**CS 2060 Programming with C - Fall 2017**

**Assignment #3**

Due Date: Sept 13, 2017 at 9:25am (MW class), Sept 14, 2017 at 9:25am (TR class)

Purpose: Learn to use relational and logical operators, if statements, and while loops

Effort: Individual

Points: **80**

Deliverables: Upload the .c source code file and your pseudocode to Blackboard by due date.

Please include pseudocode in the comments at the beginning of your code.

**Please hand in a hardcopy version of your code at beginning of class.**

**Assignment Description**

Write a program that implements a simple scheme for encrypting and decrypting data. This is exercise 3.48 in your book with **modifications**. Your application will only encrypt and decrypt four-digit integers.

The simple **encryption** scheme is as follows:

* Replace each digit with the result of adding 7 to the digit and getting the reminder after dividing the new value by 10. A couple of examples:
  + 0 becomes a 7 because (0 + 7) % 10 = 7
  + 1 becomes an 8 because (1 + 7) % 10 = 8
* Next, swap the 1st digit and the 3rd digit, and swap the 2nd digit and the 4th digit.

**Decryption** is done by reversing the encryption scheme to form the original number.

**Specifications**

1. Create a C project called **Assignment3 (please use this exact name)**
2. Follow "CS2060 Programming Assignments Policy"
3. Use correct data types and constants where possible (see p.220 for example of constant)
4. Write code that:

Displays a menu with selections to encrypt, decrypt or exit

Prompts user for a four-digit integer to encrypt or decrypt

Performs the encryption or decryption

Displays the newly encrypted/decrypted value

1. The code must allow the user to encrypt/decrypt an unspecified number of four-digit integer values
2. The code must handle user validation for the menu selection. If an invalid menu option is entered:

* Code **MUST** print message and **display menu options**

**Tip: To simplify if-statements use logical operators**

* See section 4.10 p. 132 in your book if you are not familiar with logical operators

**Tip: Include <stdbool.h> to include the bool data type**

* **#include** <stdbool.h>
* See appendix E, E.4 on p. 929 for more information

**Output**

Your output might look like the following:

**Output - Example 1**

CS2060 Top Secret Decoding Program

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1) Encryption

2) Decryption

3) Exit

Would you like to encrypt, decrypt, or exit? Select option 1, 2, or 3: **1**

Enter value to encrypt: **1234**

The encrypted value is: 0189

CS2060 Top Secret Decoding Program

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1) Encryption

2) Decryption

3) Exit

Would you like to encrypt, decrypt, or exit? Select option 1, 2, or 3: **2**

Enter value to decrypt: **0189**

The decrypted value is: 1234

CS2060 Top Secret Decoding Program

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1) Encryption

2) Decryption

3) Exit

Would you like to encrypt, decrypt, or exit? Select option 1, 2, or 3: **3**

Good Bye

**Output - Example 2 – Invalid Menu Selection**

CS2060 Top Secret Decoding Program

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1) Encryption

2) Decryption

3) Exit

Would you like to encrypt, decrypt, or exit? Select option 1, 2, or 3: **0**

Invalid menu selection - please enter 1, 2, or 3

CS2060 Top Secret Decoding Program

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1) Encryption

2) Decryption

3) Exit

Would you like to encrypt, decrypt, or exit? Select option 1, 2, or 3: **4**

Invalid menu selection - please enter 1, 2, or 3