

LAB 7 - TASK 13

Stocks

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COMP-232: Programming Languages
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<https://comp232.com>

Task 13. Stocks

Want your money to work for you? While this is not financial advice and like any investment strategy does come with risks, one way is to invest in the stock market.

In this assignment, we will write **stocks.c** program to track the performance of four (4) companies and an Index 500 fund.

Here are the ticker symbols we will use:

APPL	Apple Inc.
DIS	Walt Disney Company
FXAIX	Fidelity 500 Index Fund
NIO	NIO Inc.
TSLA	Tesla Inc.

Your program will display the gain/loss for the above symbols for a 10-year period (2015), a 5-year period (2020), or year to date (YTD) by running:

% stocks 2016 ← 10 year period

% stocks 2021 ← 5 year period

% stocks 2026 ← Year to Date

If the user doesn't provide a year or the year isn't 2015, 2020, or 2025, you will need to display the following error messages:

john@oho:~/LAB4\$ **stocks**

Usage:

stocks YYYY

where

YYYY represents 2016 (10 year), 2021 (5 year), or 2026 (YTD).

john@oho:~/LAB4\$ **stocks 2000**

ERROR: Year not 2016, 2021, or 2026.

Usage:

stocks YYYY

where

YYYY represents 2016 (10 year), 2021 (5 year), or 2026 (YTD).

There are three input files: 2016.txt, 2021.txt, and 2026.txt. These files contain the opening stock price on January 1, 2016 (10 years), January 1, 2021 (5 years), and January 1, 2026 (Year to Date (YTD)).

The file format for each file follows:

<symbol><TAB><#shares><TAB><price paid/share><TAB><company>

where:

symbol	Ticker symbol for a company or index fund.
<TAB>	Tab character
#shares	The number of shares purchased on January 1 for the year.
<TAB>	
price paid/share	Opening price on January 1 for the year.
<TAB>	
<company>	The company name

We'll assume we purchased 10 shares of each company and index fund at the opening price on January 1st for the year specified.

Below are the contents for 2016.txt, 2021.txt, and 2026.txt for the symbols APPL, DIS, FXAIX, NIO, and TSLA.

```
root@comp232:~/LAB7# more 2016.txt
```

APPL	10	28.00	Apple Inc.
DIS	10	75.39	Walt Disney Company
FXAIX	10	72.84	Fidelity 500 Index Fund
TSLA	10	14.62	Tesla Inc.

```
root@comp232:~/LAB7# more 2021.txt
```

APPL	10	74.36	Apple Inc.
DIS	10	146.50	Walt Disney Company
NIO	10	3.55	NIO Inc.
FXAIX	10	112.19	Fidelity 500 Index Fund
TSLA	10	29.53	Tesla Inc.

```
root@comp232:~/LAB7# more 2026.txt
```

APPL	10	250.42	Apple Inc.
DIS	10	111.35	Walt Disney Company
NIO	10	4.36	NIO Inc.
FXAIX	10	204.19	Fidelity 500 Index Fund
TSLA	10	403.84	Tesla Inc.

You can download 2016.txt, 2021.txt, and 2026.txt in the /home/LAB7 directory on comp232.com. Note that NIO didn't exist in 2016.

To start writing this program, first read in the above text files into an array defined by the following structure:

```
#define MAX_COMPANIES    10

struct company {
    char    symbol[6];
    int     number_of_shares;
    float   share_price_paid;
    char    name[50];
} company[MAX_COMPANIES];
```

For the year provided, I would first read in and print out the following values to make sure you're reading in the file correctly.

```
john@oho:~/LAB4$ stocks 2026
```

```
Symbol=:APPL:, Number of Shares=10, Price/Share = 250.42, Name=:Apple Inc.:
```

```
Symbol=:DIS:, Number of Shares=10, Price/Share = 111.35, Name=:Walt Disney Company:
```

```
Symbol=:FXAIX:, Number of Shares=10, Price/Share =204.19, Name=:Fidelity 500 Index Fund:
```

```
Symbol=:NIO:, Number of Shares=10, Price/Share =4.36, Name=:NIO Inc.:
```

```
Symbol=:TSLA:, Number of Shares=10, Price/Share = 403.84, Name=:Tesla Inc.:
```

```
Number of companies read: 5
```

And use the following Makefile:

```
john@oho:~/LAB4$ cat Makefile
```

```
# Makefile
```

```
SOURCES=stocks.c
```

```
stocks: stocks.c
```

```
    gcc -g stocks.c -o stocks
```

```
    strip stocks
```

```
clean:
```

```
    rm *.o stocks
```

To run the above Makefile, you can type **make** or **make clean**.

