

**CS3353: Data Structures and Algorithm Analysis I
Fall 2022**

Homework #2

- Full name only: _____
- Release date: Sep 26, 2022 (Monday), 5:15 PM
- Due date: **Oct 05, 2022 (Wednesday), 4:00 PM**
- It should be done INDIVIDUALLY; Show ALL your work; Submit your source code and results through Canvas.
- Total: 20 pts

I. Write a program to convert a number from a decimal notation to a number expressed by a number system whose base 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 #2, 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 stack source code on Canvas.

3. Submit your all source codes and results (e.g., screen copy) through Canvas before the due date, **Oct 05, 2022 (Wednesday), 4:00 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_2.cpp, james_bond_2.h, etc.
- Results in a WORD file (e.g., screen copy)