+1;
y=y;
p=p+2*(dy);
}
else
{
x=x+1;
y=y+1;
p=p+2*(dy-dx);
}
putpixel(x,y,RED);
delay(10);
}
}
void main()
{
int gd=DETECT,gm;
initgraph(&gd,&gm,"C:\\turboc3\\bgi");
int x1,x2,y1,y2;
cout<<"Enter the x1,y1,x2,y2 values: ";
cin>>x1>>y1>>x2>>y2;
```

```
bsline(x1,y1,x2,y2);
getch();
closegraph();
}
```

**Output:**




**Conclusion:** Bresenham's algorithm is a highly efficient method for drawing lines on a discrete grid, widely used in computer graphics. Its simplicity and speed make it a valuable tool for line rasterization, ensuring smooth and accurate representations with minimal computational overhead. Embracing Bresenham's algorithm empowers developers to enhance performance in line-drawing tasks across various applications.