CS2413: Data Structures
Fall 2021

Lab Assignment #5

- Release date: Sep 28th, 2021 (Tuesday)
- Due date: Sep 30th, 2021 (Thursday) 11:59 PM
- Please turn in your codes through Blackboard in the **same file in .cpp format**. Do **NOT** compress/zip your submission. This is to ensure faster grading.
- Please name your submission file starting with "LastName_FirstName_Lab05"
- Total: 30 pts

Problem:

When a share of common stock of some company is sold, the capital gain (or sometimes loss) is the difference between the share's selling price and the price originally paid to buy it. This rule is easy to understand for a single share, but if we sell multiple shares of stock bought over a long period of time, then we must identify the shares being sold. A standard accounting principle for identifying which shares of a stock were sold in such a case is to use FIFO protocol- the shares sold are the ones that have been held the longest (indeed, this is the default method built into several personal finance software packages).

Example:

Suppose we buy 100 shares at 20$ each on day 1, 20 shares each at 24$ on day 2, 200 shares each at 36$ on day 3. And then sell 150 shares on day 4 at 30$ each. Applying the FIFO protocol means that of the 150 shares sold, 100 were bought on day 1, 20 were bought on day 2 and 30 were bought on day 3. The capital gain in this case would therefore be 100*10 + 20*6 + 30*(-6) = 940$.

Task:

Write a C++ program that takes as input a sequence of transactions of the form **"`buy x share(s) at $y each`"** or **"`sell x share(s) at $y each`"**, if the transactions occur on consecutive days and the values x and y are integers. Given this input sequence, the output should be the total capital gain or loss for the entire sequence, using FIFO protocol to identify shares.

Help:

You may use Queue from C++ STL. Queues are a type of container adaptors which operate in a first in first out (FIFO) type of arrangement. Elements are inserted at the back (end) and are deleted from the front.