**Practical No:2**

**1)Implement DDA and Bresenham line drawing algorithm to draw: i) Simple Line ii) Dotted Line iii) Dashed Line iv) Solid line; using mouse interface Divide the screen in four quadrants with center as (0, 0). The line should work for all the slopes positive as well as negative.**

**Code:**

**#include<iostream>**

**#include<GL/glut.h>**

**using namespace std;**

**int Algo,type;**

**void Init()**

**{**

**glClearColor(0,0,0,0);**

**glColor3f(0,1,0);**

**gluOrtho2D(0,640,0,480);**

**glClear(GL\_COLOR\_BUFFER\_BIT);**

**}**

**int sign(float a){**

**if(a==0){**

**return 0;**

**}**

**if(a>0){**

**return 1;**

**}**

**return -1;**

**}**

**void B\_Line(int x\_1,int y\_1,int x\_2,int y\_2,int t){**

**float dy, dx, m , P;**

**dy = y\_2 - y\_1;**

**dx = x\_2 - x\_1;**

**m = dy/dx;**

**P = 2\*dy - dx;**

**int x = x\_1, y = y\_1;**

**cout<<"\n x1 = "<<x<<" y1 = "<<y;**

**if(m<1){**

**int cnt=1;**

**for(int i=0; i<=dx;i++){**

**if(t == 1){**

**glBegin(GL\_POINTS);**

**glVertex2i(x,y);**

**glEnd();**

**}**

**if(t == 2){**

**if(i%2==0){**

**glBegin(GL\_POINTS);**

**glVertex2i(x,y);**

**glEnd();**

**}**

**}**

**if(t == 3){**

**if(cnt <= 10){**

**glBegin(GL\_POINTS);**

**glVertex2i(x,y);**

**glEnd();**

**}**

**cnt++;**

**if(cnt == 15){**

**cnt =1;**

**}**

**}**

**if(P<0){**

**x = x +1;**

**y =y;**

**P = P + 2\*dy;**

**}**

**else{**

**x= x+1;**

**y = y+1;**

**P = P + 2\*dy - 2\*dx;**

**}**

**}**

**}**

**else{**

**int cnt = 1;**

**for(int i=0;i<=dy;i++){**

**if(t == 1){**

**glBegin(GL\_POINTS);**

**glVertex2i(x,y);**

**glEnd();**

**}**

**if(t == 2){**

**if(i%2==0){**

**glBegin(GL\_POINTS);**

**glVertex2i(x,y);**

**glEnd();**

**}**

**}**

**if(t == 3){**

**if(cnt <= 10){**

**glBegin(GL\_POINTS);**

**glVertex2i(x,y);**

**glEnd();**

**}**

**cnt++;**

**if(cnt == 15){**

**cnt =1;**

**}**

**}**

**if(P<0){**

**x = x;**

**y =y+1;**

**P = P + 2\*dx;**

**}**

**else{**

**x= x+1;**

**y = y+1;**

**P = P + 2\*dx - 2\*dy;**

**}**

**}**

**}**

**cout<<"\n xlast = "<<x<<" ylast = "<<y;**

**glFlush();**

**}**

**void DDA\_LINE(int x\_1,int y\_1,int x\_2,int y\_2, int t){**

**float dx,dy,length;**

**dx = x\_2-x\_1;**

**dy = y\_2-y\_1;**

**if(abs(dx) >= abs(dy)){**

**length = abs(dx);**

**}**

**else{**

**length = abs(dy);**

**}**

**float xin, yin;**

**xin = dx/length;**

**yin = dy/length;**

**float x,y;**

**x = x\_1 + 0.5 \* sign(xin);**

**y = y\_1 + 0.5 \* sign(yin);**

**int i=0;**

**int cnt =1;**

**while(i<=length){**

**if(t == 1){**

**glBegin(GL\_POINTS);**

**glVertex2i(x,y);**

**glEnd();**

**}**

**if(t == 2){**

**if(i%2==0){**

**glBegin(GL\_POINTS);**

**glVertex2i(x,y);**

**glEnd();**

**}**

**}**

**if(t == 3){**

**if(cnt <= 10){**

**glBegin(GL\_POINTS);**

**glVertex2i(x,y);**

**glEnd();**

**}**

**cnt++;**

**if(cnt == 