Practical 10

Task 1 : Write a program to demonstrate Cohen Sutherland algorithm.

Source Code:

```
#include<stdio.h>
#include<graphics.h>

//Get coords location WRT to viewport

int getLocationIdea(float viewport_minx,float viewport_miny,float
viewport_maxx,float viewport_maxy,float x,float y)
{
 int location=0;
 if(x<viewport_minx)
 location |= 1;
 else if(x>viewport_maxx)
 location |= 2;
 if(y<viewport_miny)
 location |= 4;
 else if(y>viewport_maxy)
 location |= 8;
 return location;
}
int main()
{
 int gd = DETECT,gm;
 float xa,ya,xb,yb,xao,yao,xbo,ybo;
 float xatp,yatp,xbtp,ybtp;
 float viewport_minx,viewport_miny,viewport_maxx,viewport_maxy;
 printf("Enter the lower end diagnol coords of viewport\n");
 scanf("%f %f",&viewport_minx,&viewport_miny);
 printf("Enter the upper end diagnol coords of viewport\n");
 scanf("%f %f",&viewport_maxx,&viewport_maxy);
 printf("Enter the Line coords to plot\n");
 printf("Enter the starting point");
 scanf("%f %f",&xa,&ya);
 printf("Enter the ending point");
 scanf("%f %f",&xb,&yb);
 xatp=xa,xbtp=xb,yatp=ya,ybtp=yb;
 xao=xa,ybo=yb,yao=ya,xbo=xb;
```

```
  int locp1 =
getLocationIdea(viewport_minx,viewport_miny,viewport_maxx,viewport_max
y,xa,ya);
  int locp2 =
getLocationIdea(viewport_minx,viewport_miny,viewport_maxx,viewport_max
y,xb,yb);
  printf("%d %d \n",locp1,locp2 );
  if((locp1==0) && (locp2==0))
  {
    xatp=xa,xbtp=xb,yatp=ya,ybtp=yb;
  }
  else if((locp1&locp2) == 0 )
  {
    while((locp1&4) !=0)
    {
      xatp = xa + (((xb-xa)*(viewport_miny-ya))/(yb-ya));
      yatp = viewport_miny;
      xa=xatp;
      ya=yatp;

locp1=getLocationIdea(viewport_minx,viewport_miny,viewport_maxx,viewpo
rt_maxy,xa,ya);
    }
    while((locp1&8) != 0)
    {
      xatp = xa + (((xb-xa)*(viewport_maxy-ya))/(yb-ya));
      yatp = viewport_maxy;
      xa=xatp;
      ya=yatp;

locp1=getLocationIdea(viewport_minx,viewport_miny,viewport_maxx,viewpo
rt_maxy,xa,ya);
    }
    while((locp1&1) != 0)
    {
      xatp = viewport_minx;
      yatp = ya + (((yb-ya)*(viewport_minx-xa))/(xb-xa));
      xa=xatp;
      ya=yatp;

locp1=getLocationIdea(viewport_minx,viewport_miny,viewport_maxx,viewpo
rt_maxy,xa,ya);
    }
    while((locp1&2) != 0)
    {
```

```
      xatp = viewport_maxx;
      yatp = ya + (((yb-ya)*(viewport_maxx-xa))/(xb-xa));
      xa=xatp;
      ya=yatp;

locp1=getLocationIdea(viewport_minx,viewport_miny,viewport_maxx,viewpo
rt_maxy,xa,ya);
    }


    while((locp2&4) !=0)
    {
      xbtp = xa + (((xb-xa)*(viewport_miny-ya))/(yb-ya));
      ybtp = viewport_miny;
      xb=xbtp;
      yb=ybtp;

locp2=getLocationIdea(viewport_minx,viewport_miny,viewport_maxx,viewpo
rt_maxy,xb,yb);
    }
    while((locp2&8) != 0)
    {
      xbtp = xa + (((xb-xa)*(viewport_maxy-ya))/(yb-ya));
      ybtp = viewport_maxy;
      xb=xbtp;
      yb=ybtp;

locp2=getLocationIdea(viewport_minx,viewport_miny,viewport_maxx,viewpo
rt_maxy,xb,yb);
    }
   while((locp2&1) != 0)
    {
      xbtp = viewport_minx;
      ybtp = ya + (((yb-ya)*(viewport_minx-xa))/(xb-xa));
      xb=xbtp;
      yb=ybtp;

locp2=getLocationIdea(viewport_minx,viewport_miny,viewport_maxx,viewpo
rt_maxy,xb,yb);
    }
    while((locp2&2) != 0)
    {
      xbtp = viewport_maxx;
      ybtp = ya + (((yb-ya)*(viewport_maxx-xa))/(xb-xa));
      xb=xbtp;
```

```
      yb=ybtp;

locp2=getLocationIdea(viewport_minx,viewport_miny,viewport_maxx,viewpo
rt_maxy,xb,yb);
    }

  }
  else
  {
    xatp=0,xbtp=0,yatp=0,ybtp=0;
  }
  printf("%f %f %f %f\n",xatp,xbtp,yatp,ybtp);
  initgraph(&gd,&gm,NULL);
  //Draw viewport
  line(viewport_minx,viewport_miny,viewport_maxx,viewport_miny);
  line(viewport_minx,viewport_miny,viewport_minx,viewport_maxy);
  line(viewport_minx,viewport_maxy,viewport_maxx,viewport_maxy);
  line(viewport_maxx,viewport_miny,viewport_maxx,viewport_maxy);
  line(xatp,yatp,xbtp,ybtp);
  setlinestyle(DASHED_LINE,2,THICK_WIDTH);
  line(xao,yao,xbo,ybo);
  delay(5000);
  return 0;
}
```

Output:

```
adnrs96@Aditya-HP-ENVY-15-Notebook-PC: /media/adnrs96/Local Disk/Local Disk(G)/CG 80x24
[xcb] Aborting, sorry about that.
a.out: ../../src/xcb_io.c:274: poll_for_event: Assertion `!xcb_xlib_threads_sequence_lost' failed.
adnrs96@Aditya-HP-ENVY-15-Notebook-PC:/media/adnrs96/Local Disk/Local Disk(G)/CG
$ gcc prac_10_cohen_Sutherland_algo.c -lgraph
adnrs96@Aditya-HP-ENVY-15-Notebook-PC:/media/adnrs96/Local Disk/Local Disk(G)/CG
$ ./a.out
Enter the lower end diagnol coords of viewport
200 200
Enter the upper end diagnol coords of viewport
400 400
Enter the Line coords to plot
Enter the starting point10 10
Enter the ending point480 480
5 10
200.000000 400.000000 200.000000 400.000000
[xcb] Unknown sequence number while processing queue
[xcb] Most likely this is a multi-threaded client and XInitThreads has not been called
[xcb] Aborting, sorry about that.
a.out: ../../src/xcb_io.c:274: poll_for_event: Assertion `!xcb_xlib_threads_sequence_lost' failed.
adnrs96@Aditya-HP-ENVY-15-Notebook-PC:/media/adnrs96/Local Disk/Local Disk(G)/CG
$
```