

National Institute of Technology, Calicut
Department of Computer Science and Engineering
CS4058D Computational Geometry
Assignment 1

1. Read the x and y coordinates of a set of points from a text file *input.txt* and display the points on a QT window using CGAL.

Input format:

Each line in the input file contains two values (separated by a space) corresponding to the x and y coordinates of a point.

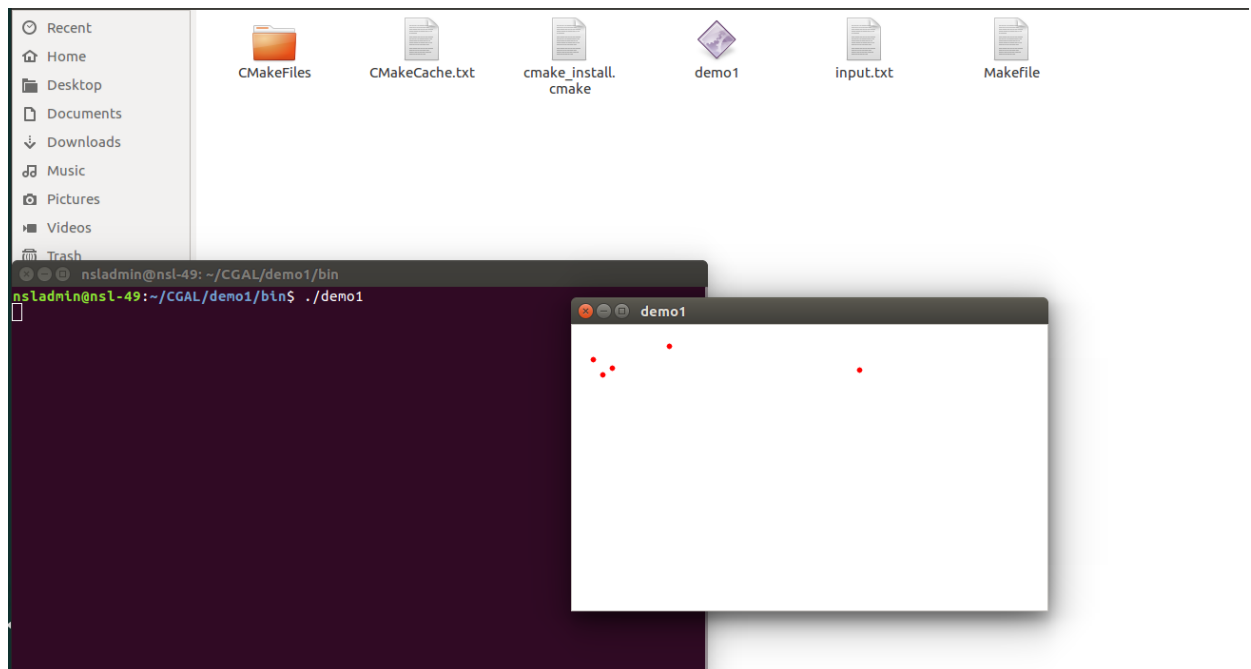
Output format:

Display the points on a QT window.

Sample *input.txt*:

```
20 80
30 100
40 90
90 50
200 100
```

Output:



2. Read the end points of a set of line segments from a text file *input.txt* and display them on a QT window using CGAL.

Input format:

Each line in the input file contains four values (separated by a space).

First two values correspond to the x and y coordinates of one end point, and the next two values correspond to the x and y coordinates of the other end point of a line segment.

Output format:

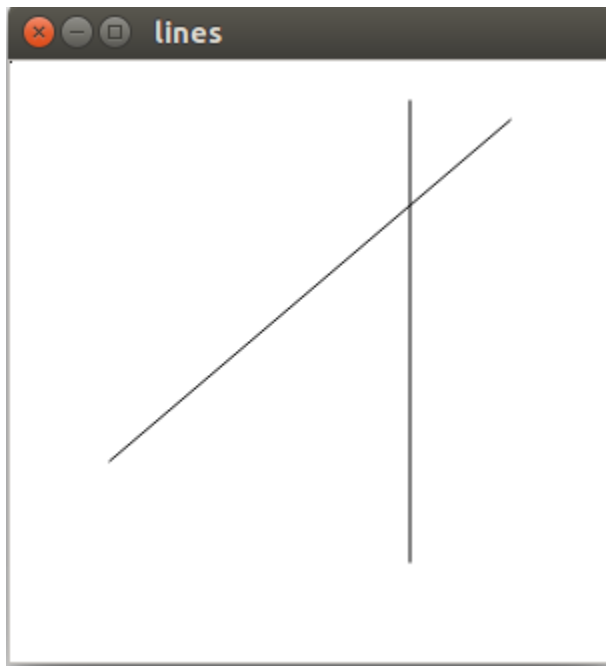
Display the line segments on a QT window.

