Experiment No 5

Title Implement Cohen Sutherland polygon clipping method to clip the polygon with respect the viewport and window. Use mouse click, keyboard interface

#include <iostream>

#include <math.h>

#include <time.h>

#include <GL/glut.h>

using namespace std;

int wxmin = 200,wxmax=500,wymax=350, wymin=100;

int points[10][2];

int edge;

void init(){

glClearColor(1.0,1.0,1.0,0.0);

glMatrixMode(GL\_PROJECTION);

gluOrtho2D(0,640,0,480);

glClear(GL\_COLOR\_BUFFER\_BIT);

}

void Draw(){

glClearColor(1.0,1.0,1.0,0.0);

glClear(GL\_COLOR\_BUFFER\_BIT);

glColor3f(0.2,0.2,1);

glBegin(GL\_POLYGON);

for(int i=0; i<edge; i++)

{

glVertex2i(points[i][0],points[i][1]);

}

glEnd();

glFlush();

glColor3f(0,1,0);

glBegin(GL\_LINE\_LOOP);

glVertex2i(200,100);

glVertex2i(500,100);

glVertex2i(500,350);

glVertex2i(200,350);

glEnd();

glFlush();

}

int BottomCliping(int e){

float m=0;

int x=0,k=0;

int t[10][2];

for(int i=0; i<e; i++){

if(points[i][1] < wymin){

if(points[i+1][1] < wymin){

}

else if(points[i+1][1] > wymin){

float x1,x2;

float y1,y2;

x1 = points[i][0];

y1 = points[i][1];

x2 = points[i+1][0];

y2 = points[i+1][1];

x = ((1/((y2-y1)/(x2-x1))) \* (wymin - y1) )+ x1;

t[k][0] = x;

t[k][1] = wymin;

k++;

}

}

else if(points[i][1]>wymin){

if(points[i+1][1] > wymin){

t[k][0] = points[i][0];

t[k][1] = points[i][1];

k++;

}

else if(points[i+1][1] < wymin){

float x1,x2;

float y1,y2;

x1 = points[i][0];

y1 = points[i][1];

x2 = points[i+1][0];

y2 = points[i+1][1];

x = ((1/((y2-y1)/(x2-x1))) \* (wymin - y1) )+ x1;

t[k][0] = x1;

t[k][1] = y1;

k++;

t[k][0] = x;

t[k][1] = wymin;

k++;

}

}

}

cout<<"k = "<<k;

for(int i=0; i<10;i++)

{

points[i][0] = 0;

points[i][1] = 0;

}

for(int i=0; i<k;i++)

{

cout<<"\n"<<t[i][0]<<" "<<t[i][1];

points[i][0] = t[i][0];

points[i][1] = t[i][1];

}

points[k][0] = points[0][0];

points[k][1] = points[0][1];

return k;

}

int TopCliping(int e){

float m=0;

int x=0,k=0;

int t[10][2];

for(int i=0; i<e; i++){

if(points[i][1] > wymax){

if(points[i+1][1] > wymax){

}

else if(points[i+1][1] < wymax){

float x1,x2;

float y1,y2;

x1 = points[i][0];

y1 = points[i][1];

x2 = points[i+1][0];

y2 = points[i+1][1];

x = ((1/((y2-y1)/(x2-x1))) \* (wymax - y1) )+ x1;

t[k][0] = x;

t[k][1] = wymax;

k++;

}

}

else if(points[i][1]<wymax){

if(points[i+1][1] < wymax){

t[k][0] = points[i][0];

t[k][1] = points[i][1];

k++;

}

else if(points[i+1][1] > wymax){

float x1,x2;

float y1,y2;

x1 = points[i][0];

y1 = points[i][1];

x2 = points[i+1][0];

y2 = points[i+1][1];

x = ((1/((y2-y1)/(x2-x1))) \* (wymax - y1) )+ x1;

t[k][0] = x1;

t[k][1] = y1;

k++;

t[k][0] = x;

t[k][1] = wymax;

k++;

}

}

}

cout<<"k = "<<k;

for(int i=0; i<10;i++)

{

points[i][0] = 0;

points[i][1] = 0;

}

for(int i=0; i<k;i++)

{

cout<<"\n"<<t[i][0]<<" "<<t[i][1];

points[i][0] = t[i][0];

points[i][1] = t[i][1];

}

points[k][0] = points[0][0];

points[k][1] = points[0][1];

return k;

}

int leftCliping(int e){

float m=0;

int y=0, k = 0;

int t[10][2];

for(int i=0;i<e;i++)

