CSCI-14 Assignment #4, if and if/else programming (70 points) – due 2/20/18

Two programs:

Program one (30 points):

In a right triangle, the square of the length of the hypotenuse is equal to the sum of the squares of the lengths of the other two sides. For example, a triangle with sides of lengths 4, 5, and 3 units is a right triangle because 5^2 (25) = 3^2 (9) + 4^2 (16). You do not need to use pow() to square a number!

Write a program that prompts for the (integer) lengths of the three sides of a triangle and prints an appropriate message saying whether the triangle is a right triangle or not. You may not assume the sides are entered in any particular order, but you may assume the sides would make a triangle (the sum of the lengths of two sides will be greater than the length of the third side). All sides will have whole number lengths (integer lengths greater than 0), and you may assume this in the code. Do not worry about floating-point entries.

Test with 3, 4, 5; 5, 4, 3; 4, 5, 3; 6, 10, 8; 4, 4, 6; and several other sets of lengths of your own choice, both forming a right triangle and not forming a right triangle. Check a few by hand and include the math in a little text file submitted with your program and output files.

Use three separate if() statements for the "is-it-a-right-triangle" tests. Each if() statement will test a different combination of sides. You may not combine your tests into a compound Boolean expression and do this in one if() test. Remember whether or not you find a right triangle in any of the first three if() statements for a fourth if() statement printing a message saying the sides don't form a right triangle. **You may not use if-else() for this program.** **For the fourth if() test, you may not test "is it not a right triangle" by testing the squares of the sides again.**

For example, a test run might look like this:

```
Enter side a : 5
Enter side b : 3
Enter side c : 4
The sides form a right triangle.

Process returned 0 (0x0)   execution time : 4.696 s
Press any key to continue.
```

Or, it might look like this:

```
Enter side a : 4
Enter side b : 4
Enter side c : 7
The sides do not form a right triangle.

Process returned 0 (0x0)   execution time : 4.274 s
Press any key to continue.
```

Program 2 (40 points):

Write a C++ program that takes a single character and prints the corresponding digit on the old-style dial or touchtone telephone keypad, if it exists, or a message stating that the character does not correspond to a digit on the keypad. Use the following grouping for the letters and digits on the keypad:

2 = ABC	3 = DEF	4 = GHI	5 = JKL
6 = MNO	7 = PRS	8 = TUV	9 = WXY

Note that there were no corresponding digits for Q or Z, and that there are no lower-case letters or non-alphabetic characters on the keypad. We're not using a text-messaging cell phone here; we're talking about the old-style telephone keypad. Therefore, for Q or Z, your program should report that there is no corresponding digit; and for any other character (lower-case letter or for any non-alphabetic character) your program should print a general "that is not a capital letter" message.

Your major code structure will be a cascaded if-else structure, not a series of independent if statements. Notice that much of the output will be essentially the same for the digits on the keypad. **Do not repeat a message like "The letter X corresponds to the digit Y on the keyboard", with different values of X and Y, in several places in the code, or use a string variable to hold the message.** Instead, use a single output statement for the letter-and-corresponding-digit message, and use variables to hold the values to print. This will require other control structures other than a single cascaded if-else structure. There are several solutions that work here.

You MAY NOT use a switch statement for this: you MUST use nested or cascaded if/else structures.

For example:

```
Enter a single letter and I will tell you the digit
it corresponds to on the telephone keypad:
A
The character A corresponds to the digit 2 on the keypad.

Enter a single letter and I will tell you the digit
it corresponds to on the telephone keypad:
Q
Q doesn't correspond to any digit on the keypad.

Enter a single letter and I will tell you the digit
it corresponds to on the telephone keypad:
a
The character a is not a capital letter.
```

Test your program with at least one letter from each group, Q, Z and several other lower-case and non-alphabetic characters. Again, only code each message in a single place – do not repeat similar messages.