Sample *input.txt*:

50 200 250 30

200 250 200 20

Output:



3. You are given the endpoints of a set of line segments. For each pair of line segments, display whether they intersect or not (Yes/ No). Also find the point of intersection for each pair of line segments.

Input format:

Each line in the input file contains four values (separated by a space).

First two values correspond to the x and y coordinates of one end point, and the next two values correspond to the x and y coordinates of the other end point of a line segment.

Output format:

For each pair of line segments, display them and print whether they intersect or not (Yes/ No). If they intersect each other, print the coordinates of the point of intersection also.

Sample *input.txt*:

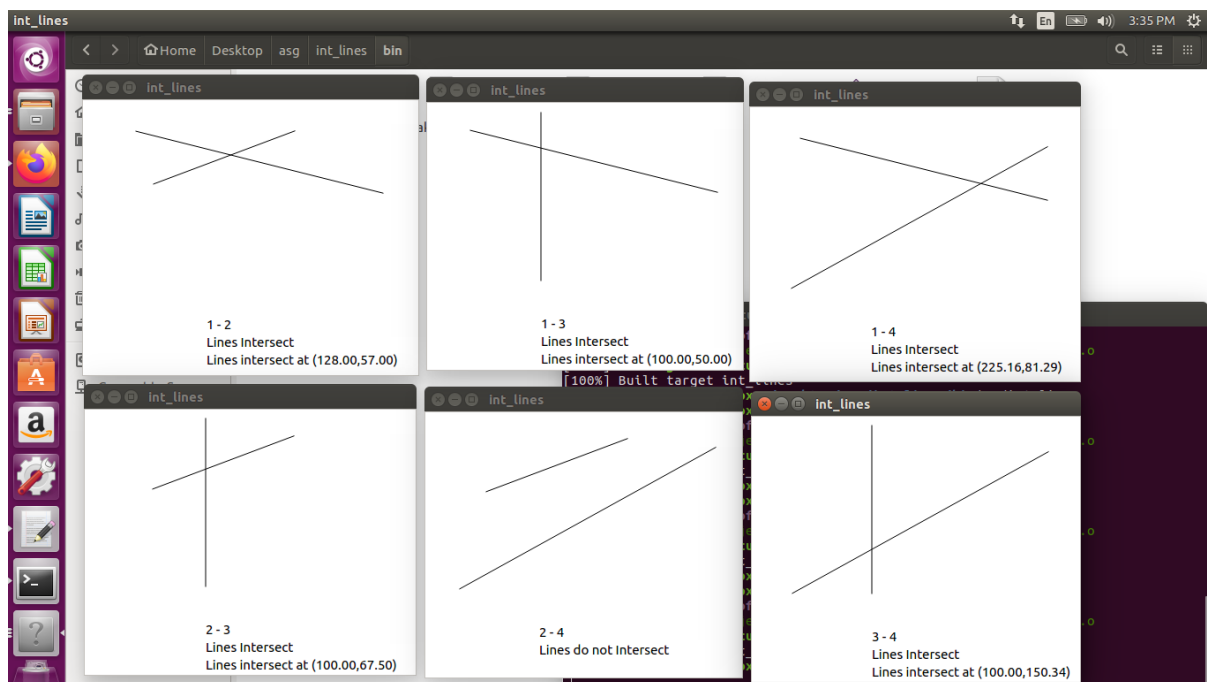
20 30 300 100

200 30 40 90

100 10 100 200

10 200 300 40

Output:



4. Write a program to find out the area of a triangle. Read the x and y coordinates of three vertices of the triangle from a text file and display the triangle in a QT window along with the area.

Input format:

Each line in the input file contains two values (separated by a space) corresponding to the x and y coordinates of a vertex of the triangle.

