CS2413: Data Structures
Fall 2021

Homework #6

- Full name only: _____
- Release date: Nov 17th, 2021 (Wednesday)
- Due date: **Nov 30th, 2021 (Tuesday) 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 + 10 pts (Bonus)

1. Write a program to sort user input data using a set of sorting algorithms.

    - Type the homework number and your full name at the top of your source code.

      ```
      /* Homework #6, James Bond */
      ```

    - Your program should be a menu-driven and execute the chosen command. If you type 6, then exit the program.

      ```
                              M E N U

      Input Data (0), Insertion Sort (1), Selection Sort (2),
      Bubble Sort (3), Quick Sort (4), Radix Sort (5)
      Exit Program (6)

                             Choose?
      ```

    - A user can input a set of elements and select one of sorting algorithms to sort the recent input set. Show ALL your work. For example,

      ```
                              M E N U

      Input Data (0), Insertion Sort (1), Selection Sort (2),
      Bubble Sort (3), Quick Sort (4), Radix Sort (5)
      Exit Program (6)

                             Choose?  0  9  7  6  15  16  5  10  11

      9  7  6  15  16  5  10  11

                              M E N U

      Input Data (0), Insertion Sort (1), Selection Sort (2),
      Bubble Sort (3), Quick Sort (4), Radix Sort (5)
      Exit Program (6)

                             Choose?  1

      5  6  7  9  10  11  15  16
      ```

```
                        M E N U

Input Data (0), Insertion Sort (1), Selection Sort (2),
Bubble Sort (3), Quick Sort (4), Radix Sort (5)
Exit Program (6)

                      Choose?  0  2  8  6  1  10  15  3  12  11

2  8  6  1  10  15  3  12  11

                        M E N U

Input Data (0), Insertion Sort (1), Selection Sort (2),
Bubble Sort (3), Quick Sort (4), Radix Sort (5)
Exit Program (6)

                      Choose?  4

1  2  3  6  8  10  11  12  15
                         .
                         .
                         .
```

2. If you implement Radix sort using queues (see Textbook, pp. 522), then you will receive 10 bonus points. You must show your work by showing results. Here, you should implement a queue data structure based on your own way. You should not simply borrow any queue related library function provided by the system.

3. Please refer to the textbook for any related sorting algorithms and codes.

4. Submit your all source codes and results (e.g., screen copy) through the Blackboard before the due date, **Nov 30th, 2021 (Tuesday) before midnight, 11:59 PM**. The TA will build and run your source codes and test with random input data.

- Source codes – The file name should be "your name + homework number", e.g., james_bond_6.cpp, james_bond_6.h, etc.
- Results in a word file (e.g., screen copy) – If you do not submit results, 5 points will be deducted.