SSN COLLEGE OF ENGINEERING

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

UCS1712 – GRAPHICS AND MULTIMEDIA LAB

EX NO: 7 – Cohen Sutherland Line Clipping Algorithm

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AIM:

To write a C++ program using OPENGL to clip a line using Cohen – Sutherland line clipping algorithm.

ALGORITHM:

1.Create a cpp file
2. Import the libraries required for OPEN GL
3. Initialise the display by setting the dimensions 600×600.
4.Clear the display by making the colour white
5.Read the co-oridantes of vertices (xi, yi) for all the vertices.
6.Read window coordinates xwmin , ywmin , xwmax, ywmax
7.Read line coordinates xd1 , yd1 , xd2, yd2
8.If ((c & 8)>0) perform horizontal top intersection.
9.If ((c & 4)>0) perform horizontal bottom intersection.
10.If ((c & 2)>0) perform horizontal right intersection.
11.f ((c & 1)>0) perform horizontal left intersection.
10.While executing on pressing x perform clipping.
11.Display clipped line.

CODE:

```
#include <iostream>
#include<GLUT/GLUT.h>
#include<math.h>
using namespace std;
void display();
float xmin=-150;
float ymin=-200;
```

```
float xmax=150;
float ymax=200;
float xd1,yd1,xd2,yd2;
void init(void)
{
   glClearColor(0,0,0,0);
   glMatrixMode(GL_PROJECTION);
   gluOrtho2D(-300,300,-300,300);

}

int code(float x,float y)
{
   int c=0;
   if(y>ymax)c=8;
   if(y<ymin)c=4;
   if(x>xmax)c=c|2;
   if(x<xmin)c=c|1;
   return c;
}

void cohen_line(float x1,float y1,float x2,float y2)
{
   int c1=code(x1,y1);
   int c2=code(x2,y2);
   float m =(y2-y1)/(x2-x1);
   while((c1|c2)>0)
   {
      if((c1 & c2)>0)
      {
         exit(0);
      }
      float xi=x1;float yi=y1;
      int c=c1;
      if(c==0)
      {
         c=c2;
         xi=x2;
         yi=y2;
      }
      float x,y;
      if((c & 8)>0)
      {
         y=ymax;//horizontal top intersection
```

```
            x=xi+1.0/m*(ymax-yi);
        }
        else
            if((c & 4)>0)
            {
                y=ymin;//horizontal bottom intersection
                x=xi+1.0/m*(ymin-yi);
            }
        else
          if((c & 2)>0)
          {
              x=xmax;//vertical right intersection
              y=yi+m*(xmax-xi);
          }
        else
            if((c & 1)>0)
          {
              x=xmin;//vertical left intersection
              y=yi+m*(xmin-xi);
          }
        if(c==c1)
        {
            xd1=x;
            yd1=y;
            c1=code(xd1,yd1);
        }
        if(c==c2)
        {
            xd2=x;
            yd2=y;
            c2=code(xd2,yd2);
        }
    }
    display();
}
void mykey(unsigned char key,int x,int y)
{
    if(key== 'x')
    {
        cout<<"COHEN - CLIPPING";
        cohen_line(xd1,yd1,xd2,yd2);
        glFlush();
    }
}
```