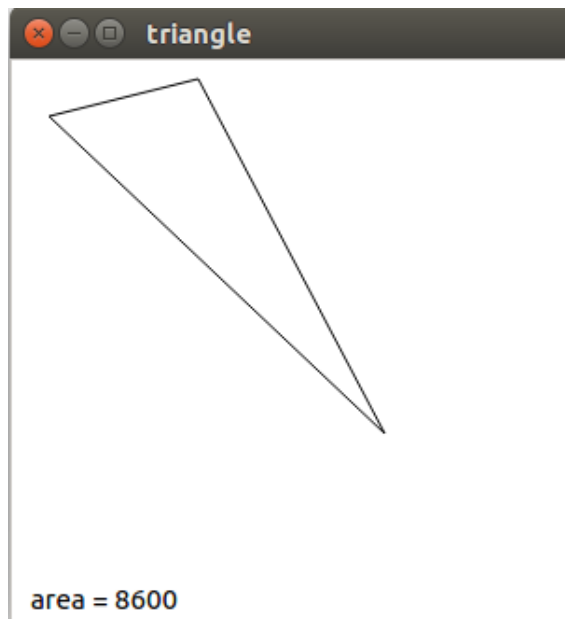
Output format:

Display the triangle on a QT window. Also print the area of the triangle.

Sample *input.txt*:

```
20 30
200 200
100 10
```

Output:



5. Write a program to find out the area of a polygon. Read the x and y coordinates of the vertices of the polygon from a text file and display it in a QT window along with the area.

Input format:

Each line in the input file contains two values (separated by a space) corresponding to the x and y coordinates of each vertex of the polygon, in clockwise direction.

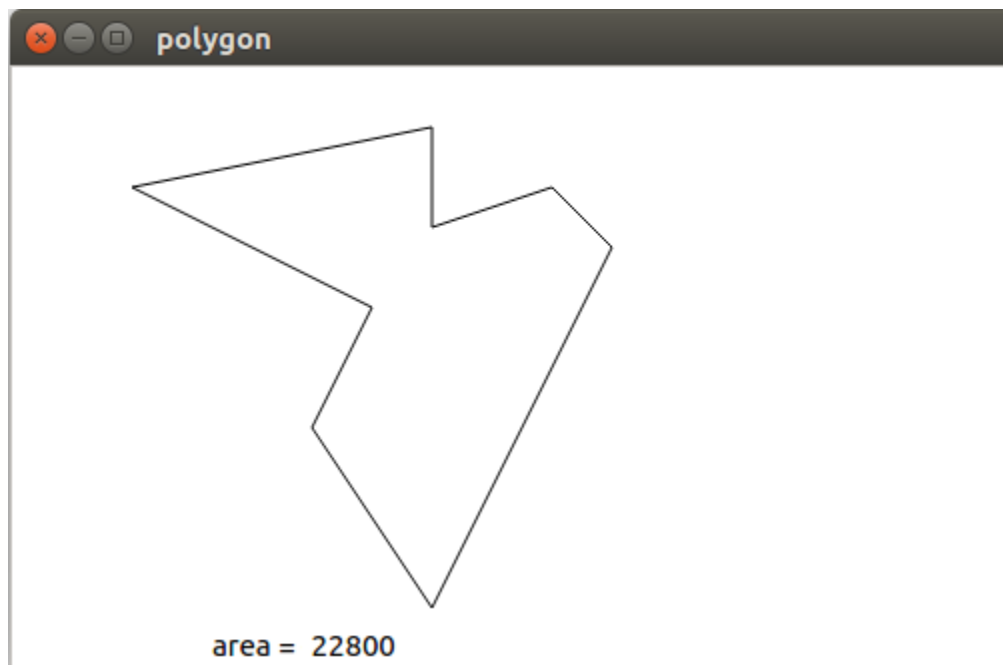
Output format:

Display the polygon on a QT window. Also print the area of the triangle.

Sample *input.txt*:

```
300 90
270 60
210 80
210 30
60 60
180 120
150 180
210 270
```

Output:



6. Write a program to triangulate a polygon using the concept of ear removal. Color the triangles with different colors such that they can be distinguished from each other.

Input format:

Each line in the input file contains two values (separated by a space) corresponding to the x and y coordinates of each vertex of the polygon, in clockwise direction.

Output format:

Display the triangulated polygon on a QT window, with each triangle having different colors.

Sample *input.txt*:

```
300 90
270 60
210 80
210 30
60 60
180 120
150 180
210 270
```

Output:

