

# Data Structures and Lab

## Assignment #2

### Linked List and applications

#### 1. Description.

Write the solution for each task separately.

- Please refer the examples for the input and output formats.
- Do not attempt to enter unnecessary or unrequested inputs.

※ Constraints: For problems from 1 to 3 use only necessary expressions and statements from Linked List power point slides. Pay attention to the task and constraints for each particular problem.

**[Example].** This problem is given as example, and you will need to modify this example code for other problems.

**Example task:** Write the code for Linked list that will place values in ascending order, without using any sorting algorithms such as Insertion, Selection, Bubble, Merge, Quick, Heap and others. Also, implementing delete function which deletes list's node based on value rather than index. Use characters 'i', 'p' and 'd' for insert, printing and delete methods, respectively

Input	Output
i 5	
i 3	
i 1	
i 6	
i 10	
i 6	
p	1 3 5 6 6 10
i -1	
p	-1 1 3 5 6 6 10
d -1	
p	1 3 5 6 6 10
d 10	
p	1 3 5 6 6
d 10	No such element in the list

**[Problem 1].** Use linked list's method to find the middle value in the list. Use 'm' for method Middle in options.

Input	Output
i 1	
i 2	
i 3	
i 4	
i 5	
p	1 2 3 4 5
m	3

Input 2	Output 2
i 1 i 2 i 3 i 4 i 5 i 6 p m	      1 2 3 4 5 6 4

**[Problem 2].** Modify the example code and use recursion rather than iteration for insertion. In addition, make the insertion method to discard duplicate values.

**Constraints:**

private methods :

List\* insertNode(int n , List\* cur, List\* prev);

public methods :

void insert(int n) ;

void print() ;

void deleteNode(int n) ;

Input	Output
i 5 i 3 i 1 i 6 i 10 i 6 p i -1 p d -1 p d 10 p d 10	      Duplicate value 1 3 5 6 10  -1 1 3 5 6 10  1 3 5 6 10  1 3 5 6 No such element in the list