

CIS 230 – Spring 2006
Homework #4
Due Wednesday, 15-Feb-06 at 10:00 AM

Submit your files using the submission tool on the qs-server:

>/class-files/gilden/230submit

Include all of your .cpp files and your .h files, as well as a script of your program runs using the values given below.

Program Description:

Write a program which prompts the user for the lengths of three sides of a triangle. Report whether the triangle is or is not each of the following:

- a) an isosceles triangle (at least two sides are equal)
- b) an equilateral triangle (all three sides are equal)
- c) a right triangle (remember Pythagoras and his theorem)

Program Requirements

1. Use a function (name it `getInput`) to ask the user for the lengths of the three sides. This function must pass parameters by reference (make sure you know why). This function must refuse to accept values which do not represent a triangle. Your function must validate the user's input to guarantee that the three values can construct a triangle. The function should not return control until it has three legitimate values. Remember that in a triangle, the two shortest sides must together add to a value *greater than* the longest side.
2. Use another function (name it `sort`) to accept three values and re-arrange them into ascending sequence. This function must pass parameters by reference (make sure you know why).
3. Use another function (name it `compute`) to compute *all* of the answers to the three questions (it may in turn call other functions but it doesn't have to). This function can pass three of its parameters by value but must pass the other three parameters by reference (make sure you know why). An equilateral triangle is by definition also an isosceles triangle.
4. Use another function (call it `report`) to print the results. This function should pass its parameters by value (make sure you know why).
5. The `main` function has *no* responsibility other than to pass information from one function to another. A "structure chart" of the program's architecture is on the next page.
6. All functions must be declared *in a separate .h file* and defined *in a separate .cpp file*. All function definitions (including `main`) must be commented to describe their purposes.

When your program is completed and working, run it using these values:

12.3, 4.6, 5.0 corrected to 12.3, 14.6 and 10.0

5.0, 3.0, 4.0

20.3, 15.6, 20.3

6.0, 3.0, 5.0

10.1, 10.1, 10.1

Here is an algorithm for sorting three values, a, b and c, into ascending order:

```

if a > b
  swap a and b
  if b > c
    swap b and c
    if a > b
      swap a and b
    endif
  endif
endif
else
  if b > c
    swap b and c
    if a > b
      swap a and b
    endif
  endif
endif
endif

```

You may find it useful to remember the “swap” function we discussed in class.

