CS3353: Data Structures and Algorithm Analysis I
Fall 2022

Homework #1

- Full name only: _____
- Release date: Sep 12, 2022 (Monday), 5:15 PM
- Due date: **Sep 21, 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

1. Write a program that can **insert**, **delete**, **search**, and **print** nodes using **single linked lists** and **double linked lists**. Here is a set of requirements to follow:
   - Type the homework number and your full name at the top in your source code.

     ```
     /* Homework #1, James Bond */
     ```

   - Your program should be a **menu-driven** and **execute the chosen operation**. If you type 12, then exit the program. An example of menu is below. Here, IH (Insert Head), IT (Insert Tail), DH (Delete Head), DT (Delete Tail), SD (Search & Delete), PS (Print Single Linked List), and PD (Print Double Linked List).

     ```
                  M E N U

         SLL: IH(0), IT(1), DH(2), DT(3), SD(4), PS(5)
         DLL: IH(6), IT(7), DH(8), DT(9), SD(10), PD(11)
         Exit Program (12)


                  Choose?
     ```

   - Each node consists of two (single linked list) or three (double linked list) components: value (integer or character), pointer to previous node (double linked list only), and pointer to next node.
   - Display an error message when a node to be searched or deleted does not exist. Or try to delete a node in the empty list.
   - Show ALL your work. For example,

     ```
                  M E N U

         SLL: IH(0), IT(1), DH(2), DT(3), SD(4), PS(5)
         DLL: IH(6), IT(7), DH(8), DT(9), SD(10), PD(11)
         Exit Program (12)


                  Choose? 0  a

                  M E N U

         SLL: IH(0), IT(1), DH(2), DT(3), SD(4), PS(5)
         DLL: IH(6), IT(7), DH(8), DT(9), SD(10), PD(11)
         Exit Program (12)


                  Choose? 1  b
     ```

```
                     M E N U

     SLL: IH(0), IT(1), DH(2), DT(3), SD(4), PS(5)
     DLL: IH(6), IT(7), DH(8), DT(9), SD(10), PD(11)
     Exit Program (12)

                      Choose? 0  c

                     M E N U

     SLL: IH(0), IT(1), DH(2), DT(3), SD(4), PS(5)
     DLL: IH(6), IT(7), DH(8), DT(9), SD(10), PD(11)
     Exit Program (12)

                      Choose? 5

c    a    b

                     M E N U

     SLL: IH(0), IT(1), DH(2), DT(3), SD(4), PS(5)
     DLL: IH(6), IT(7), DH(8), DT(9), SD(10), PD(11)
     Exit Program (12)

                      Choose? 4  b

                     M E N U

     SLL: IH(0), IT(1), DH(2), DT(3), SD(4), PS(5)
     DLL: IH(6), IT(7), DH(8), DT(9), SD(10), PD(11)
     Exit Program (12)

                      Choose? 5

c    a
                     M E N U

     SLL: IH(0), IT(1), DH(2), DT(3), SD(4), PS(5)
     DLL: IH(6), IT(7), DH(8), DT(9), SD(10), PD(11)
     Exit Program (12)

                      Choose? 4 d

     There is no such node in the list!

                      .
                      .
```

2. Please refer source codes in the lecture slides.

3. Submit your source code and results (e.g., screen copy) through Canvas before the due date, **Sep 21, 2022 (Wednesday), 4:00 PM**. The TA will build and run your source code and test with a random input.
   - Source code (one file only) – The file name should be "your name + homework number", e.g., james_bond_1.cpp or james_bond_1.java
   - Results (e.g., screen copy)