

# ECE 70 – Computational Programming for Engineers

Professor Kriehn – Fall 2016

**Code Due By:** Midnight on Tuesday, September 13, 2016

**Writeup Due By:** Class on Thursday, September 15, 2016

## HOMEWORK #5 – Engineering Container Design Problem

You work at a hardware company that manufactures open-top cylindrical containers. To estimate production costs, your company needs you to determine the cost of a batch of containers.

### Analysis:

The surface area of the container is the sum of the area of the circular base plus the area of the outside cylindrical shell (the circumference of the base times the height of the container). Once the surface area has been calculated, the cost is determined by multiplying the total surface area by the material cost (per square centimeter) times the number of containers to be produced in a batch.

### Specifications:

The filename should be called **hw5.c**. **PI** should be defined as a constant having a value of 3.14159. Define all variables as floats, except for the quantity, which should be an integer value. Prompt the user to enter the radius of the base, the height of the container, the cost per square centimeter of the material (in dollars), and the number of containers to be produced. Be sure to use a semicolon ‘:’ each time the user is prompted for information.

**HINT:** You will have to pattern match the cost using in your **scanf()** function. Since there will still be a couple of Enter characters in the buffer from previous scan statements, use something like “ **\$%f**” for the string literal. Explain why this works in your documentation.

After reading in this information from the keyboard, calculate the surface area of a container, the unit cost of a container and the total cost of the batch. Print your costs to the screen using **%.2f**.

As an example, if you execute the program with the following underlined inputs, the output will be:

```
~> hw5.o
Welcome to the Cylindrical Container Cost Program.
Please Enter the Following Container Information.

Enter radius of base in cm: 1.2
Enter height of container in cm: 2.4
Enter material cost per square cm: $0.35
Enter number of containers to be produced: 500

Surface area of container: 22.62 cm
Cost per container: $7.92
Total production costs: $3958.40
~>
```

Develop your I/O diagram and pseudocode, debug your code, and submit **hw5.c** to the Grader Program.

## HOMEWORK #6 – Currency Bill Verification System

You work at a bank and need to automate the bills that are given to a customer when they cash a check. When the check is cashed, the system should automatically break down the dollar amount into the smallest number of \$20, \$10, \$5, and \$1 bills.

### Specifications:

Write a program that prompts the user to enter a U.S dollar amount and then shows how to pay the customer using the smallest number of bills.

The filename should be called **hw6.c**. After prompting the user to enter the dollar amount, scan it in and calculate the number of twenties, tens, fives, and ones that are necessary to pay to the customer. You may assume that the dollar amount is always an integer value.

As an example, if you execute the program with the following underlined inputs, the output will be:

```
~> hw6.o
Enter a dollar amount: 93

$20 bills: 4
$10 bills: 1
$ 5 bills: 0
$ 1 bills: 3
~>
```

Develop your I/O diagram and pseudocode, debug your code, and submit **hw6.c** to the Grader Program.