

Assignment #4

Write a complete C++ program to do the following:

A main program will interactively read a group of three integers, representing the three sides of a triangle. If the three integers do not describe a valid triangle, the group is to be rejected and a message printed. If the group does represent a valid triangle, the main program will call a function **classify** which will classify the triangle in various ways. When **classify** returns to the main program, the main program will process the next triangle, and so on. At the end of the set of data, some statistics will be printed.

Here are the details:

1. The main program is to read in (and then immediately print a copy of) the three integers. The main program should also keep track of how many groups of data have been read. The main program then calls a Boolean function **valid** which determines whether or not the three integers form a valid triangle. If the group of integers represents a valid group, the main program should call the **classify** function. The main program should also keep track of how many invalid groups have been read.
2. The main program should determine whether or not there are any more data lines to be processed. If there are, the main program should, repeat the steps outlined above. If not, the main program should print the final statistics: the number of groups of data, how many were valid groups, and how many were invalid.
3. The function **valid** returns a Boolean value based upon whether or not the group represents a valid triangle. If any of the three is negative or zero, the group does not represent a valid triangle. In addition, the sum of the lengths of any two sides must exceed the length of the third side. **valid** should also print a message giving the reason for rejecting the group.
4. The function **classify** should do three things. First, it should determine the largest of the three sides (by calling a function **largest**). Then it should determine if the triangle is equilateral, isosceles, or scalene. Then it should determine if the triangle is or is not a right triangle. The procedure should print the results of the three questions.
5. The function **classify** is to use three functions, one for each question. The first function will select the largest of the three sides. The second function will determine if the triangle is equilateral (e.g. all three sides are equal), isosceles (e.g. two but not three sides equal), or scalene (e.g. all three sides distinct). The third function will determine if the triangle is a right triangle (e.g. the square of one side is equal to the sum of the squares of the other two sides).

Data:

7	7	7
0	7	6
-1	7	1
-1	-1	8
-1	-1	0
7	9	9
13	12	5
8	7	4
7	8	8
2	3	15
21	5	4
9	9	7
10	9	1
9	8	7
4	3	5
5	5	5
1	1	1

Be sure your program is well commented and uses the structured programming technique discussed in class. All variable are to be declared locally. Your output should be formatted neatly and labeled.