

CG-Assignment

Liang Barsky Line Clipping Algorithm

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LIANG BARSKY LINE CLIPPING ALGORITHM

Aim: To implement Liang Barsky line clipping algorithm.

Algorithm:

the coordinates of line are x_1, y_1, x_2, y_2

rectangle ($x_{min}, y_{min}, x_{max}, y_{max}$);

making $p[4]$ and $q[4]$

$$p[0] = (-1) * (x_2 - x_1)$$

$$q[0] = x_1 - x_{min}$$

$$p[1] = x_2 - x_1$$

$$q[1] = x_{max} - x_1$$

$$p[2] = (-1) * (y_2 - y_1)$$

$$q[2] = y_1 - y_{min}$$

$$p[3] = y_2 - y_1$$

$$q[3] = y_{max} - y_1$$

$$q[3] = y_{max} - y_1$$

loop(i):

if $p[i] = 0$, the line is parallel

if $q[i] > 0$

if $(i < 2)$

if $(y_1 < y_{min})$

$y_1 = y_{min}$

... accordingly we set condition to clip for conditions for y_2 being $> y_{max}$ and following same for x_2 and x_1 , in the case of parallel line.

$$t_1 = 0$$

$$t_2 = 1$$

P.T.O.

for ($i < 4$) : { $llie = 0$, $i++$

temp = $q[i] / p[i]$

if ($p[i] < 0$)

if ($t1 \leq temp$)

$t1 = temp$

else

if ($t2 > temp$)

$t2 = temp$ }

if ($t1 < t2$)

$xx1 = x1 + t1 * p[1]$

$xx2 = x1 + t2 * p[1]$

$yy1 = y1 + t1 * p[3]$

$yy2 = y1 + t2 * p[3]$

line($xx1, yy1, xx2, yy2$);

line has been clipped

else

there was no need to clip the line

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Program:

Implementing Liang Barsky line clipping algorithm in C

Code:

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

void main(){
    int gd = DETECT, gm;
    int x1,y1,x2,y2,xwmin,ywmin,xwmax,ywmax,i;
    int xx1,yy1,xx2,yy2,status;
    float t1,t2,p[4],q[4],temp;
    initgraph(&gd, &gm, "C:\\\\TURBOC3\\\\BGI");
    printf("Enter the coordinates for line:(xmin = ymin = 100,
xmax = ymax = 250)\n");
    scanf("%d%d%d%d",&x1,&y1,&x2,&y2);
    xwmin = ywmin = 100;
    xwmax = ywmax = 250;
    rectangle(xwmin,ywmin,xwmax,ywmax);
    p[0] = (-1)*(x2-x1);
    q[0] = x1-xwmin;
    p[1] = x2-x1;
    q[1] = xwmax-x1;
    p[2] = (-1)*(y2-y1);
    q[2] = y1-ywmin;
    p[3] = y2-y1;
    q[3] = ywmax-y1;
    for(i=0;i<4;i++){
        if(p[i]==0){
            printf("Line is parallel\n");
            if(q[i]>=0){
                if(i<2){
                    if(y1<ywmin){
                        y1 = ywmin;
                    }
                    if(y2>ywmax){
                        y2 = ywmax;
                    }
                }
                line(x1,y1,x2,y2);
            }
        }
        if(i>1){
            if(x1<xwmin){
                x1 = xwmin;
            }
            if(x2>xwmax){
                x2 = xwmax;
            }
        }
    }
}
```

```

        }
        line(x1,y1,x2,y2);
    }
}

t1=0;
t2=1;

for(i=0;i<4;i++){
    temp = q[i]/p[i];
    if(p[i]<0){
        if(t1<=temp)
            t1=temp;
        }else{
            if(t2>temp)
                t2=temp;
        }
    }
    if(t1<t2){
        xx1 = x1 + t1*p[1];
        xx2 = x1 + t2*p[1];
        yy1 = y1 + t1*p[3];
        yy2 = y1 + t2*p[3];
        line(xx1,yy1,xx2,yy2);
        printf("Line clipped");
        setcolor(6);
        line(x1,y1,xx1,yy1);
    }else{
        printf("Line not clipped");
    }
}

printf("\n\n\n\n\n\nHriday Keswani\n2003088\nC-21");

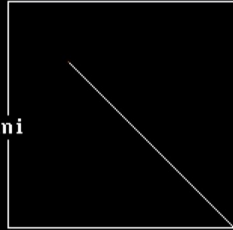
getch();
clrscr();}

```

Output:

```
Enter the coordinates for line:(xmin = ymin = 100, xmax = ymax = 250)
140
140
270
270
Line clipped
```

```
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```



```
Enter the coordinates for line:(xmin = ymin = 100, xmax = ymax = 250)
250
250
300
300
Line not clipped
```

```
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```



