Problem Set 2 Exercise #26: Triangle Centroid

Reference: Lecture 6 notes

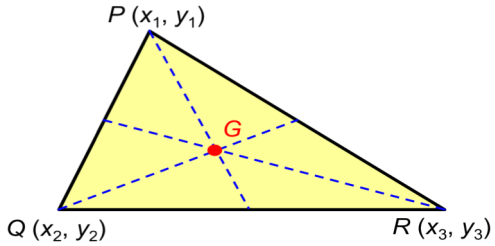
Learning objective: Functions with Pointers

Estimated completion time: 20 minutes

Problem statement:

In a triangle, a *median* is a line that connects a vertex to the midpoint of its opposite side. The intersection of the 3 medians is called the *centroid*.

In the diagram on the right, the medians are shown as blue dotted lines, and point *G* is the centroid.



Write a program **centroid.c** to read in the coordinates (of type **`double`**) of 3 vertices of a triangle and compute the coordinates of its centroid.

Your program should contain a function **`get_centroid()`** that passes back the coordinates of the centroid via two pointers. What are the correct parameters to take?

Note that there should be no **`printf()`** statement in your **`get_centroid()`** function as this function is solely for computation purpose. The **`main()`** function is responsible for data input / output.

A tip is given at the beginning of next page.

Sample run #1:

```
Coordinates of 1st vertex: 0 0
Coordinates of 2nd vertex: 0 1
Coordinates of 3rd vertex: 1 1
Coordinates of centroid = (0.33, 0.67)
```

Sample run #2:

```
Coordinates of 1st vertex: 4.8 12.7
Coordinates of 2nd vertex: -12.3 8.2
Coordinates of 3rd vertex: -5.6 15.3
Coordinates of centroid = (-4.37, 12.07)
```

Useful tip:

Given three vertices of a triangle (x_1, y_1), (x_2, y_2) and (x_3, y_3), the coordinates of centroid are calculated as $(\frac{x_1+x_2+x_3}{3}, \frac{y_1+y_2+y_3}{3})$.