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Aim: To implement DDA algorithms for drawing a line segment between two given end points.

Objective: Draw the line using (vector) generation algorithms which determine the pixels that should be turned ON are called as digital differential analyzer (DDA).It is one of the techniques for obtaining a rasterized straight line. This algorithm can be used to draw the line in all the quadrants.

Theory:
DDA algorithm is an incremental scan conversion method. Here we perform calculations at each step using the results from the preceding step. The characteristic of the DDA algorithm is to take unit steps along one coordinate and compute the corresponding values along the other coordinate. Digital Differential Analyzer (DDA) algorithm is the simple line generation algorithm which is explained step by step here.

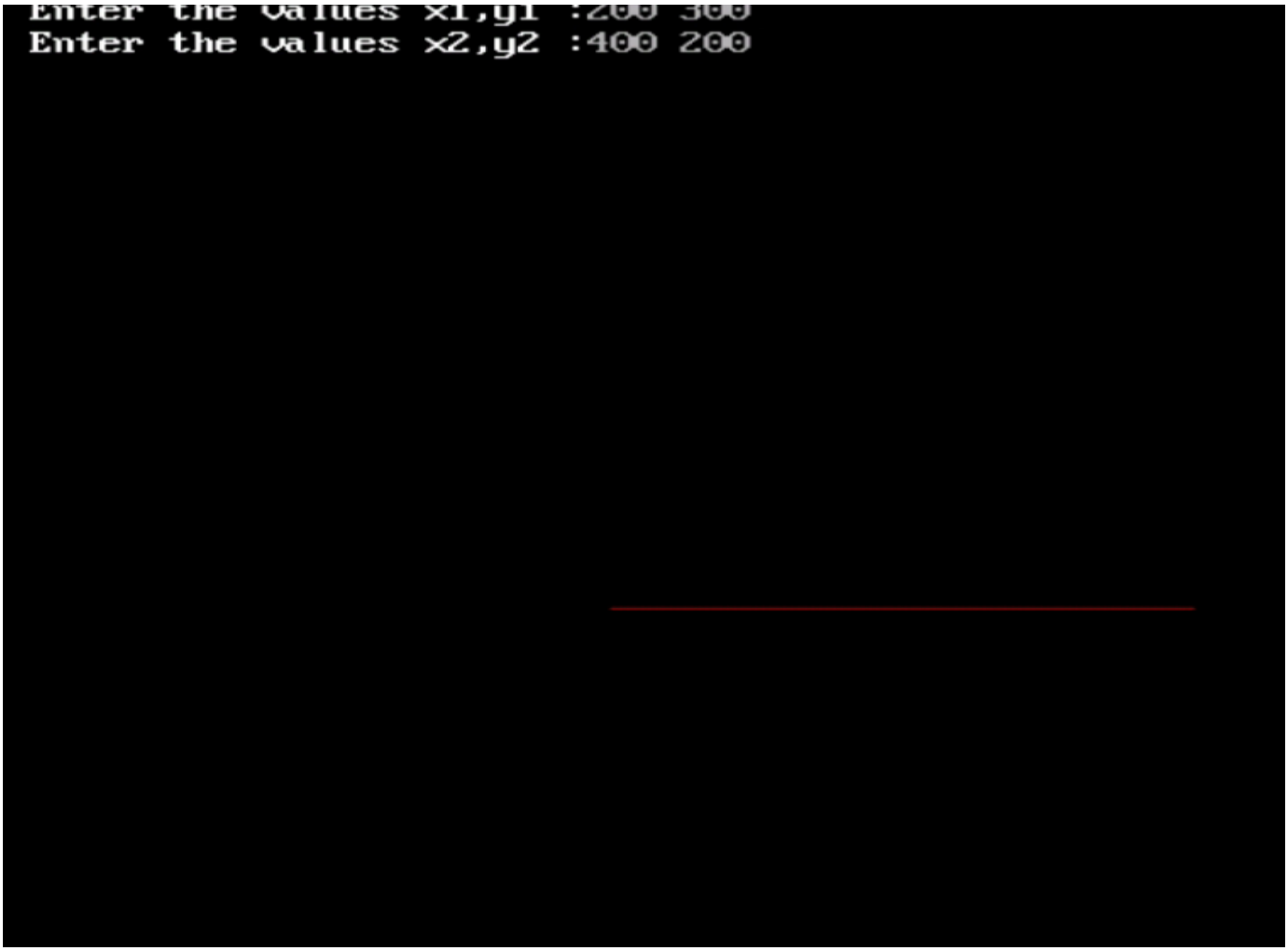
Algorithm:(x1,y1,x2,y2)dx=x2-x1
dy=y2-y1
x=x1
y=y1
m=dy/dx
if abs(m)<1 then
num_of_pixels=abs(dx)else
num_of_pixels=abs(dy)end
xi=dx/num_of_pixels
yi=dy/num_of_pixels
putpixel(x,y)
for x=x1 to x2 do
x=x+xi
y=y+yi
end

Program: #include<stdio.h>
#include<graphics.h>
#include<math.h>

```
void main() {
   int gd = DETECT, gm;
   int dx, dy, steps;
   float xinc, yinc, x, y;
   int x1, y1, x2, y2;

   printf("Enter the coordinates of the first point (x1, y1):\n");
   scanf("%d %d", &x1, &y1);

   printf("Enter the coordinates of the second point (x2, y2):\n")
;
   scanf("%d %d", &x2, &y2);

   dx = x2 - x1;
   dy = y2 - y1;

   if (abs(dx) > abs(dy))
      steps = abs(dx);
   else
      steps = abs(dy);

   xinc = dx / (float) steps;
   yinc = dy / (float) steps;

   x = x1;
   y = y1;

   initgraph(&gd, &gm, "C:\\TURBOC3\\BGI");

   for (int k = 1; k <= steps; k++) {
      putpixel(round(x), round(y), 4); // 4 is code for color Red
      x = x + xinc;
      y = y + yinc;

   }
```

```
    }

    getch();
    closegraph();
}
```

Output:



Conclusion: Comment on -
Pixel:-It involves floating point operation for each pixel
Equation for line:-y=mx+c
Need of line drawing algorithm:-Does not require any special skill
Slow or fast:-it is faster