METU Department of Computer Engineering
CENG 707 Data Structures and Algorithms
Homework 2 – Fall 2019
Deadline: 18.11.2019
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1) Linked List:

a) [20 points] Implement a LinkedList class that supports services we discussed in class (most of the implementation is in our lecture slides; you merely need to collect them in a CPP file).

b) [30 points] Then use this class for the following application: Create two linked lists with random amount of random distinct integers selected from the range 0-30. Sort linked list with SelectionSort, which is described in our Sorting lecture slides 7, 8, and 9. Make sure you do the swaps by moving nodes explicitly (via remove and insert), not just by swapping the node values. Once two lists are sorted, append the second one to the first one. Finally, print the number of duplicated items in the resulting appended list.

2) Stacks:

a) [20 points] Implement a Stack class that supports services we discussed in class (most of the implementation is in our lecture slides; you merely need to collect them in a CPP file).

b) [30 points] Solve the following puzzle using the Stack class you implemented. Notice that you will need to do Backtracking for which the Stack is the most convenient data structure (see our lecture slides on Backtracking as well).

At each square of the puzzle you may move exactly the number of squares indicated by the integer in the square you are in. You may move either left or right but may not exceed the boundaries. The goal of the puzzle is to move the marker to the end. See the example steps to solve the puzzle below:

3	6	4	1	3	4	2	5	3	0
3	6	4	***1***	3	4	2	5	3	0
3	6	***4***	1	3	4	2	5	3	0
3	6	4	1	3	4	***2***	5	3	0
3	6	4	1	3	4	2	5	***3***	0
3	6	4	1	3	***4***	2	5	3	0
3	6	4	1	3	4	2	5	3	***0***

There are no negative numbers in the puzzle. There might be zeros (if you go there you are stuck). Printout Ls for left and Rs for right moves in the solution you found. Print two distinct solutions. You will receive +5 bonus points for each additional solution you print, up to +15 max bonus points.

Submission: Email to ys@ceng.metu.edu.tr your source code, executable, and screenshots.