

Input Failure Control and Decisions:**Simple Stock Portfolio Tracker**

For this project you will modify and extend your implementation for Project 1 to employ an input-failure/sentinel loop and more sophisticated calculations. The input and output files will be radically different.

Sample input data:

Here is a sample input file, named `StockData.txt`, for the program. The first line specifies the name of the customer, and the second specifies the customer's account number. The third line specifies the report date. Each of the remaining lines specifies the name of a particular stock, the number of shares the customer holds, and the initial, high, low, and final prices for the stock. These values are separated by single tab characters.

Customer Name	Terry Pratchett				
Account #	520-103205-2817-56				
Report Date	02/21/2002				
IBM	1856	67.90	72.49	58.23	62.42
AT&T	7689	9.31	14.14	5.21	5.21
Lucent	8020	1.60	4.29	0.01	0.59
FannieMae	821	71.51	81.32	61.80	67.15
PepsiCo	9497	40.52	42.09	39.00	42.02
End of data.	0	0.00	0.00	0.00	0.00

The final line of stock data may (or may not) be followed by a sentinel line as shown above. There is no limit on the number of lines of stock data that may be supplied; your program must terminate properly when the sentinel value is detected, or when the input stream fails, whichever occurs first. If there is a sentinel line, the period will be followed by a tab character to be consistent with the preceding lines of stock data.

The input values are guaranteed to be syntactically and logically correct. The customer name, account number and date are just string data. For formatting purposes, you may assume that the customer name will be no more than 40 characters long, and the account number and date will be no longer than the ones shown above.

Calculations:

For each of the given stocks, you will calculate the change in total value of all the shares the customer holds, and the percentage change in the value of a single share of the stock.

As before, the percentage change is the change in value as a percentage of the initial stock price. One change from the previous project is that the total change and percentage change are now reported as signed values.

We add a summary report, including the total initial and final value for all the shares of all the stocks, the overall change, and the overall percentage change.

The comments on representing monetary values given for Project 1 still apply.

Sample output:

The first two lines of the output file just identify the programmer and project. Next there is a blank line. The next line specifies the customer name and account number, and the next specifies the report date. The next line gives the headers for the stock report table.

Each line of the stock report table gives the number of shares, initial and final price, total change and percentage change for one stock. The table is bounded above and below by a single line of delimiters. The first summary line gives the overall summary data for the entire stock portfolio. Next there is a blank line, followed by a report on how many stocks increased in value and how many decreased in value. (Stocks with unchanged value are not counted.)

All monetary amounts are to be reported to two decimal places; the percentage changes are to be reported to three decimal places, as shown above.

Here is a sample output file, named `Summary.txt`, which corresponds to the input data given above:

```

Programmer: William D McQuain
CS 1044 Simple Portfolio Tracker

Customer: Terry Pratchett 520-103205-2817-56
Date: 02/21/2002
Stock      Shares      Open      Close      Change      % Change
-----
IBM        1856        67.90     62.42     -10170.88   -0.081
AT&T      7689         9.31      5.21     -31524.90   -0.440
Lucent    8020         1.60      0.59     -8100.20    -0.631
FannieMae 821         71.51     67.15    -3579.56    -0.061
PepsiCo   9497         40.52     42.02     14245.50    0.037
-----
Summary                653967.14  614837.10  -39130.04   -0.060

Winners: 1
Losers: 4

```

If you have read the description of how the Curator scores your program in the *Student Guide*, you know that is important that you use the same spelling and capitalization for all the labels shown above. The horizontal spacing does not effect scoring unless you combine things that should be separate or separate things that should be combined. You are free to experiment with the horizontal layout but you should try to align the columns neatly.

Suggested implementation plan:

You should design your solution piece by piece. Begin by identifying the major tasks that have to be done, and then add detail for each of those tasks. Your implementation should be developed in the same manner. Here's a suggested order of implementation.

