# Homework #5

Assigned: 3/21/22
Due: 4/8/22 by 5 PM

A web-server is managing customer purchase data for an online retailer, selling computer hard drives (somehow). The retailer has a limited supply of product, and therefore must implement a **Queue** in order to most effectively serve the customers. Your **Queue** will contain several **CustomerOrder** objects, which will contain the essential data a customer may enter to order something. Furthermore, your **Queue** must use a linked data structure, you're heavily encouraged to use **LinkedQueue** as a basis for this assignment. The code for **LinkedQueue** will be available for you on Brightspace by 3/22.

Note: You will lose considerable points if you fail to use a **Queue** and fail to use a Linked data structure. If you use an Array to do this, you're probably doing something wrong. There are no Tree's in this assignment, that will be later on. Furthermore, **you should not import Java's LinkedList, and will be penalized heavily if you do so.**

Prepare the following Class's:

- **CustomerOrder:**
  - Contains instance variables for name, date (use a string here), quantity
    - Note: Name and date will be unused, but should be included for completeness
  - Contains a default constructor to make a **null** customer
  - Contains a parameterized constructor to set up a customer
  - Implement a method to ship this customer a product. This will simply decrement quantity by one, **unless** quantity would become negative.

- **OrderQueue:**
  - Contains a **LinkedQueue** of **CustomerOrders**
  - Contains instance variables for stock (a number), size of queue
  - Contains a default constructor to set up an empty queue with no stock
  - Contains a parameterized constructor to set up an order queue, with a stock that is passed as a parameter.
  - Implement a method to add a new order to the queue. This method should construct a CustomerOrder (taking all the necessary data), and **enqueue** it to the order queue.
  - Implement a method to add additional stock. This simple method should take a single integer, and merely add it to the instance variable **stock**
  - Implement a method that will take the customer at the front of the queue, and fulfill one of their orders by decrementing their quantity by one, and the stock in the **OrderQueue** by one. If the customers quantity becomes 0, they should be **dequeued**.
  - Implement a method that will sell the remaining stock to each customer at the front of the queue until the stock is 0. You should use a **while** loop to accomplish this.
  - Implement a toString method that simply prints the quantity of the **CustomerOrder** at the front of the queue.

- **OrderTester:**
  - Contains a main function that will:
    - Instantiate an **OrderQueue** with a stock of 12.
    - Enqueue three customer orders with a positive balance, and quantities of 3, 5, and 8.
    - Print the **OrderQueue**
    - Clear the stock by filling as many orders as possible with the original stock of 12.
    - Print the **OrderQueue**
    - Add an additional 8 units to stock
    - Add three additional customer orders, with quantities of 2, 2, 5
    - Clear the stock by filling as many orders as possible with the new stock of 8
    - Print the **OrderQueue**

Expected output:
3
4
5

Submit .java files **in a .zip file** for each of the above to Brightspace link for Homework #5.