

Coordinate and SinglyLinkedList

Objective: To use the `Coordinate` class as values and test the `SinglyLinkedList` class.

Assignment:

Download the `SinglyLinkedList.zip` file from Mr Greenstein's web site. Unzip the file and it will create the `SinglyLinkedList` directory. Do all of your work in that directory.

The zip file contains four files: `Coordinate.java`, `ListNode.java`, `SinglyLinkedList.java`, and `SinglyLinkedListTester.java`. The `Coordinate` class is the value in your linked list, the `ListNode` is a generic node, and `SinglyLinkedListTester` is the test program. All three of these programs are complete and will compile and run. Your job is to complete the `SinglyLinkedList` file by adding functionality.

Once `SinglyLinkedList` is complete, run `SinglyLinkedListTester`. Here is a sample run:

```
% java SinglyLinkedListTester

Singly Linked List Tester
-----
1. Testing add(E value)
[ 0, 0]; [ 0, 1]; [ 0, 2]; [ 1, 0]; [ 1, 1]; [ 1, 2]; [ 2, 0]; [ 2, 1]; [ 2, 2];

2. Testing add(int index, E value)
[ 0, 2]; [ 1, 0]; [ 2, 0]; [ 1, 2]; [ 0, 1]; [ 1, 1]; [ 2, 1]; [ 2, 2]; [ 0, 0];
ERROR: no index = 20

3. Testing clear()
List after clear():

4. Testing size()
[ 0, 0]; [ 0, 1]; [ 0, 2]; [ 1, 0]; [ 1, 1]; [ 1, 2]; [ 2, 0]; [ 2, 1]; [ 2, 2];
size = 9

5. Testing E get(int index)
Before:
[ 0, 0]; [ 0, 1]; [ 0, 2]; [ 1, 0]; [ 1, 1]; [ 1, 2]; [ 2, 0]; [ 2, 1]; [ 2, 2];
index = 7    Coordinate = [ 2, 1]
index = 5    Coordinate = [ 1, 2]
ERROR: no index = 100

6. Testing set(int index, E value)
Before:
[ 0, 0]; [ 0, 1]; [ 0, 2]; [ 1, 0]; [ 1, 1]; [ 1, 2]; [ 2, 0]; [ 2, 1]; [ 2, 2];
index = 5    oldCoord = [ 1, 2]
newCoord = [ 111, 222]
After:
[ 0, 0]; [ 0, 1]; [ 0, 2]; [ 1, 0]; [ 1, 1]; [ 111, 222]; [ 2, 0]; [ 2, 1]; [ 2, 2];
ERROR: no index = 200

7. Testing remove(int index)
Before:
[ 0, 0]; [ 0, 1]; [ 0, 2]; [ 1, 0]; [ 1, 1]; [ 111, 222]; [ 2, 0]; [ 2, 1]; [ 2, 2];
Remove index = 3    Coordinate = [ 1, 0]
After:
[ 0, 0]; [ 0, 1]; [ 0, 2]; [ 1, 1]; [ 111, 222]; [ 2, 0]; [ 2, 1]; [ 2, 2];
Remove index = 2    Coordinate = [ 0, 2]
After:
[ 0, 0]; [ 0, 1]; [ 1, 1]; [ 111, 222]; [ 2, 0]; [ 2, 1]; [ 2, 2];
ERROR: no index = 250

8. Testing isEmpty (and copy constructor) until list is empty
```

```
Before:
[ 0, 0]; [ 0, 1]; [ 1, 1]; [ 111, 222]; [ 2, 0]; [ 2, 1]; [ 2, 2]; [ 0, 0]; [ 0, 1]; [ 0, 2];
[ 1, 0]; [ 1, 1]; [ 1, 2]; [ 2, 0]; [ 2, 1]; [ 2, 2];
After:
```

9. Testing contains

```
Before:
[ 0, 0]; [ 0, 1]; [ 1, 1]; [ 111, 222]; [ 2, 0]; [ 2, 1]; [ 2, 2];
contains(2, 1) = true
contains(2, 0) = true
contains(2, 3) = false
```

10. Testing indexOf(E value)

```
Before:
[ 0, 0]; [ 0, 1]; [ 1, 1]; [ 111, 222]; [ 2, 0]; [ 2, 1]; [ 2, 2];
s11.indexOf((1, 2)) = -1
s11.indexOf((3, 2)) = -1
```