Solutions to Tutorial 10: - Abstract Data Types (ADTs) (2): Queues and Lists

Tasks:

Complete the following.

Task 1: Test the Java implementation of a `Queue Class` given in ArrayQueue.java using the class tester in WS1001 (Download the Java code from Blackboard)

a. Explain the structure of this program;
b. Observe the behaviours of this program by running it a few times.

Running result (run ArrayQueueTest class in WS1001)

```
starting...
insert: 40
insert: 73
insert: 49
insert: 2
insert: 27
insert: 76
insert: 56
insert: 60
insert: 91
insert: 66
remove: 40
remove: 73
remove: 49
remove: 2
remove: 27
remove: 76
remove: 56
remove: 60
remove: 91
remove: 66
Done ;-)
```

Task 2: Test the Java implementation of the `ArrayList Class` given in WS1002. (Note that it takes Cities.txt as input text file) (Download the Java code from Blackboard)

a. Notice the invocation of `add()` and `remove()` methods provided by the `ArrayList Class`;
b. Execute this program and analyse the results corresponding to individual method invocations in the program.

Running result:

```
[Tokyo, Mexico City, Sao Paulo, Seoul, New York, Osaka, Bombay, Calcutta, Buenos Aires]
[Tokyo, Mexico City, Sao Paulo, New York, Bombay, Shanghai, Los Angeles, Calcutta, Buenos Aires]
```

Task 3: Test the Java program WS1003 to observe the behaviors of the `list Iterator` (download the Java code from Blackboard)

a. Analyse the potential behaviours of running this program;
b. Execute this program and compare your analysis with the executed results.

Running result

```
[Tokyo, Mexico City, Sao Paulo, Seoul, New York, Osaka, Bombay, Calcutta, Buenos Aires]
it.next() = Tokyo
it.next() = Mexico City
it.next() = Sao Paulo
it.next() = New York
```

Task 4: Devise an alternative Java implementation of WS1004 using the `LinkedList Class` (Download the Java code WS1004 from Blackboard ONLY IF you could not devise an alternative program).

a. Execute your program;
b. Discuss the results obtained from running these two programs.

Running result

```
[Tokyo, Mexico City, Sao Paulo, Seoul, New York, Osaka, Bombay, Calcutta, Buenos Aires]
[Tokyo, Mexico City, Sao Paulo, New York, Bombay, Shanghai, Los Angeles, Calcutta, Buenos Aires]
```