CS2413: Data Structures
Fall 2021

Homework #3

- Full name only: _____
- Release date: Sept 20th, 2021 (Monday)
- Due date: **Oct 7th, 2021 (Thursday) before midnight, 11:59 PM**
- It should be done INDIVIDUALLY; Show ALL your work; Submit your all source codes and results through the Blackboard.
- Total: 20 pts

1. Write a program to convert a number from a decimal notation to a number expressed by a number system whose base (or radix) is 2 (binary), 8 (octal), or 16 (hexadecimal). The conversion is performed by repetitious division by the base to which a number is being converted and then taking the remainders of division in the reverse order. For example, in converting to binary, number 6 requires three such divisions: 6/2 = 3 remainder 0, 3/2 = 1 remainder 1, and finally, 1/2 = 0 remainder 1. The remainders 0, 1, and 1 are put in a reverse order so that the binary equivalent of 6 is equal to 110. Here is a set of requirements to follow:

- Type the homework number and your full name at the top in your all source codes.

```
/* Homework #3, James Bond */
```

- A hexadecimal system requires 16 digits: 0, 1, …, 9, A, B, C, D, E, F. In this system, decimal number 26 is equal to 1A in hexadecimal notation because 26/16 = 1 remainder 10 (that is, A), and 1/16 = 0 remainder 1.
- Your program should be a menu-driven and execute the chosen command. If you type 3, then exit the program.

```
                    M E N U

Binary (0), Octal (1), Hexadecimal (2)
Exit Program (3)

                  Choose?
```

- Deploy a stack that is implemented by a linked list.
- Show ALL your work. For example,

```
                    M E N U

Binary (0), Octal (1), Hexadecimal (2)
Exit Program (3)

                  Choose?  0  6

1 1 0

                    M E N U

Binary (0), Octal (1), Hexadecimal (2)
Exit Program (3)

                  Choose?  1  15
```

```
1 7

            M E N U

Binary (0), Octal (1), Hexadecimal (2)
Exit Program (3)

                Choose?  2  26

1 A
       .
       .
       .
```

2. Please refer source code in the textbook, Fig. 4.5 (pp. 137).

3. Submit your all source codes and results (e.g., screen copy) through the Blackboard before the due date, **Oct 7th, 2021 (Thursday) before midnight, 11:59 PM**. The TA will build and run your source codes and test with a random input.

- Source codes – The file name should be "your name + homework number", e.g., james_bond_3.cpp, james_bond_3.h, etc.
- Results in a word file (e.g., screen copy)