15){**

**cnt =1;**

**}**

**}**

**x = x + xin;**

**y = y + yin;**

**i++ ;**

**}**

**glFlush();**

**}**

**void display()**

**{**

**DDA\_LINE(0,240,640,240,1);**

**B\_Line(320,0,320,640,1);**

**glFlush();**

**}**

**void mymouse(int b,int s, int x, int y)**

**{**

**static int x\_s,y\_s,x\_e,y\_e,pt=0;**

**if(b==GLUT\_LEFT\_BUTTON && s==GLUT\_DOWN)**

**{**

**if(pt==0)**

**{**

**x\_s =x;**

**y\_s =480 - y;**

**pt++;**

**glBegin(GL\_POINTS);**

**glVertex2i(x\_s,y\_s);**

**glEnd();**

**}**

**else**

**{**

**x\_e=x;**

**y\_e=480-y;**

**cout<<"\n x\_1\_click "<<x\_s<<" y\_1\_click "<<y\_s;**

**cout<<"\n x\_2\_click "<<x\_e<<" y\_2\_click "<<y\_e<<"\n";**

**glBegin(GL\_POINTS);**

**glVertex2i(x\_e,y\_e);**

**glEnd();**

**if(Algo == 1){**

**DDA\_LINE(x\_s,y\_s,x\_e,y\_e,type);**

**}**

**if(Algo == 2){**

**B\_Line(x\_s,y\_s,x\_e,y\_e,type);**

**}**

**}**

**}**

**else if(b==GLUT\_RIGHT\_BUTTON && s==GLUT\_DOWN)**

**{**

