Lecture 8.3 Programming Exercise

Customers arrive at a bank and make various transactions. When a customer arrives, if there is a line the customer waits in line until a bank teller becomes available, and then is serviced by the teller. This type of waiting line is called a first-in-first-out (FIFO) or first-come-first-serve (FCFS) waiting line model or queue. The Java `LinkedList` class is a pretty good class for implementing a waiting line model like this in code.

Write a program that uses a `LinkedList` object to store a list of customers in a FIFO queue. We will assume that each customer has a name and may require a different amount of time to be serviced, and that this time is randomly distributed between 1 minute and 20 minutes. These two data elements should be defined as part of a `Customer` class. Write a program that prompts the user to either add a customer to the queue or to quit. When a user adds a customer, the program prompts the user for a customer name and randomly generates a service time for the customer. When the user quits, the program will display the customers (i.e., the customer name and service time) in the queue, in the order in which they were added.

For this exercise, you can use the `java.util.Random` class to generate random numbers, as follows:

```
Random rnGenerator = new Random( rnSeed );      // creates a Random object
shelfLife = rnGenerator.nextInt( 20 ) + 1;      // next int in range 0 to 30
```

You have already used this class in one or more previous exercises. The first statement above instantiates a `Random` object called `rnGenerator`. The constructor argument `rnSeed` is called a random number seed. It is of type `long`, and is used to help ensure that the same sequence of random numbers is generated each time your program is run. The `nextInt()` method returns a random integer in the range 0 to 19.