First, implement the input code to read the customer name, account number and date, and write the output code to print them back out in the specified format. This will require declaring the appropriate stream variables and setting up the file streams, and declaring and using variables to store the input values. Test this code and make sure it produces correct results. Once you know this part works you should never have to worry about it again.

Second, implement the input code to read the stock name and other stock data, assuming the sentinel line is present. Add code to just echo the values you read in, to be sure you're reading them correctly, and stopping at the right place. Next, modify this code to also stop correctly on an input failure, and test that (both with and without a sentinel line).

Then add the code to calculate the unit and total change in the stock value and to print them. Test this code. Add the calculation of the percentage change in the total value. Finally, test all of this code now to be sure it works.

By implementing the program feature by feature you let yourself concentrate on solving one small part of the problem at a time. You also should only have to test one part of it at a time as well.

Evaluation:

Everything that you have been told about testing in class applies here. Do not waste submissions to the Curator in testing your program! There is no point in submitting your program until you have verified that it produces correct results on the sample data files that are provided. If you waste all of your submissions because you have not tested your program adequately then you will receive a low score on this assignment. You will not be given extra submissions.

Your submitted program will be assigned a score, out of 100, based upon the runtime testing performed by the Curator System. We will also be evaluating your submission of this program for documentation style and a few good coding practices. This will result in a deduction (ideally zero) that will be applied to your score from the Curator to yield your final score for this project.

Read the *Programming Standards* page on the CS 1044 website for general guidelines. You should comment your code in the same manner as the code given for the first two programming assignments. In particular:

- You should have a header comment identifying yourself, and describing what the program does.
- Every constant and variable you declare should have a comment explaining its logical significance in the program.
- Every major block of code should have a comment describing its purpose.
- Adopt a consistent indentation style and stick to it.

Your implementation must also meet the following requirements:

- Choose descriptive identifiers when you declare a variable or constant. Avoid choosing identifiers that are entirely lower-case.
- Use named constants instead of literal constants when the constant has logical significance.
- Use C++ streams for input and output, not C-style constructs.
- Use C++ string variables to hold character data, not C-style character pointers or arrays.
- Note: you are explicitly forbidden to write any user-defined functions for this program. This will make the program somewhat repetitive, and physically longer than the alternative. To some extent, that's the reason for this restriction.

Understand that the list of requirements here is not a complete repetition of the *Programming Standards* page on the course website. It is possible that requirements listed there will be applied, even if they are not listed here.

Submitting your program:

You will submit this assignment to the Curator System (read the *Student Guide*), and it will be graded automatically. Instructions for submitting, and a description of how the grading is done, are contained in the *Student Guide*.

You will be allowed up to five submissions for this assignment. Use them wisely. Test your program thoroughly before submitting it. Make sure that your program produces correct results for every sample input file posted on the course website. If you do not get a perfect score, analyze the problem carefully and test your fix with the input file returned as part of the Curator e-mail message, before submitting again. The highest score you achieve will be counted.

The *Student Guide* and submission link can be found at:

<http://www.cs.vt.edu/curator/>

Pledge:

Each of your program submissions must be pledged to conform to the Honor Code requirements for this course. Specifically, you **must** include the following pledge statement in the header comment for your program:

```
// On my honor:  
//  
// - I have not discussed the C++ language code in my program with  
//   anyone other than my instructor or the teaching assistants  
//   assigned to this course.  
//  
// - I have not used C++ language code obtained from another student,  
//   or any other unauthorized source, either modified or unmodified.  
//  
// - If any C++ language code or documentation used in my program  
//   was obtained from another source, such as a text book or course  
//   notes, that has been clearly noted with a proper citation in  
//   the comments of my program.  
//  
// - I have not designed this program in such a way as to defeat or  
//   interfere with the normal operation of the Curator System.  
//  
// <Student Name>
```

Failure to include this pledge in a submission is a violation of the Honor Code.