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):

```
          ======== QUESTION 1 ========

--- New LinkedListStack "scientists" created ---
---------  using LinkedListStack.java  ---------


--- Check to see if scientists is empty ---
The stack "scientists" is empty: true


--- Four scientists added to the stack ---


--- 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


--- 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 "scientists" ---
Size of the stack: 2


Print-out of members in the "scientists" stack:
Isaac Newton
Albert Einstein


--- peek() method executed on "scientists" ---
Scientist at the top of the stack: Isaac Newton


--- Check to see if scientists is empty---
The stack "scientists" is empty: false
```

- 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  ---------


--- Check to see if scientists is empty ---
The stack "scientists" is empty: true


--- Four scientists added to the stack ---


--- 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


--- 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 "scientists" ---
Size of the stack: 2


Print-out of members in the "scientists" stack:
Isaac Newton
Albert Einstein


--- peek() method executed on "scientists" ---
Scientist at the top of the stack: Isaac Newton


--- Check to see if scientists is empty---
The stack "scientists" is empty: false
```

- New ArrayListStack() 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
```

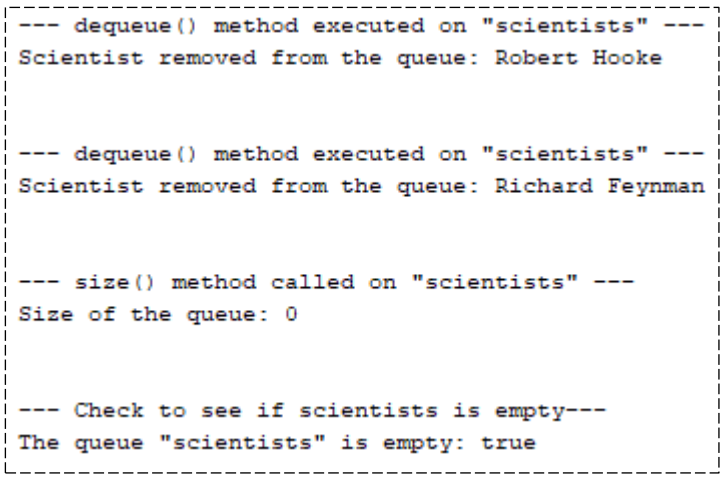
- Pop() method called again to remove topmost member
- Pop() method called again to remove topmost member
- Size() method called to return number of members in the stack
- isEmpty() method checked on stack when empty again

Question 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



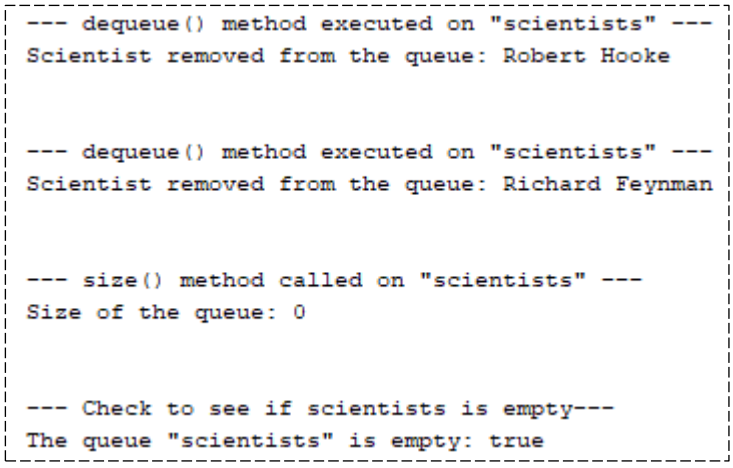
- Dequeue() method called again to remove frontmost member
- Dequeue() method called again to remove frontmost member
- Size() method called to return number of members in the queue
- isEmpty() method checked on queue when empty again

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 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