Data Structures
CS 246 - ON40
Department of Physics and Computer Science
Medgar Evers College
Exam 2

Direction: Modify the "exam02.cpp" file provided; you cannot include additional libraries. Afterwards, submit your typed work in the Exams directory of your github repository and/or as an attachment on Google classroom under the Exam02 assessment. All submissions should have their appropriate extensions.

Problem	Maximum Points	Points Earned
1	5	
2	5	
3	5	
4	5	
Total	20	

1. Construct an array trace table for each sorting algorithms (bubblesort, insertionsort, selectionsort) using the argument

   `[7,4,5,1,2,6,3]`

   Assume the algorithms are sorting the array in descending order. Furthermore, label each trace table with the name of the algorithm being traced. Likewise, only include swap operations in the table; a complete swap is considered a single step.

2. Write the definition of the function `BackAppend()` whose header is

   ```
   template <typename T>
   void BackAppend(Node<T>*& data,Node<T>* addon)
   ```

   Given that *data* and *addon* reference the heads of singly linked lists, the function appends the linked list referenced by *addon* to the end of the linked list referenced by *data*. However, if *data* references an empty list, it will reference the list referenced by *addon*. And if *addon* references an empty list, nothing changes. For instance, if *data* $= [a, b, c, d, e]$ and *addon* $= [f, g, h, i, j]$; then after the call of the function, *data* $= [a, b, c, d, e, f, g, h, i, j]$.

3. Write the definition of the function `NthOccurrence()` whose header is

   ```
   template <typename T>
   int NthOccurrence(Array<T>& data,const T& value,int n)
   ```

   It returns the index of the nth occurrence of *value* in *data*. If n is not positive, *value* appears less than n times in *data* or *data* is empty, it returns -1.

4. Write the definition of the function `IsSet()` whose header is

   ```
   bool IsSet(Array<int>& data)
   ```

   It returns true if *data* represents a set; otherwise, it returns false. A set is a collection of distinct objects that can be empty.