

CS367 Lab 4

This lab consists of 4 parts; for each part write a complete C program. Submit hard copies of your source code file for each part along with the output from running the programs for all parts and the answers to the questions in Part A.

Part A. Write a C program that outputs “**My name is *Your Name***”, substituting your name for *Your Name* (*hint*: begin with the “Hello World” program you were given in class; once you successfully compile and execute that modify it as indicated).

Print-out and turn-in a hard copy of the following:

1. your source code.
2. the command line you use to compile your program. The compile command should name the executable “**myname**”.
3. the command line you used to execute your program.
4. the output from executing your program.

Part B. Write a C program that outputs a count-down by doing the following (*hint*: recall that when in doubt, try “*Just Like Java*”).

1. Define a constant integer variable to hold the count-down starting value and assign it the value **10**. Use this variable in the rest of the program whenever the value is needed (i.e., changing the initial value of this variable should change the program output accordingly).
2. Use a loop to output a count-down from the start value to zero, one value per line, followed by “**BLAST OFF**”. Each count-down value should be **3** digits wide and right justified.

For example, if the initial value was **4** your output should look like:

```
  4
  3
  2
  1
  0
BLAST OFF
```

Turn-in a hard-copy of your source code and the output from running the program.

Part C. Given the height h and radius r of a cylinder we can calculate the surface area s and volume v of the cylinder using the following formulas:

$$s = (r + h) * 2 * \pi * r$$
$$v = \pi * r * r * h$$

Write a C program that calculates and outputs the surface area and volume of a cylinder given fixed values for the height and radius. Your program must:

1. Use a preprocessor directive to define a constant for π initialized to **3.1415926**. Use this constant whenever π is needed in the rest of your program.
2. Create constant variables to hold the values for height and radius and assign them the values **5.77** and **6.1** respectively. Use these variables in what follows, not the values themselves. Make no assumptions about the values of these variables in the rest of your program; your program should work given any initial values.
3. Create variables to hold the surface area and volume of this cylinder.
4. Calculate the surface area and volume of this cylinder, storing the result in the variables you created.
5. Output the radius, height, surface area, and volume. The output must be in the form of a sentence with all values clearly labeled. All values should be output with **3** decimal places to the right of the decimal point.
6. Output whether or not the radius and height are equal; if not, output which is larger. Your output must be in the form of a sentence and include both values, both output with **1** decimal place to the right of the decimal point.

Turn-in a hard-copy of your source code and the output from running the program.

Part D. Note that **printf** can output a variable of any integer type as either a number or as a character, depending on the conversion specifier used. Use this knowledge to output a table of numbers along with their corresponding ascii characters. Your program should consist of the following:

1. Use preprocessor directives to define constants for the minimum and maximum printable ascii character values, which are **32** and **126** respectively.
2. Output a table consisting of all integers between the minimum and maximum printable ascii character values (inclusive) along with their corresponding ascii character. Each character should be bracketed by **<>**'s. Use conversion modifiers as necessary to ensure that the columns are aligned; the first column of numbers should be left-justified. For example, the portion of your table from numeric value **98** to **101** should look like the following:

```
98  <b>
99  <c>
100 <d>
101 <e>
```

Turn-in a hard-copy of your source code and the output from running the program.