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Class: SY IT A1

Assignment 6

Polygon Clipping

Aim: Polygon clipping Algorithm

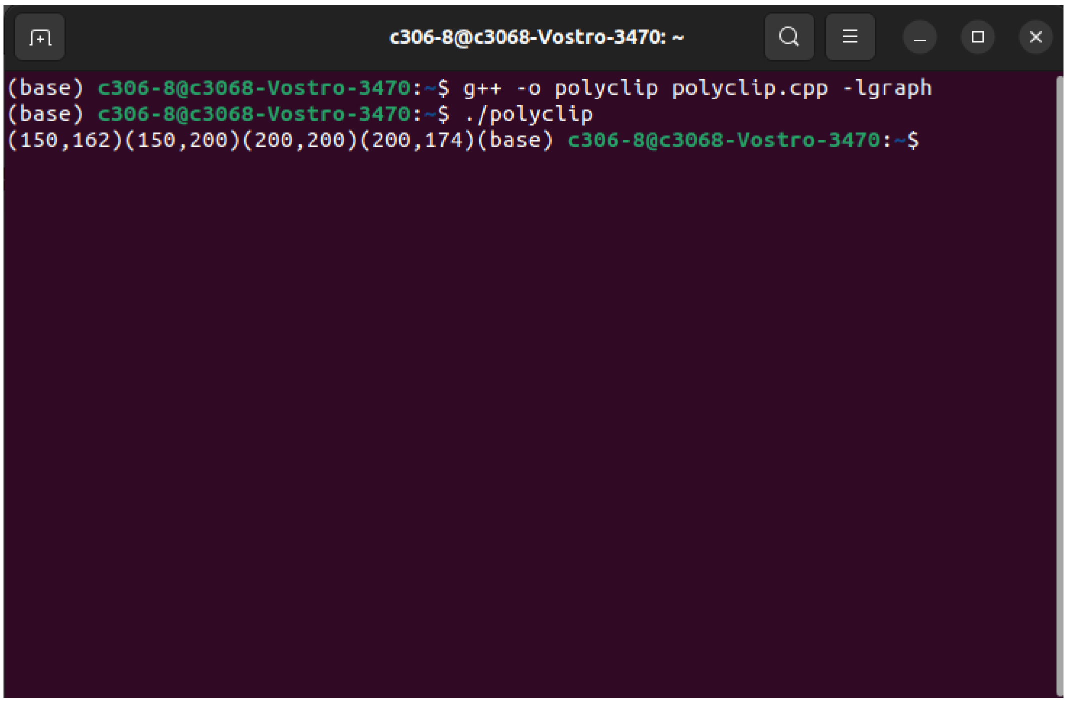
Program:

```
#include <iostream>
using namespace std;
const int MAX_POINTS = 20;

int x_intersect(int x1, int y1, int x2, int y2,int x3, int y3, int x4, int y4)
{
int num = (x1*y2 - y1*x2) * (x3-x4) -
(x1-x2) * (x3*y4 - y3*x4);
int den = (x1-x2) * (y3-y4) - (y1-y2) * (x3-x4);
return num/den;
}

int y_intersect(int x1, int y1, int x2, int y2,
int x3, int y3, int x4, int y4)
{
int num = (x1*y2 - y1*x2) * (y3-y4) -
(y1-y2) * (x3*y4 - y3*x4);
int den = (x1-x2) * (y3-y4) - (y1-y2) * (x3-x4);
return num/den;
}

void clip(int poly_points[][2], int &poly_size,
int x1, int y1, int x2, int y2)
{
int new_points[MAX_POINTS][2], new_poly_size = 0;
for (int i = 0; i < poly_size; i++)
{

int k = (i+1) % poly_size;
int ix = poly_points[i][0], iy = poly_points[i][1];
int kx = poly_points[k][0], ky = poly_points[k][1];

int i_pos = (x2-x1) * (iy-y1) - (y2-y1) * (ix-x1);

int k_pos = (x2-x1) * (ky-y1) - (y2-y1) * (kx-x1);
```

```
if (i_pos < 0 && k_pos < 0)
{

new_points[new_poly_size][0] = kx;
new_points[new_poly_size][1] = ky;
new_poly_size++;

}

else if (i_pos >= 0 && k_pos < 0)
{

new_points[new_poly_size][0] = x_intersect(x1, y1, x2, y2, ix,
iy, kx, ky);
new_points[new_poly_size][1] = y_intersect(x1, y1, x2, y2, ix,
iy, kx, ky);
new_poly_size++;
new_points[new_poly_size][0] = kx;
new_points[new_poly_size][1] = ky;
new_poly_size++;
}

else if (i_pos < 0 && k_pos >= 0)
{

new_points[new_poly_size][0] = x_intersect(x1, y1, x2, y2, ix,iy, kx, ky);
new_points[new_poly_size][1] = y_intersect(x1, y1, x2, y2, ix,iy, kx, ky);
new_poly_size++;
}

}

poly_size = new_poly_size;
for (int i = 0; i < poly_size; i++)
{
poly_points[i][0] = new_points[i][0];
poly_points[i][1] = new_points[i][1];
}
}

void suthHodgClip(int poly_points[][2], int poly_size,
int clipper_points[][2], int clipper_size)
{

for (int i = 0; i < clipper_size; i++)
{
int k = (i + 1) % clipper_size;
```

```
clip(poly_points, poly_size, clipper_points[i][0],
clipper_points[i][1], clipper_points[k][0],
clipper_points[k][1]);

}

for (int i = 0; i<poly_size; i++)
cout<< "(" << poly_points[i][0] << "," << poly_points[i][1] << ")";
}

int main()
{

int poly_size = 3;
int poly_points[20][2] = {{100, 150}, {200, 250}, {300, 200}};

int clipper_size = 4;
int clipper_points[][2] = {{150, 150}, {150, 200}, {200, 200}, {200,150}};
// 2nd Example with triangle clipper
/*int clipper_size = 3;
int clipper_points[][2] = {{100, 300}, {300, 300}, {200, 100}};*/
// Calling the clipping function
suthHodgClip(poly_points, poly_size, clipper_points, clipper_size);
return 0;
}
```

Output:



```
(base) c306-8@c3068-Vostro-3470:~$ g++ -o polyclip polyclip.cpp -lgraph
(base) c306-8@c3068-Vostro-3470:~$ ./polyclip
(150,162)(150,200)(200,200)(200,174)(base) c306-8@c3068-Vostro-3470:~$
```