

**Eleventh Annual South Jersey Regional High School Programming Contest**  
**Rowan University**  
**April 19, 1997**

**BASIC PROBLEM**

Consider the following scenario. A piece of material 1 meter square has been laid out on a table in preparation for cutting. The table is marked with measurements (in tenths of meters) in both the horizontal and vertical directions. A single cut is to be made in this piece of material as follows: a pair of points on the perimeter of the material is specified, a straight line is drawn between these two points, and the cut is made along this line. Each point is specified by a pair of numbers between 0 and 1, the first being the horizontal measurement from the left side of the material and the second being the vertical measurement from the bottom of the material. After the cut is made there will usually be two pieces of material, and the area of the piece containing the original lower left corner is to be computed.

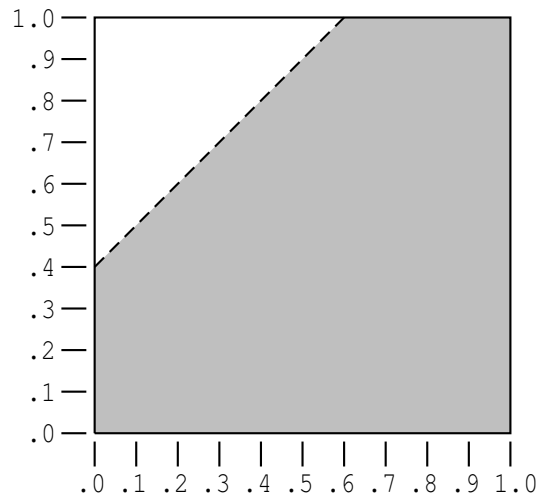
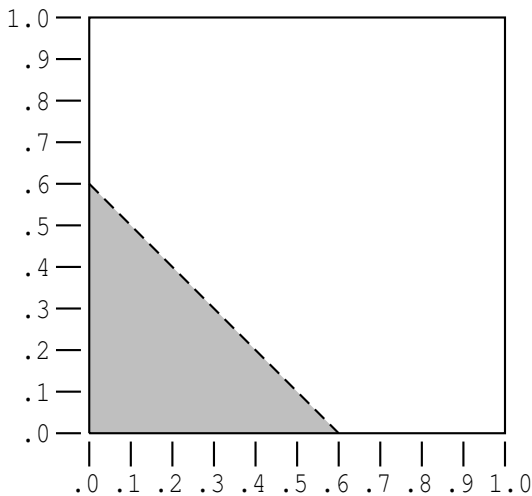
Let us assume that we have a set of 1-meter square pieces of material to be cut. Your job is to write a program that will compute the area resulting from each cut and some statistics about the set of areas. Since the resulting piece whose area is computed should include the lower left corner, there would be an ambiguity if 0, 0 were one of the two points specified. Hence, we have decided to use 0, 0 as a signal that we are done.

Here is an example of the beginning of a run of a program that solves this problem, followed by illustrations;  $x_1$  and  $x_2$  are used as variable names for the horizontal dimension, while  $y_1$  and  $y_2$  are used as variable names for the vertical dimension. In these examples the *italicized information* is entered by the person; the plain text is printed by the program.

```
==> Area computation program written by contestant WKSHP57. <==  
Enter pairs of points, using x and y of 0 to signal end of data.
```

```
Enter first pair of points (x1, y1, x2, y2): .6, 0, 0, .6  
Area = 0.180 sq. meters
```

```
Enter next pair of points (x1, y1, x2, y2): 0, .4, .6, 1  
Area = 0.820 sq. meters
```



Note that when two points on the same side of the 1-meter square are specified, for example .4, 0, .7, 0, this will not be considered an error; instead, the square is viewed as divided into two parts, one of which has an area of 0 and the other of which has an area of 1.0; the latter piece includes the lower left corner, and thus the answer is 1.0.

Your program should compute the area for each cut and should also compute the minimum, maximum, and average of this set of areas. If an invalid pair of points is supplied, no area should be computed.

You should run your program for the following set of inputs:

```
0, .4, .6, 1
.5, 1, 1, .6
.6, 0, 1, .7
.7, 0, 0, .8
1, 0, 0, 1
.5, 0, .5, .5
0, .2, 0, .7
0, .3, 1, .8
.4, 0, .9, 1
0, 0, 0, 0
```

Supply the resulting output, along with a listing of your code. If you are at a PC, use the PrintScreen key to get a screen dump of the output. Note that it is a moderate challenge to get all the information to fit on one screen (i.e., within 25 lines). If you follow a fairly terse style (as the sample does earlier), you can fit your output into exactly 25 lines.

Be sure to have your contestant ID in a comment at the beginning of your source code as well as early in your output. (Do not mention your name or your school name!)