

# **SFWRENG 2MP3 – Programming for Mechatronics**

## **Fall 2018**

### **Exercise 1: If Statements, Loops, printf, scanf**

Note: Weekly course assignments account for 20% of the final course grade. **This assignment is due September 16<sup>th</sup>, 2018 at 11:59pm.**

#### **Objectives**

The purpose of this activity is to develop a greater understanding of if/ else statements as well as for and while loops within the C programming language.

#### **Tasks**

In order to complete this assignment a written report of the C code and output to accomplish each of the following questions.

**Question 1:** Create a program that will output the McMaster 12-point grading scale conversion number for any percentage entered, using integer values 0-100 and producing an integer value 0-12 (<https://registrar.mcmaster.ca/exams/grades/> for reference)

**Example Input:** 83

**Example Output:** 10

**Question 2:** Create a program that will produce a string output that states if a year that has been entered as an integer is a leap year

**Example Input:** 2018

**Example Output:** Not a leap year

**Example Input:** 2028

**Example Output:** Leap Year

**Question 3:** Create a program that produces a string output for the number of days in a month. The program input should work regardless of the case used

**Example Input:** January

**Example Output:** 31 Days

**Question 4:** Create a program that will output a string that displays if a given integer is even or odd

**Example Input:** 3

**Example Output:** 3 is an odd number

**Question 5:** Create a program that will determine the order largest to smallest of three integers entered and produce a string output

**Example Input 1:** 5 **Example Input 2:** 27 **Example Input 3:** 15

**Example Output:** 27 is the largest number, followed by 15 and 5

**Question 6:** Create a program that uses while loops to compute the factorial of an integer that is entered

**Example Input:** 7

**Example Output:** 5040

**Question 7:** Create a program that uses while loops to create a change calculator that will compute the optimal combination of quarters, dimes, nickels and pennies and will display it as a string output

**Example Input:** 1.37

**Example Output:** To create \$1.37 in change use 5 quarters, 1 dimes, 0 nickels and 2 pennies

**Question 8:** Create a program using a for loop that, given an integer n, will compute the first n terms of the Fibonacci sequence

**Example Input:** 6

**Example Output:** 0, 1, 1, 2, 3, 5

**Question 9:** Create a program that uses for loops which, given an integer n that is less than or equal to 10, will generate an nxn star pattern

**Example Input:** 4

**Example Output:**

```
****
****
****
****
```