CS2050: Computer science 2

Project 4 **Two-Way Linked Lists**

Total Points (60 pts)

**Due: April 9, 2022 @ 11:59**

(*Implement a doubly linked list*)

The [**MyLinkedList**](https://msudenver.instructure.com/courses/54690/files/11140892?wrap=1) class in canvas is a one-way directional linked list that enables one-way traversal of the list.

**Tasks**:

1. Modify the **Node** class to add the new data field name **previous** to refer to the previous node in the list, as follows:

**public class** Node<E> {

E element;

Node<E> next;

Node<E> previous;

**public** Node(E e) {

element = e;

}

}

1. Implement a new class named **TwoWayLinkedList** that uses a doubly linked list to store elements.
2. Define **TwoWayLinkedList** to implements **MyList**.
3. You need to implement all the methods defined in **MyLinkedList** as well as the methods **listIterator()** and **listIterator(int index)**. Both return an instance of **java.util.ListIterator<E>** (see Figure 20.4 page 784 in the textbook). The former sets the cursor to the head of the list and the latter to the element at the specified index.
4. Test your new class using the following code:

import java.util.Iterator;

import java.util.ListIterator;

import java.util.LinkedList;

import java.util.Scanner;

import java.util.Collection;

public class Project4 {

public static void main(String[] args) {

new Project4 ();

}

public Project4 () {

TwoWayLinkedList<Double> list = new TwoWayLinkedList<>();

System.out.print("Enter five numbers: ");

Scanner input = new Scanner(System.in);

double[] v = new double[5];

for (int i = 0; i < 5; i++)

v[i] = input.nextDouble();

list.add(v[1]);

list.add(v[2]);

list.add(v[3]);

list.add(v[4]);

list.add(0, v[0]);

list.add(2, 10.55);

list.remove(3);

java.util.ListIterator<Double> iterator1 = list.listIterator();

while (iterator1.hasNext())

System.out.print(iterator1.next() + " ");

java.util.ListIterator<Double> iterator2 = list.listIterator(list.size() - 1);

System.out.println();

while (iterator2.hasPrevious())

System.out.print(iterator2.previous() + " ");

}

}

What to submit?

1. Compile and Submit to canvas (you must submit the program regardless whether it is complete or incomplete, correct or incorrect) (Your test class name is Project4)

2. Paste your screen shot of the sample run here:

A screenshot of a computer

Description automatically generated with medium confidence