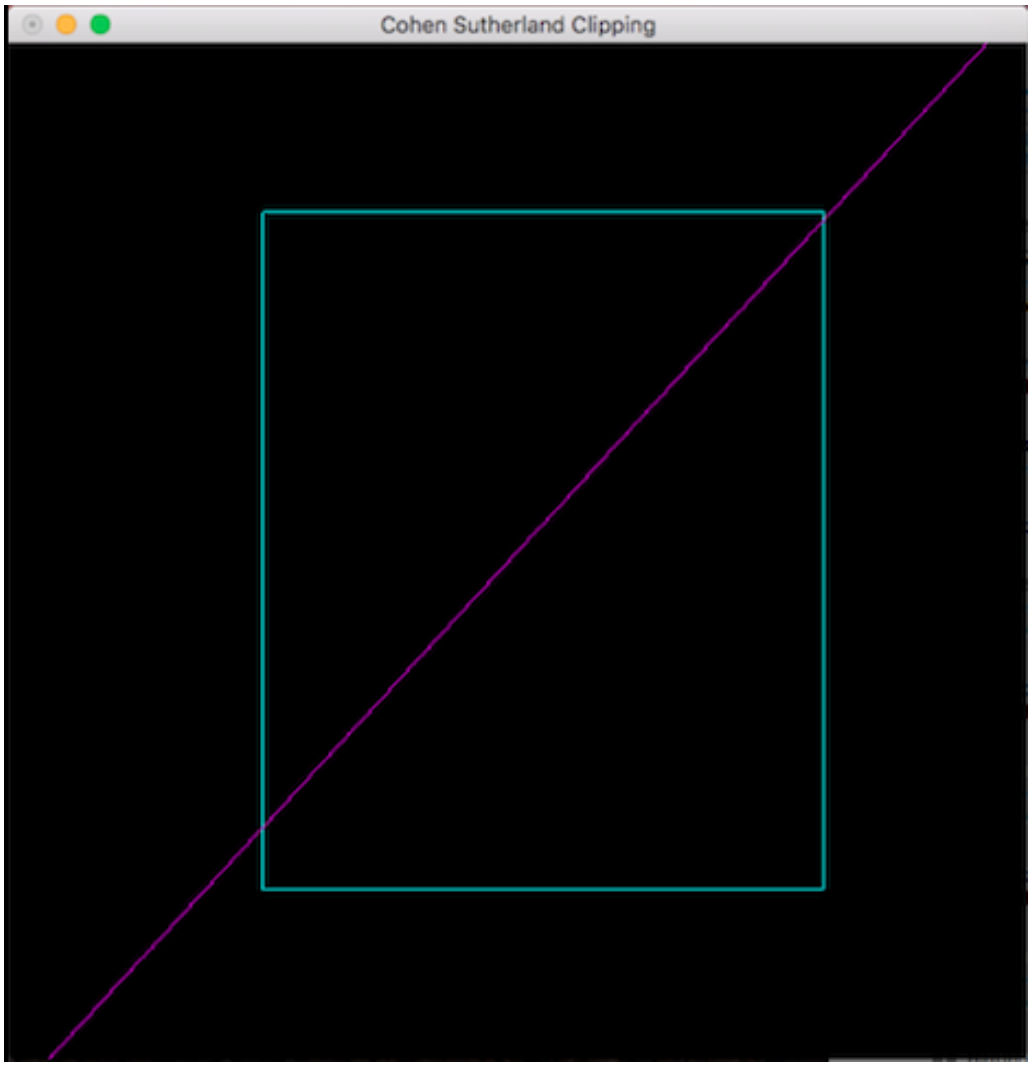
```
void display()
{
   glClear(GL_COLOR_BUFFER_BIT);
   glColor3f(0.0,1.0,1.0);
   glBegin(GL_LINE_LOOP);
   glVertex2i(xmin,ymin);
   glVertex2i(xmin,ymax);
   glVertex2i(xmax,ymax);
   glVertex2i(xmax,ymin);
   glEnd();
   glColor3f(1.0,0.0,1.0);
   glBegin(GL_LINES);
   glVertex2i(xd1,yd1);
   glVertex2i(xd2,yd2);
   glEnd();
   glFlush();
}

int main(int argc, char** argv) {
   cout<<"Cohen Sutherland Clipping\n";
   cout<<"Enter window Co-ordinates:";
   cin>>xmin>>xmax>>ymin>>ymax;
   cout<<"Enter line Co-ordinates:";
   cin>>xd1>>yd1>>xd2>>yd2;
   glutInit(&argc,argv);
   glutInitDisplayMode(GLUT_SINGLE|GLUT_RGB);
   glutInitWindowSize(600,600);
   glutInitWindowPosition(0,0);
   glutCreateWindow("Cohen Sutherland Clipping");
   glutDisplayFunc(display);
   glutKeyboardFunc(mykey);
   init();
   glutMainLoop();
   return 0;
}
```

