

Beginning C Programming for Engineers

Homework Set 2

Name: _____

As always, please follow the guidelines for homework submissions shown in the last slide from lesson one, *or credit will be deducted*. Each study group should turn in a single copy of the homework.

1. We would like a program to repeatedly read integers and test if they are “Pythagorean triples.” That is, it should read in values a , b , and c , and test whether or not $a^2 + b^2 = c^2$. Your program should keep reading in triples until all three values entered are zero. When you enter three zeroes, it should exit without printing anything additional. (If someone types in three zeroes the very first time, your program should still exit without printing anything.)

Here is example output of a working program:

```
Enter a, b, c: 3, 4, 5
Pythagorean triple: 9 + 16 = 25
Enter a, b, c: 1,2,3
Not a Pythagorean triple: 1 + 4 != 9
Enter a, b, c: 0,0,0
```

- (a) Draw a flowchart to illustrate an algorithm that solves the stated problem.
 - (b) Write a C program to implement your algorithm. Use multiplication, rather than the `pow` and `sqrt` functions.
2. We would like a program that chooses a random integer in the range $[1, 10]$, then gets two additional integers from the keyboard. The program should then print the three numbers sorted in *both* ascending and descending order. The program should provide a useful prompt.
 - (a) Should it be possible for two or more of the numbers to be equal? Why or why not?
 - (b) Draw a flowchart illustrating an algorithm that solves this problem.
 - (c) Write a C program to implement your algorithm. Make sure it works with a variety of input data.