{

if(points[i][0] < wxmin){

if(points[i+1][0] < wxmin){

cout<<"\n Test 1";

}

else if (points[i+1][0] > wxmin){

cout<<"\n Test 2";

float x1,x2;

float y1,y2;

x1 = points[i][0];

y1 = points[i][1];

x2 = points[i+1][0];

y2 = points[i+1][1];

y = (((y2-y1)/(x2-x1)) \* (wxmin - x1) )+ y1;

t[k][0] = wxmin;

t[k][1] = y;

k++;

}

}

else if(points[i][0] > wxmin){

if(points[i+1][0] > wxmin){

t[k][0] = points[i][0];

t[k][1] = points[i][1];

k++;

}

else if(points[i+1][0] < wxmin){

float x1,x2;

float y1,y2;

x1 = points[i][0];

y1 = points[i][1];

x2 = points[i+1][0];

y2 = points[i+1][1];

y = ((y2-y1)/(x2-x1)\*(wxmin - x1)) + y1;

t[k][0] = x1;

t[k][1] = y1;

k++;

t[k][0] = wxmin;

t[k][1] = y;

k++;

}

}

}

cout<<"k = "<<k;

for(int i=0; i<10;i++)

{

points[i][0] = 0;

points[i][1] = 0;

}

for(int i=0; i<k;i++)

{

cout<<"\n"<<t[i][0]<<" "<<t[i][1];

points[i][0] = t[i][0];

points[i][1] = t[i][1];

}

points[k][0] = points[0][0];

points[k][1] = points[0][1];

return k;

}

int RightCliping(int e){

float m=0;

int y=0, k = 0;

int t[10][2];

for(int i=0;i<e;i++)

{

if(points[i][0] > wxmax){

if(points[i+1][0] > wxmax){

}

else if(points[i+1][0] < wxmax){

float x1,x2;

float y1,y2;

x1 = points[i][0];

y1 = points[i][1];

x2 = points[i+1][0];

y2 = points[i+1][1];

y = (((y2-y1)/(x2-x1)) \* (wxmax - x1) )+ y1;

t[k][0] = wxmax;

t[k][1] = y;

k++;

}

}

else if(points[i][0] < wxmax){

if(points[i+1][0] < wxmax){

t[k][0] = points[i][0];

t[k][1] = points[i][1];

k++;

}

else if(points[i+1][0] > wxmax){

float x1,x2;

float y1,y2;

x1 = points[i][0];

y1 = points[i][1];

x2 = points[i+1][0];

y2 = points[i+1][1];

y = ((y2-y1)/(x2-x1)\*(wxmax - x1)) + y1;

t[k][0] = x1;

t[k][1] = y1;

k++;

t[k][0] = wxmax;

t[k][1] = y;

k++;

}

}

}

cout<<"k = "<<k;

for(int i=0; i<10;i++)

{

points[i][0] = 0;

points[i][1] = 0;

}

for(int i=0; i<k;i++)

{

cout<<"\n"<<t[i][0]<<" "<<t[i][1];

points[i][0] = t[i][0];

points[i][1] = t[i][1];

}

points[k][0] = points[0][0];

points[k][1] = points[0][1];

return k;

}

void P\_C(){

Draw();

}

void goMenu(int value){

switch(value){

case 1:

edge = leftCliping(edge);

Draw();

break;

case 2:

edge = RightCliping(edge);

Draw();

break;

case 3:

edge = TopCliping(edge);

Draw();

break;

case 4:

edge = BottomCliping(edge);

Draw();

break;

}

glutPostRedisplay();

}

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

cout<<"\n Enter No of edges of polygon ";

cin>>edge;

for(int i=0;i<edge;i++){

cout<<"\n Enter point "<<i<<" x space y ";

cin>>points[i][0]>>points[i][1];

}

points[edge][0] = points[0][0];

points[edge][1] = points[0][1];

glutInit(&argc, argv);

glutInitDisplayMode(GLUT\_SINGLE|GLUT\_RGB);

glutInitWindowSize(640,480);

glutInitWindowPosition(200,200);

glutCreateWindow("Polygon Clipping");

init();

glutCreateMenu(goMenu);

glutAddMenuEntry("Left",1);

glutAddMenuEntry("Right",2);

glutAddMenuEntry("Top",3);

glutAddMenuEntry("Bottom",4);

glutAttachMenu(GLUT\_RIGHT\_BUTTON);

glutDisplayFunc(P\_C);

glutMainLoop();

return 0;

}

Out put

g++ filename.cpp -lGL -lGLU -lglut

./a.out







