ÇANKAYA UNIVERSITY

SENG 201 Data and Game Structures

Lab Assignment 1

In this assignment you will be given several tasks, and you need to implement the necessary methods.

1. Using the doubly-linked-list (DLinkedList) given below, implement the class having the following methods:
    a. A method called **"`swapFirstSecond`"** swaps the first and second nodes. Do not swap the nodes' data, but the references to the nodes.
    b. A method called **"`remove`"** that takes an integer *i* and removes the i^{th} node (starting from head) from the dlist and returns the removed data.
    c. A method called **"`removeFirst`"** removes the first node from the dlist and returns the removed data.
    d. A method called **"`removeLast`"** removes the last node from the dlist and returns the removed data.
    e. A method called **"`duplicate`"** that takes an integer *i* and creates a copy of the i^{th} node after itself in the dlist.
    f. A method called **"`addLast`"** that takes a "Type" data and adds it to the end of the dlist.

```
class DLinkedList<Type> {
      Node head;
      Node tail;
      int size;
}
```

```
class Node<Type> {
      Type data;
      Node next;
      Node prev;
}
```

2. Implement the **"MyQueue"** and the **"MyStack"** based on the **"DLinkedList"** you created on the first question. The data structures should have the API given below.

```
class MyQueue<Type> {
      void MyQueue<Type>();
      void enqueue<Type>();
      Type dequeue();
}
```

```
class MyStack<Type> {
      void MyStack <Type>();
      void push<Type>();
      Type pop();
}
```

You should submit one zip file name as **"YourNameSurname_Lab1.zip"** and it should contain at least:

- The DLinkedList.java file you have written with the implemented methods.
- The MyQueue.java file you have written with the implemented methods.
- The MyStack.java file you have written with the implemented methods.