CSCI 2073 – Programming Assignment 3 – Fall 2019

Inventory management is a crucial function for any product-oriented business. When a company sells goods, the company must keep track of the cost of the goods sold. In the USA, there are two commonly used methods to determine the cost or valuation of items in inventory: FIFO and LIFO. In the FIFO case, the assumption is that the first goods purchased became the first goods sold, as shown below.

FIFO Example	Units	Cost per unit	Price per unit	FIFO cost of goods sold	FIFO inventory balance	FIFO gross profit	Comments
Purchase	100	$ 20.00			$ 2,000.00	$ -	
Sale	70		$ 30.00	$ 1,400.00	$ 600.00	$ 700.00	
Purchase	80	$ 21.00			$ 2,280.00	$ 700.00	Inventory: 30 units at $20 + 80 units at $21
Sale	40		$ 30.00	$ 810.00	$ 1,470.00	$ 1,090.00	Cost: 30 units at $20 + 10 units at $21
Sale	20		$ 30.00	$ 420.00	$ 1,050.00	$ 1,270.00	Cost: 20 units at $21
Purchase	100	$ 22.00			$ 3,250.00	$ 1,270.00	Inventory: 50 units at $21 + 100 units at $22

In the LIFO method, the cost of goods sold is estimated using the most recently purchased items:

LIFO Example	Units	Cost per unit	Price per unit	LIFO cost of goods sold	LIFO inventory balance	LIFO gross profit	Comments
Purchase	100	$ 20.00			$ 2,000.00		
Sale	70		$ 30.00	$ 1,400.00	$ 600.00	$ 700.00	
Purchase	80	$ 21.00			$ 2,280.00	$ 700.00	Inventory: 30 units at $20 + 80 units at $21
Sale	40		$ 30.00	$ 840.00	$ 1,440.00	$ 1,060.00	Cost: 40 units at $21
Sale	20		$ 30.00	$ 420.00	$ 1,020.00	$ 1,240.00	Cost: 20 units at $21
Purchase	100	$ 22.00			$ 3,220.00	$ 1,240.00	Inventory: 30 at $20 + 20 at $21 + 100 at $22

Since the method chosen can have significant effects on taxes and financial reports, your company has assigned your team the task of writing software that will assist management in making a decision as to what method to choose for its operations. Your task is to write two classes: **FifoManager** and **LifoManager**, which implement the **InventoryControl** interface, which includes the methods:

- `purchase`: adds the specified number of units at the given price to the inventory system.
- `sale`: removes the specified number of units from the system and returns the cost of the units sold.
- `grossProfit`: returns the gross profit accumulated based on all purchases and sales to date.
- `balance`: returns the total cost of inventory after all purchases and sales are recorded.

Each class should also override `toString()` so that it returns a String that contains a description of the various types of units currently included in the inventory.

Your solution should be stored in the **FifoManager.java** and **LifoManager.java** source files. Your solution may include additional classes if needed. In addition, use the StackInt.java and LinkedStack.java files provided. Any stacks and queues must be declared as follows:

```
StackInt<Type> myStack = new LinkedStack<>();
Queue<Type>  myQueue = new LinkedList<>();
```

The source file **InvControlTest.java** will be provided to help you test some of the functionality of your class. However, you should test it more thoroughly before submitting it for grading. When finished, submit FifoManager.java and LifoManager.java (and any other source files you developed) to Mimir for testing. Do not submit InvControlTest.java, StackInt.java, LinkedStack.java, nor any .class files to Mimir. Comments for your classes and its methods should follow *javadoc* guidelines.