Data Structures and Algorithms with Java CS2105
Singly Linked List [1-Mark]

Lab Goal: Practice how nodes are linked, traverse a singly linked list using next, and implement a simple search operation.

PART 1 - Provided to you is SinglyLinkedList.java. Read the code before starting. Do not change addFirst() or addLast(), and add the following two methods:

- Implement ***forwardTraversal()*** – Return type ***void***. The method starts from *head*, prints each element, and moves through *next* until the end of the list
- Implement ***contains(E value)*** – Return type ***Boolean***. The method returns *true* if the value exists; otherwise, it returns *false*.

PART 2 - Create a test program - TestSinglyLinkedList.java - with a main method and do the following:

1. **At the beginning of the program, print your full name in the following format:**
   Student Full Name is: Your full name.
2. **Create two linked lists:**
   a. SinglyLinkedList <Integer> list1 = new SinglyLinkedList<>();
   b. SinglyLinkedList <Integer> list2 = new SinglyLinkedList<>();
3. **Use addFirst() with list1 to insert the following nodes (in this order):**
   100, 200, 300, 400
   Then print the list using forwardTraversal().
4. **Use addLast() with list2 to insert the same nodes (in the same order):**
   100, 200, 300, 400
   Then print the list using forwardTraversal().
5. **Compare the output of both lists and write your answer for the following (2–3 sentences):**
   a. What is the difference in the order of elements?
   b. Why does this difference happen?
6. **Test *contains* method with list2: search for 900 then for 100**
7. **Create another linked list of type String, insert several elements, and test your implementation.**

Sample output

```
Student Full Name is: Your full name

List 1:
400 -> 300 -> 200 -> 100

List 2:
100 -> 200 -> 300 -> 400

Does list2 contain 300? true
Does list2 contain 500? false

List 3:
ABC -> DEF -> GHI -> JKL
Does list3 contain ABC? true
```

Submission Notes

1. **Submit the following files via Blackboard before the deadline:**
   - SinglyLinkedList.java
   - TestSinglyLinkedList.java
   - A PDF file that includes:
     - Screenshot of the output.
     - Your written answer (2–3 sentences) comparing addFirst and addLast

Important: Half a mark will be deducted for late submission, incomplete submission, or absence without an excuse.

Good luck