**pt=0;**

**}**

**glFlush();**

**}**

**int main(int argc ,char \*\*argv)**

**{**

**cout<<"\n Select the Algorithm \n 1. DDA \n 2. Bresenham's \n";**

**cin>>Algo;**

**cout<<"Select the Line Type \n 1. Simple Line \n 2. Dotted Line\n 3. Dashed Line \n";**

**cin>>type;**

**if((Algo == 1 || Algo == 2 )&&(type==1 || type==2 || type==3)){**

**}**

**else{**

**cout<<"\n Option enter are wrong \n";**

**return 0;**

**}**

**glutInit(&argc,argv);**

**glutInitDisplayMode(GLUT\_SINGLE|GLUT\_RGB);**

**glutInitWindowPosition(100,100);**

**glutInitWindowSize(640,480);**

**glutCreateWindow("DDA-Line");**

**Init();**

**glutDisplayFunc(display);**

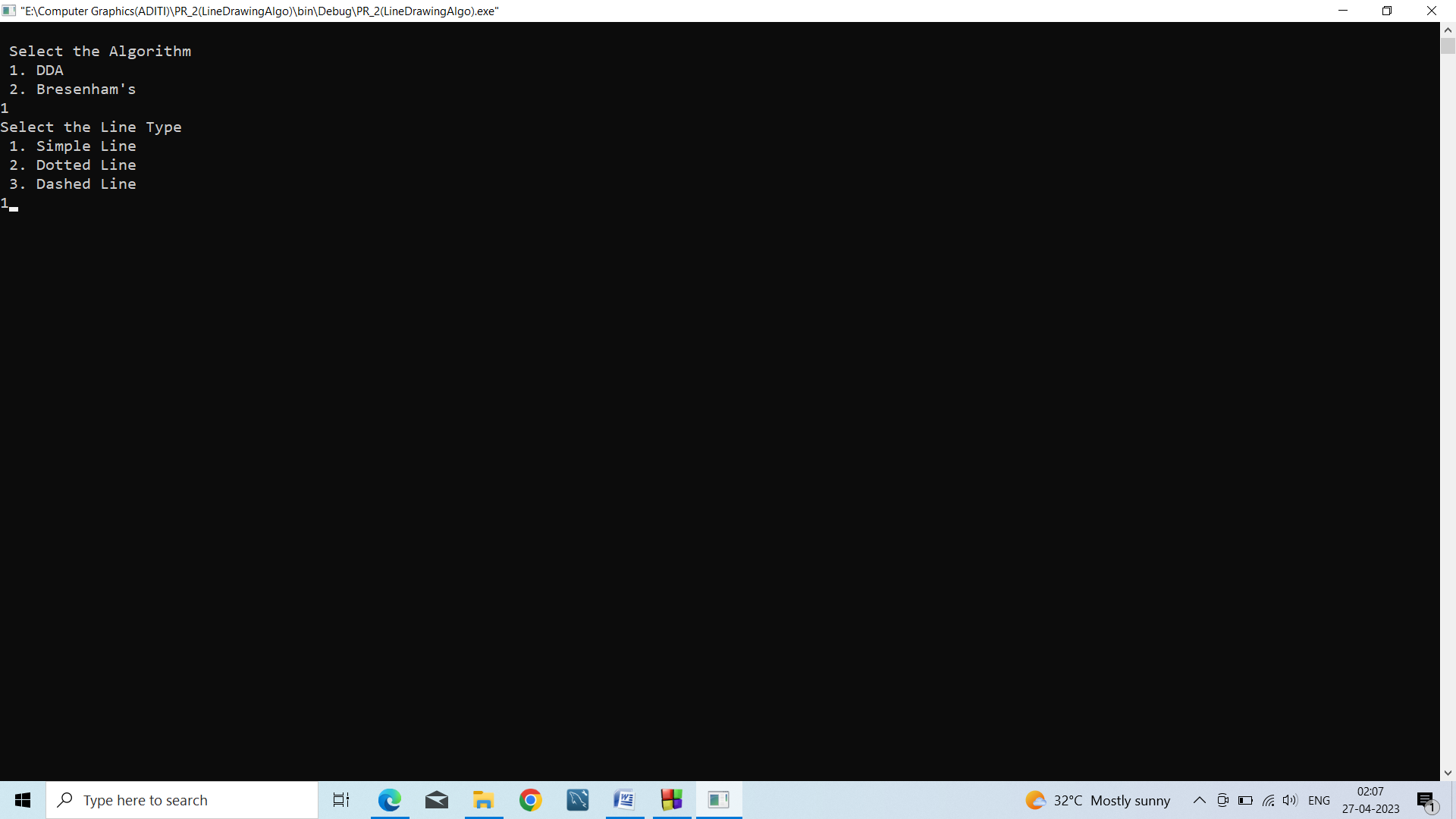
**glutMouseFunc(mymouse);**

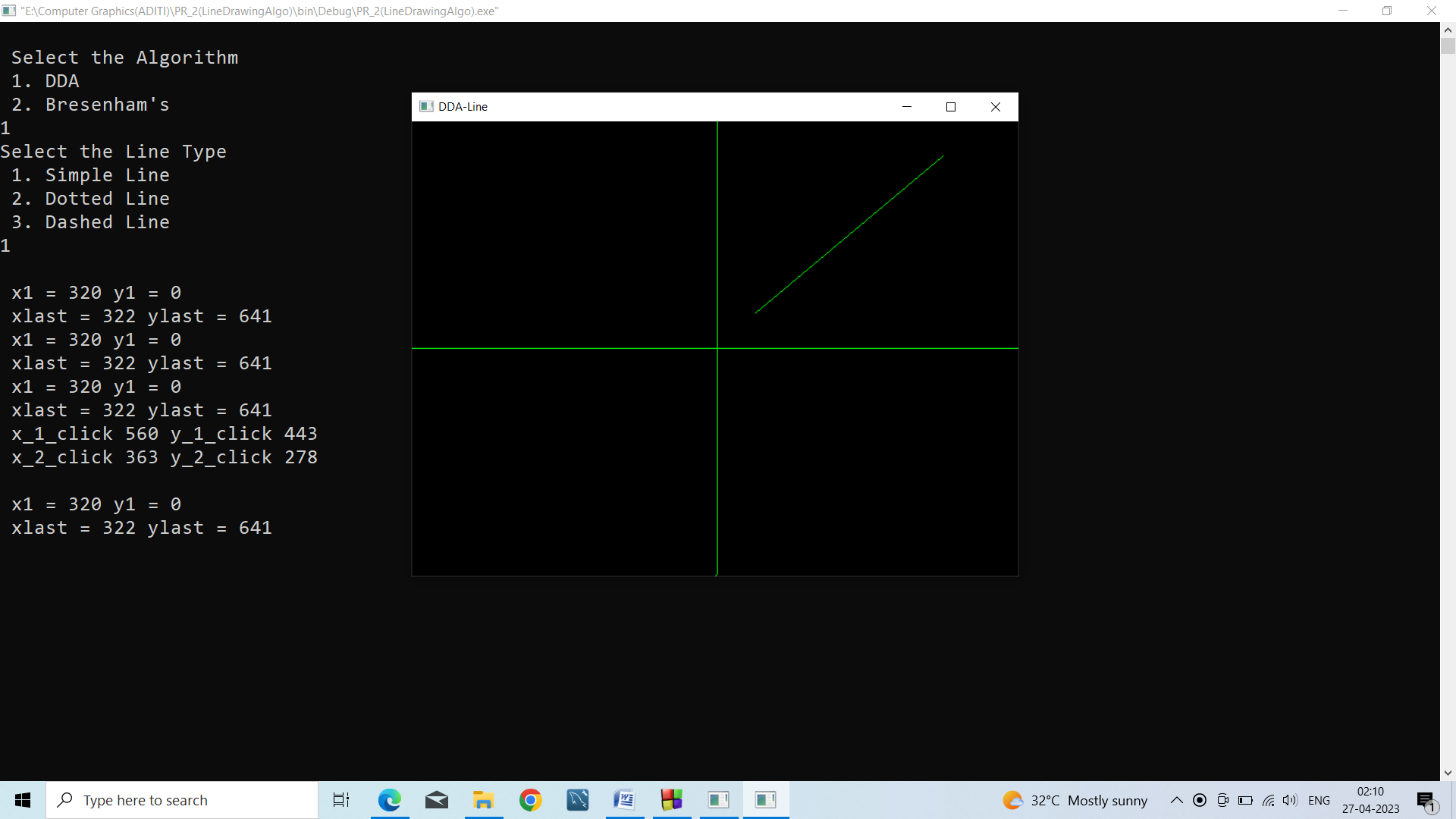
**glutMainLoop();**

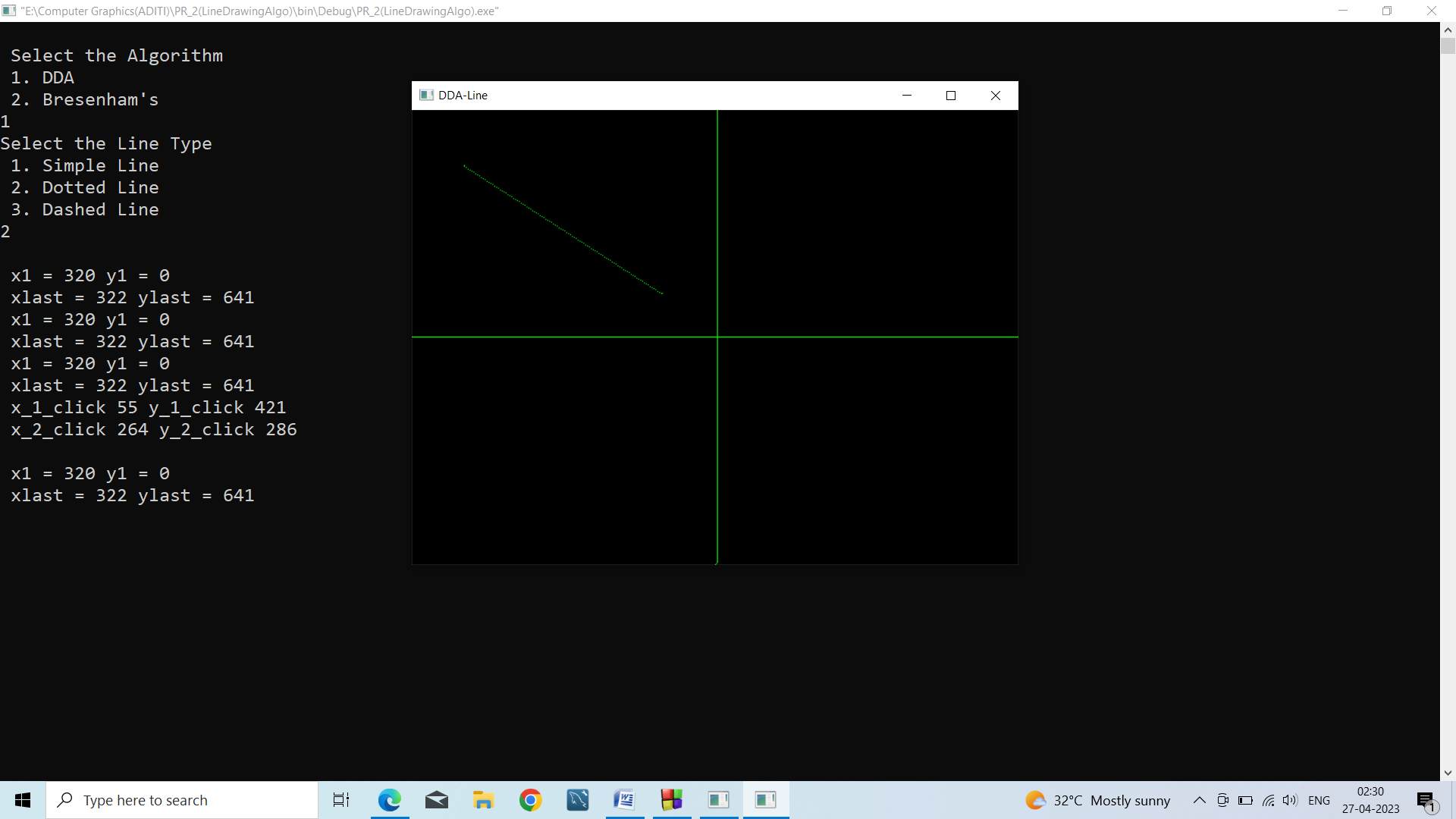
**return 0;**

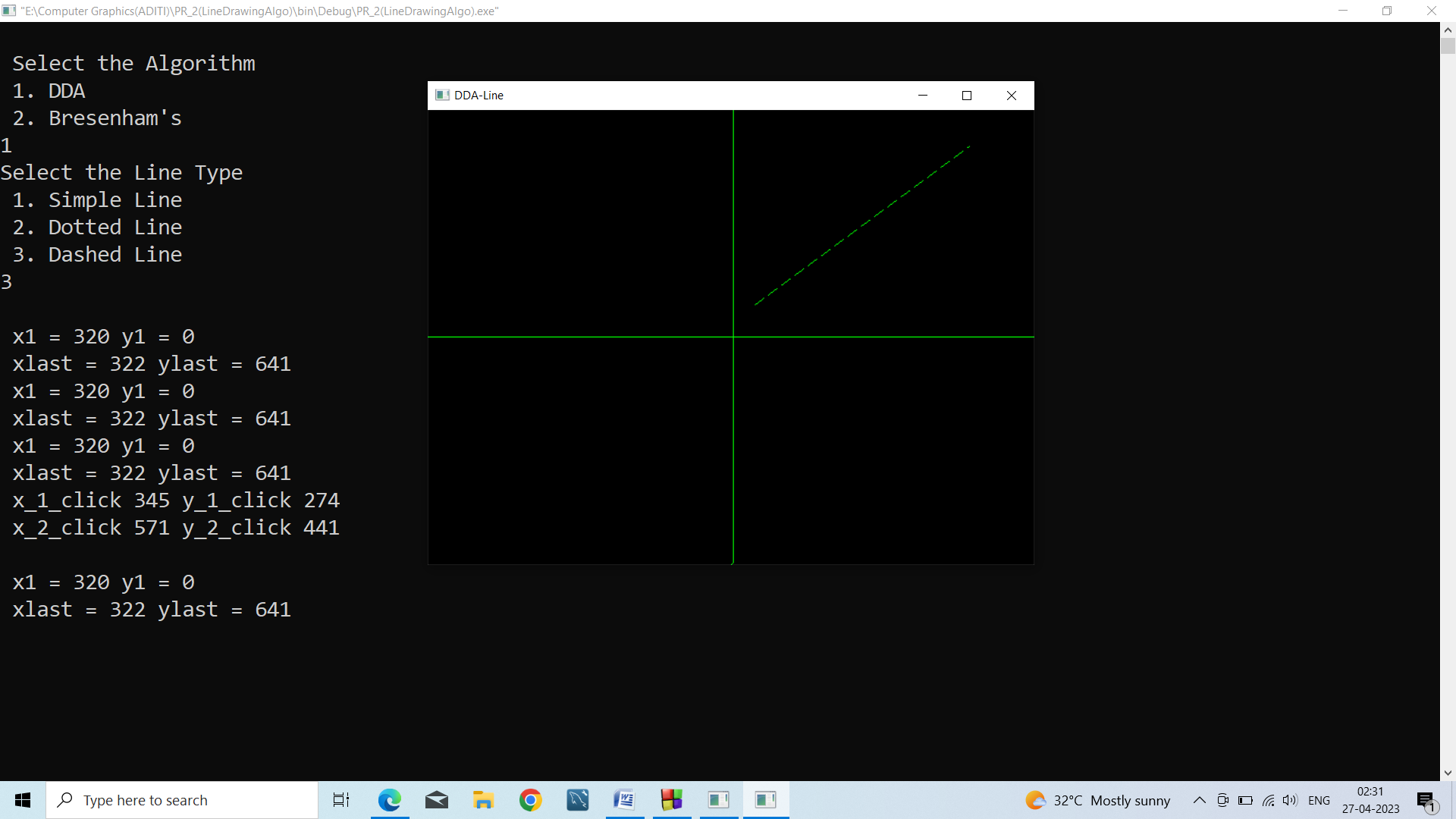
**}**

**Output:**

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