Karan Bharaj (T00693289). Assignment 3- COMP 2231

Question 1

To answer the question, the methods push(), pop(), peek(), isEmpty(), size(), toString() in LinkedListStack.java (using java.util.LinkedList) were executed in the driver (as shown below):

Linkeuliststack.java (using java.utii.Linkeulist) were executed i
====== QUESTION 1 ======
New LinkedListStack "scientists" created
i i
using LinkedListStack.java
Check to see if scientists is empty
The stack "scientists" is empty: true
line stack scientists is empty. title
Four scientists added to the stack
Tour screnors of added to the stack
i I
Print-out of members in "scientists":
Richard Feynman
Robert Hooke
Isaac Newton
Albert Einstein
peek() method executed on "scientists"
Scientist at the top of the stack: Richard Feynman
oine() marked malled on Wardenstern
size() method called on "scientists"
Size of the stack: 4
()
pop() method executed on "scientists"
Scientist removed from stack: Richard Feynman
()
pop() method executed on "scientists"
Scientist removed from the stack: Robert Hooke
size() method called on "saigntists"
size() method called on "scientists"
Size of the stack: 2
Print-out of members in the "scientists" stack:
Isaac Newton
Albert Einstein
WIDELC WINSCEIN
peek() method executed on "scientists"
Scientist at the top of the stack: Isaac Newton
Sciencist at the top of the Stack: Isaac Newton
Check to see if scientists is empty
The stack "scientists" is empty: false
The Souch Scientists is empty, laise

- New LinkedListStack() called "scientists" created
- isEmpty() method checked on stack "scientists" when empty
- Push() method called four times to add four scientist names to the stack
- toString() method call to return the members of the stack (topmost element is the last name entered)
- Peek() method called to return topmost name in the stack
- Size() method called to return number of members in the stack
- Pop() method called to remove topmost member
- Pop() method called again to remove topmost member
- Size() method called to return number of members in the stack
- toString() method call to return the members of the stack
- Peek() method called to return topmost name in the stack
- isEmpty() method checked on stack "scientists" when not empty

- --- pop() method executed on "scientists" --Scientist removed from the stack: Isaac Newton

 --- pop() method executed on "scientists" --Scientist removed from the stack: Albert Einstein

 --- size() method called on "scientists" --Size of the stack: 0

 --- Check to see if scientists is empty--The stack "scientists" is empty: true
- Pop() method called again to remove topmost member
- Pop() method called again to remove topmost member
- Size() method called to return number of members in the stack
- isEmpty() method checked on stack when empty again

Question 2

To answer the question, the methods push(), pop(), peek(), isEmpty(), size(), toString() in ArrayListStack.java (using java.util.ArrayList) were executed in the driver (as shown below):

======= QUESTION 2 ======	
New ArrayListStack "scientists" created using ArrayListStack.java	New ArrayListStack() called "scientists" created
Check to see if scientists is empty The stack "scientists" is empty: true	• isEmpty() method checked on stack "scientists" when empty
Four scientists added to the stack	 Push() method called four times to add four scientist names to the stack
Print-out of members in "scientists": Richard Feynman Robert Hooke Isaac Newton Albert Einstein	• toString() method call to return the members of the stack (topmost element is the last name entered)
peek() method executed on "scientists" Scientist at the top of the stack: Richard Feynman	 Peek() method called to return topmost name in the stack
size() method called on "scientists" Size of the stack: 4	• Size() method called to return number of members in the stack
pop() method executed on "scientists" Scientist removed from stack: Richard Feynman	• Pop() method called to remove topmost member
pop() method executed on "scientists" Scientist removed from the stack: Robert Hooke	• Pop() method called again to remove topmost member
size() method called on "scientists" Size of the stack: 2	• Size() method called to return number of members in the stack
Print-out of members in the "scientists" stack: Isaac Newton Albert Einstein	• toString() method call to return the members of the stack
peek() method executed on "scientists" Scientist at the top of the stack: Isaac Newton	 Peek() method called to return topmost name in the stack
Check to see if scientists is empty The stack "scientists" is empty: false	• isEmpty() method checked on stack "scientists" when not empty

--- pop() method executed on "scientists" --Scientist removed from the stack: Isaac Newton

--- pop() method executed on "scientists" --Scientist removed from the stack: Albert Einstein

--- size() method called on "scientists" --Size of the stack: 0

--- Check to see if scientists is empty---

The stack "scientists" is empty: true

- Pop() method called again to remove topmost member
- Pop() method called again to remove topmost member
- Size() method called to return number of members in the stack
- isEmpty() method checked on stack when empty again

