Experiment No 2

Title 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.

```
#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;
```

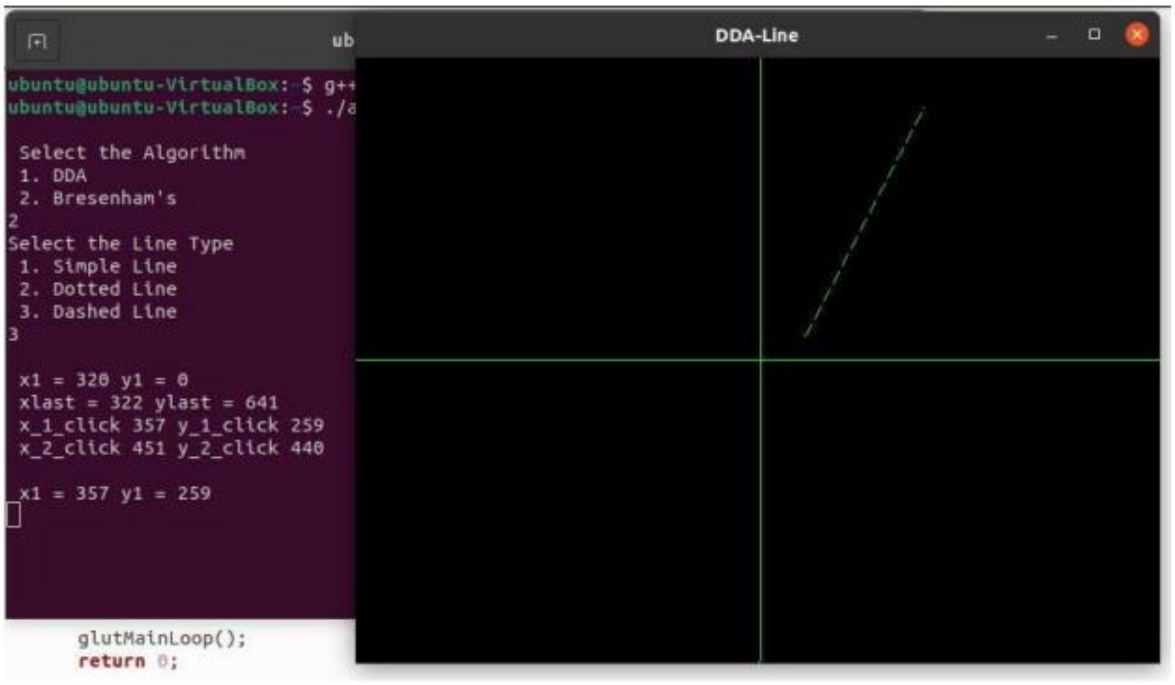
```
dy = y_2-y_1;
if(abs(dx) >= abs(dy)){
length = abs(dx);
}
else{
length = abs(dy);
}
float xin, yin;
xin = dx/length;
yin = dy/length;
float x,y;
x = x_1 + 0.5 * sign(xin);
y = y_1 + 0.5 * sign(yin);
int i=0;
int cnt =1;
while(i<=length){
if(t == 1){
glBegin(GL_POINTS);
glVertex2i(x,y);
glEnd();
}
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

```
g++ filename.cpp -lGL -lGLU -lglut
./a.out
```



```
ubuntu@ubuntu-VirtualBox:~$ g++
ubuntu@ubuntu-VirtualBox:~$ ./a

 Select the Algorithm
 1. DDA
 2. Bresenham's
2
Select the Line Type
 1. Simple Line
 2. Dotted Line
 3. Dashed Line
3

 x1 = 320 y1 = 0
 xlast = 322 ylast = 641
 x_1_click 357 y_1_click 259
 x_2_click 451 y_2_click 440

 x1 = 357 y1 = 259
```

```
      glutMainLoop();
      return 0;
```