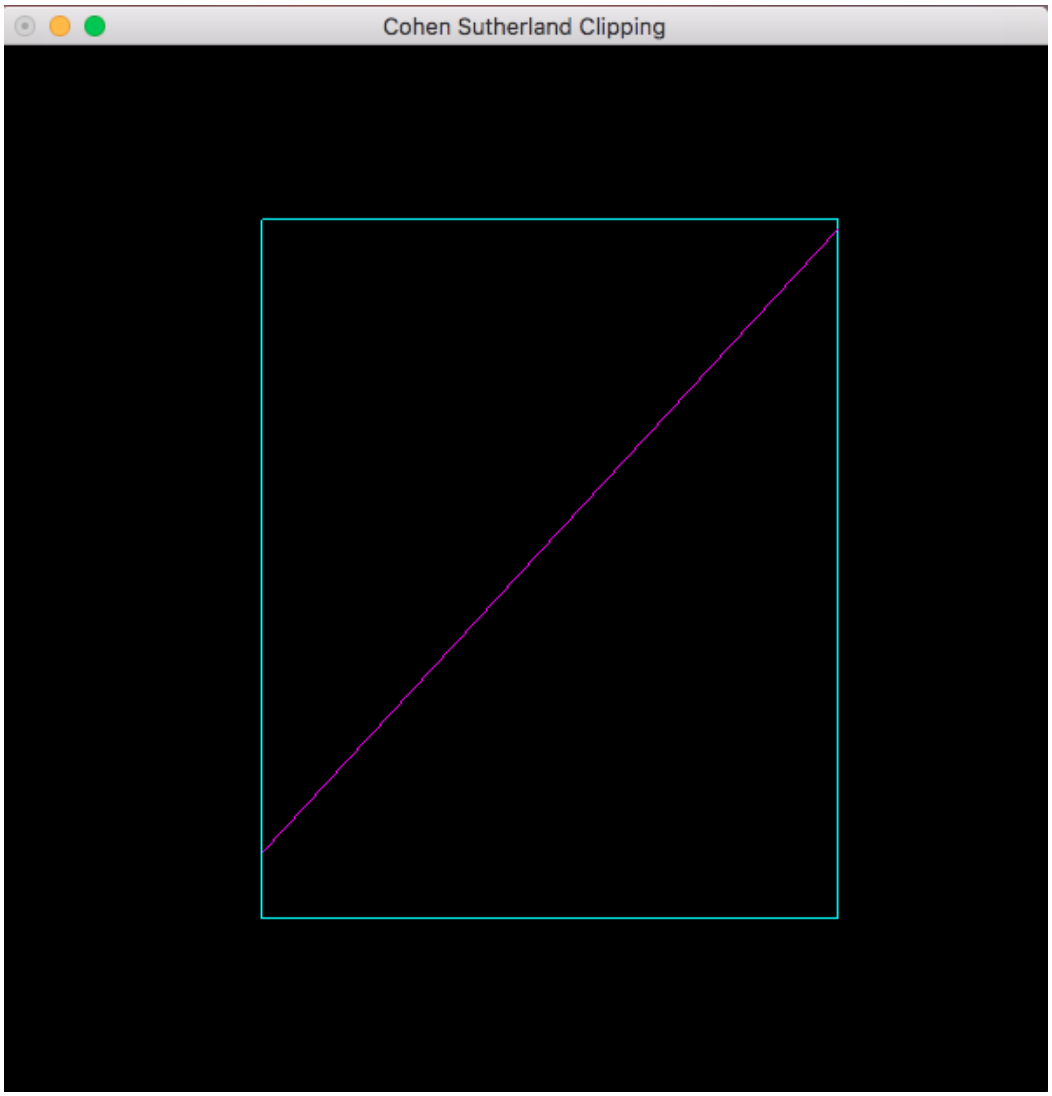
OUTPUT:

```
Cohen Sutherland Clipping
Enter window Co-ordinates:-150 180
-200 200
Enter line Co-ordinates:350 380
-350 -380
```

Initial:



After Clipping:



RESULT:

A C++ program using OPENGL to clip a line using Cohen – Sutherland line clipping algorithm has been implemented successfully.