Question 3

To answer the question, the methods enqueue(), dequeue(), first(), isEmpty(), size(), toString() in LinkedListQueue.java (using java.util.LinkedList) were executed in the driver (as shown below):

```
====== QUESTION 3 =====
--- New LinkedListQueue "scientists" created ---
----- using LinkedListQueue.java ------
--- Check to see if scientists is empty ---
The queue "scientists" is empty: true
--- Four scientists added to the queue ---
--- Print-out of members in "scientists": ---
Albert Einstein
Isaac Newton
Robert Hooke
Richard Feynman
--- first() method executed on "scientists" ---
Scientist at the front of the queue: Albert Einstein
--- size() method called on "scientists" ---
Size of the queue: 4
--- dequeue() method executed on "scientists" ---
Scientist removed from queue: Albert Einstein
--- dequeue() method executed on "scientists" ---
Scientist removed from the queue: Isaac Newton
--- size() method called on "scientists" ---
Size of the queue: 2
Print-out of members in the "scientists" queue:
Robert Hooke
Richard Feynman
--- first() method executed on "scientists" ---
Scientist at the front of the queue: Robert Hooke
--- Check to see if scientists is empty---
The queue "scientists" is empty: false
```

- New LinkedListQueue() called "scientists" created
- IsEmpty() method checked on the queue "scientists" when empty
- Enqueue() method called four times to add four names to the queue
- toString() method call to show the members of the queue (topmost element is the front of the queue)
- First() method called to return frontmost member of the queue
- Size() method called to return number of members in the queue
- Dequeue() method called to remove frontmost member
- Dequeue () method called again to remove frontmost member
- Size() method called to return number of members in the queue
- toString() method call to return the members of the queue
- First() method called to return frontmost name in the queue
- isEmpty() method checked on queue "scientists" when not empty

- --- dequeue() method executed on "scientists" --- Dequeue() method called again to Scientist removed from the queue: Robert Hooke --- dequeue() method executed on "scientists" ---Scientist removed from the queue: Richard Feynman --- size() method called on "scientists" ---Size of the queue: 0 --- Check to see if scientists is empty---The queue "scientists" is empty: true
 - remove frontmost member
 - Dequeue() method called again to remove frontmost member
 - Size() method called to return number of members in the queue
 - isEmpty() method checked on queue when empty again

Question 4

To answer the question, the methods enqueue(), dequeue(), first(), isEmpty(), size(), toString() in ArrayListQueue.java (using java.util.ArrayList) were executed in the driver (as shown below):

```
==== QUESTION 4 ==
--- New ArrayListQueue "scientists" created ---
----- using ArrayListQueue.java ------
--- Check to see if scientists is empty ---
The queue "scientists" is empty: true
--- Four scientists added to the queue ---
--- Print-out of members in "scientists": ---
Albert Einstein
Isaac Newton
Robert Hooke
Richard Feynman
--- first() method executed on "scientists" ---
Scientist at the front of the queue: Albert Einstein
--- size() method called on "scientists" ---
Size of the queue: 4
--- dequeue() method executed on "scientists" ---
Scientist removed from queue: Albert Einstein
--- dequeue() method executed on "scientists" ---
Scientist removed from the queue: Isaac Newton
--- size() method called on "scientists" ---
Size of the queue: 2
Print-out of members in the "scientists" queue:
Robert Hooke
Richard Feynman
--- first() method executed on "scientists" ---
Scientist at the front of the queue: Robert Hooke
--- Check to see if scientists is empty---
The queue "scientists" is empty: false
```

- New ArrayListQueue() called "scientists" created
- IsEmpty() method checked on the queue "scientists" when empty
- Enqueue() method called four times to add four names to the queue
- toString() method call to show the members of the queue (topmost element is the front of the queue)
- First() method called to return frontmost member of the queue
- Size() method called to return number of members in the queue
- Dequeue() method called to remove frontmost member
- Dequeue () method called again to remove frontmost member
- Size() method called to return number of members in the queue
- toString() method call to return the members of the queue
- First() method called to return frontmost name in the queue
- isEmpty() method checked on queue "scientists" when not empty

- --- dequeue() method executed on "scientists" ---Scientist removed from the queue: Robert Hooke
- --- dequeue() method executed on "scientists" --- Scientist removed from the queue: Richard Feynman
- --- size() method called on "scientists" --- Size of the queue: 0
- --- Check to see if scientists is empty---The queue "scientists" is empty: true

- Dequeue() method called again to remove frontmost member
- Dequeue() method called again to remove frontmost member
- Size() method called to return number of members in the queue
- isEmpty() method checked on queue when empty again