CSCE 206 Spring 2020 Lab Assignment: #4

Question 1. Convert Characters & Reverse (50 points)

Write a C program to accept characters as input. Convert all small letters to capital letters and all capital letters to small letters (25 points). Then reverse its order and output the reversed sequence (25 points). Name your program file **Hw4_q1_code.c**.
Example:

1. **aBcDef** is a character sequence with pure letters. Its conversion is **AbCdEF** and then its reversed order is **FEdCbA**.

2. **BarackObama** is a character sequence with pure letters. Its conversion is **bARACKoBAMA** and then its reversed order is **AMABoKCARAb**.

3. **I'm_in_TAMU_CollegeStation_77843** is another character sequence with letters, symbols, and digits. Its conversion is **i'M_IN_tamu_cOLLEGEsTATION_77843**.
   Its reverse is **34877_NOITATsEGELLOc_umat_NI_M'i**.

Requirements:

1. You are **not allowed** to use any other libraries as your header files except for <stdio.h> or <math.h>. You are not allowed to use any built-in functions.

2. You can use **scanf** function to accept input.

Sample input/output:

Hint:

1. See Professor's slides on "Character Processing". Understand what a character is and what the ASCII is.
2. Understand how a C character sequence terminates.

Question 2. Decimal Converter (50 points)

Hex is the fundamental of how a computer stores and addresses its data in memory. Write a C program to accept characters of a nonnegative hex number and then convert it to its corresponding integer number (decimal). Name your program file **Hw4_q2_code.c**.
Requirements:

1. You are **not allowed** to use any other libraries as your header files except for <stdio.h> or <math.h>. You are not allowed to use any built-in functions.

2. Use **scanf** function to accept input and input type must be stored as a character array variable.
3. You could use **switch** statement for the conversion.

In a Hex number; A, B, C, D, E, and F are 10, 11, 12, 13, 14, and 15 respectively. Here are three instances of converting a hex number to their corresponding decimal numbers.

1. $(B0)_{16} = B \times 16^1 + 0 \times 16^0 = 11 \times 16^1 = 176$
2. $(2C3D)_{16} = 2 \times 16^3 + C \times 16^2 + 3 \times 16^1 + D \times 16^0 = 2 \times 16^3 + 12 \times 16^2 + 3 \times 16^1 + 13 \times 16^0 = 11325$
3. $(FEA16)_{16} = F \times 16^4 + E \times 16^3 + A \times 16^2 + 1 \times 16^1 + 6 \times 16^0 = 15 \times 16^4 + 14 \times 16^3 + 10 \times 16^2 + 1 \times 16^1 + 6 \times 16^0 = 1042966$

Sample input/output:

Hint:

1. Check professor's slides and understand how to use if/else/switch and while/dowhile statements.
2. Read all characters of the hex number first.
3. Then try to separate each letter from the hex number you read.
4. Convert each hex number to its correct decimal with its corresponding power and then sum them together.