# CSCI 1470 – Fall 2015Lab 6 In-class Assignment

**Topic:** Switch statements and while loops

Submit all source codes (\*.cpp) at the same time via email to clarenceb@uca.edu and to tvelasco1@cub.uca.edu

***\*Note: Include the following set of comments at the top of your source code for all assignments.***

***// Student Name:***

***// Assignment #: (Example: A6-1)***

***// Lab Time: Tuesday 2:40-4:30***

***/\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*Title of Program\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\****

***Author: Date of Work:***

***Design: Provide an general overall description of the program***

***Input:***

***Process:***

***Output:***

***\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*/***

**1. *(Save this file as* A6-1.cpp)**A person’s weight is different for each planet, dwarf planet and moon in our solar system, because the size and mass of each planet, dwarf planet and moon are different. For example, on Mercury, your weight is only 0.378 times your weight on Earth. Thus, if you weigh 100 pounds on Earth, you would weigh only 37.8 pounds on Mercury. Write a program that allows you to enter your weight on Earth and your choice of planet, dwarf planet or moon for which you would like to convert your weight. Calculate your weight on the chosen planet, dwarf planet or moon. Display your Earth weight (to one decimal digit), your converted weight, and the name of the chosen planet, dwarf planet or moon. Design a menu for the choices. Loop until the user selects “Quit”.

**The relative weights for each planet are:**

* Earth 1.000
* Jupiter 2.364
* Mars 0.377
* Mercury 0.378
* Neptune 1.125
* Pluto 0.067
* Saturn 1.064
* Uranus 0.889
* Venus 0.907
* Earth’s Moon 0.166
* Jupiter’s Io 0.1835
* Jupiter’s Europa 0.1335
* Jupiter’s Callisto 0.1264

***Sample I/O:***

**This program converts your weight on Earth to your weight on the planet, dwarf planet or moon of your choice.**

**Please enter your weight on planet Earth: 152**

**Please enter the number that follows your choice:**

**0 - QUIT**

**1 - MERCURY**

**2 - VENUS**

**3 - MARS**

**4 - JUPITER**

**5 - SATURN**

**6 - URANUS**

**7 - NEPTUNE**

**8 - PLUTO**

**9 - EARTH’S MOON**

**10 - JUPITER’S IO**

**11 - JUPITER’S EUROPA**

**12 - JUPITER’S CALLISTO**

**Choice: 2**

**Your weight on earth is: 152.0**

**Your choice of planet was: Venus**

**Your weight on the chosen planet is: 137.9**

**2. *(Save this file as* A6-2.cpp*)*** A color palette shows a variety of colors that are available for a computer display. However, a color palette is typically a flat two-dimensional square, but there are three choices for color (red, green and blue). After specifying the value of red, we can display the color palette for all of the values of green and blue, associated with that choice of red, in the shape of a square. Or, we can specify the blue or the green values, and show the color palette by changing the values of the other two color components.

In this assignment, you will write a program where the user can select either a value of RED, GREEN or BLUE, and the program displays all of the colors associated with their specified value in a 256 by 256 square. If the user selects GREEN and inputs a value of 80, then the upper left corner of the square will display the color (0, 80, 0), the upper right corner will display (0, 80, 255), the lower left corner will display (255, 80, 0) and the lower right corner will display (255, 80, 255).

You should use a switch based on the user’s choice of color and a do-while loop to ensure that the user inputs a value between 0 and 255, inclusive. Then, you should use a while loop within a while loop to draw a rectangle for each color in the color palette.

To highlight the color palette, we want to place a 10 pixel wide white border around the palette. Center the color palette within the 640 by 480 graphics display window. Write the name and value of the user specified color 20 pixels underneath the color palette, appropriately centered.

Loop until user selects “Quit”.

**CSCI 1470 – Fall 2015
Lab 6 Out-of-class Assignment
Due Date: Monday, 10/5/15 @ 11:00PM**

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***\*Note: Please include appropriate comments at the top of the program***

**Assignments:**

**1. *(Save this file as* B6-1.cpp***)* Write a C++ program that converts Fahrenheit to Celsius and displays the converted value along with an appropriate image. The formula for conversion is: ***Celsius = (5.0/9.0)\*( Fahrenheit - 32).***Use the following rules when implementing this program:

If the entered Fahrenheit temperature >=-50 and < 40, display “cold.bmp” along with the phrase “It’s cold!” in the Graphics Window, along with the Fahrenheit and Celsuis temperature values.

If the entered Fahrenheit temperature >= 40 but < 90, display “normal.bmp” with the phrase “It’s just normal” in the Graphics Window, along with the Fahrenheit and Celsuis temperature values.

If the entered Fahrenheit temperature > = 90 and < 130, display “hot.bmp” with the phrase “It’s hot!” in the Graphics Window, along with the Fahrenheit and Celsuis temperature values.

If the entered Fahrenheit temperature <-50 or > 130, display “planet.bmp” with the phrase “You must be on another planet!” in the Graphics Window, along with the Fahrenheit and Celsuis temperature values.

Each bitmap image has a resolution of 300x225.

Display each image so that it is centered in the graphics display window (640 by 480).

State the two temperatures immediately under the image, and state the phrase associated with each picture under the two temperatures.

***2. (Save this file as* B6-2.cpp***)* A high school mathematics teacher wants you to write a program that will output the perimeter (circumference) and area for the following geometric shapes:

1. Quit
2. Rectangle
3. Square
4. Triangle
5. Circle
6. Semi-circle
7. Quarter-circle

Build a menu for the user to choose these calculations. The program should then perform the desired calculation. Use the ***sqrt( )*** math library function, if needed. Display the data entered by the user and the results of the desired calculation to a hundredth of a decimal.

Loop until the user selects “Quit”, which should be option 0.

***Note:*** sqrt(x) calculate the square root of x.

***Formulas:***

1. Rectangle
	1. Inputs: length, width
	2. Outputs: Area = length\*width, Perimeter = 2\*length+2\*width
2. Square
	1. Input: side
	2. Outputs: Area = side\*side, Perimeter = 4\*side
3. Triangle
	1. Inputs: lengths of three sides, a, b, c
	2. Outputs: $Area=\sqrt{s(s-a)(s-b)(s-c)}$ where $s=\frac{a+b+c}{2}$

Perimeter = a+b+c

1. Circle
	1. Input: radius r
	2. Outputs: $Area=π r^{2}$, $Circumference=2π r$
2. Semi-circle
	1. Input: radius r
	2. Outputs: $Area=\frac{π r^{2}}{2}$, $Circumference=π r+2r$
3. Quarter-circle
	1. Input: radius r
	2. Outputs: $Area=\frac{π r^{2}}{4}$, $Circumference=\frac{π r}{2}+2r$

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