**EXERCISE - 1**

**Aim :** To implement a line-drawing algorithm (e.g., DDA or Bresenham's algorithm) in C to draw a straight line between two points**.**

**Procedure (Using Bresenham’s Algorithm)**

1. Input:
   * Two endpoints (x1,y1) and (x2​,y2​).
2. Calculate the differences:
   * Δx=x2−x1
   * Δy=y2−y1​
3. Determine the decision parameters:
   * Set p = 2Δy - Δx for the initial decision variable.
4. Iteratively plot points:
   * Start from the first endpoint and move toward the second endpoint.
   * Based on the decision variable p, determine whether to increment the y-coordinate.
5. Repeat until the second endpoint is reached.

**SAMPLE CODE:**

#include <stdio.h>

#include <graphics.h>

void bresenhamLine(int x1, int y1, int x2, int y2) {

int dx = x2 - x1;

int dy = y2 - y1;

int p = 2 \* dy - dx; // Initial decision parameter

int x = x1, y = y1;

// Plot the first point

putpixel(x, y, WHITE);

// Iterate through the points

while (x < x2) {

x++;

if (p < 0) {

p += 2 \* dy; // Mid-point below the line

} else {

y++;

p += 2 \* (dy - dx); // Mid-point above or on the line

}

putpixel(x, y, WHITE); // Plot the next point

}

}

int main() {

int gd = DETECT, gm;

int x1, y1, x2, y2;

// Initialize the graphics system

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

// Input endpoints

printf("Enter the coordinates of the first point (x1, y1): ");

scanf("%d %d", &x1, &y1);

printf("Enter the coordinates of the second point (x2, y2): ");

scanf("%d %d", &x2, &y2);

// Draw the line using Bresenham's algorithm

bresenhamLine(x1, y1, x2, y2);

// Wait for user input to close the graphics window

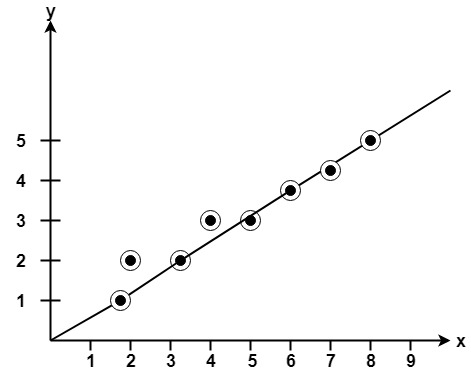
getch();

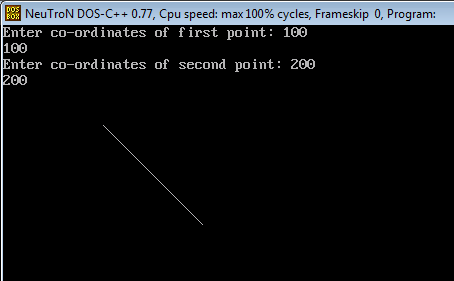
closegraph();

return 0;

}

**OUTPUT**

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