After being able to display the company data found in 2016.txt, 2021.txt, and 2026.txt files, the next step is to read in the current stock prices for the above companies.

The **prices.txt** file contains the closing price of the stock on **October 5, 2026**. The format for the prices.txt file is:

```
<symbol><TAB><MM/DD/YYYY><TAB><closing price>
```

where:

symbol	The abbreviated stock identifier for a company
<TAB>	The tab character
MM/DD/YYYY	Date
<TAB>	
999.99	Stock's closing price on 10/05/2026 .

The prices.txt file, which you cannot modify, contains the closing prices for ten symbols, including APPL, DIS, FXAIX, NIO, and TSLA, as of **10/05/2026**.

```
root@comp232:~/LAB7# more prices.txt
APPL      10/07/2025      256.48
BAC       10/07/2025      50.29
CAT       10/07/2025     486.71
DIS       10/07/2025     112.53
FXAIX     10/07/2025     233.25
NIO       10/07/2025      7.50
NVDA      10/07/2025     185.05
QQQ       10/07/2025     604.51
T         10/07/2025      26.16
TSLA      10/07/2025     433.09
```

The next step is to read in the above prices.txt data into an array defined using:

```
#define      MAX_QUOTES      25

struct prices {
    char      symbol[6];
    char      date[11];
    float     price;
} prices[MAX_QUOTES];
```

Once you are able to read in the 2016.txt, 2021.txt, and 2026.txt files and the prices.txt file, we can generate the three reports for 2016, 2021, and 2026.

The format for the report is below. This is for 2025 output. Your output will be for 2026.

```
johnd@ohio:~/OHO2022/LAB7/STOCKS$ stocks 2025
```

Stock Price Gains/Losses From 1/1/2025 to 10/05/2025.

Symbol	Shares Owned	Price/ Share	Cost Basis	Last Price	Current Value	Total Gain/Loss	Company Name
APPL	10	\$124.17	1241.70	151.60	1516.00	274.30	Apple Inc.
DIS	10	\$ 88.97	889.70	99.06	990.60	100.90	Walt Disney Company
NIO	10	\$ 9.63	96.30	8.97	89.70	-6.60	NIO Inc.
FXAIX	10	\$132.59	1325.90	138.64	1386.40	60.50	Fidelity 500 Index Fund
TSLA	10	\$108.10	1081.00	187.71	1877.10	796.10	Tesla Inc.
Totals:							
Cost Basis:			4634.60				
Current Value:			5859.80				
Actual Gain/Loss:			1225.20				
Percent Gain/Loss:			+ 26.44%				

The title of the report will specify the date range we are calculating the values for. The above report represents the price gains/losses from 1/1/2025 to 10/05/2025. **Your report will be for 1/1/2026 to 10/05/2026.**

Symbol is the company's trading symbol.

The **Shared Owned** is 10 shares for each company and the FXAIX index fund.

Price/Share is the price we paid per share purchased on 1/1/2026.

The **Cost Basis** is how much you paid for the shares. For APPL in the example above, we bought 10 shares at \$124.17 per share, so the cost basis is \$1,241.70.

The **Last Price** is the closing price for APPL is \$151.60.

The **Current Value** is the number of shares owned multiplied by the Last Price. For APPL, the Current Value is 10 shares x \$151.60 = \$1,516.00.

The **Total Gain/Loss** is the Current Value minus Cost Basis for all shares owned. For APPL, the Total Gain/Loss is \$1,516.00 - \$1,241.70 = +\$274.30.

Company Name is the name of the company.

Under Totals, the **Cost Basis** is the sum of the Cost Basis column value for all companies and index fund.

The **Current Value** for the entire account is the sum of the Current Value column value for all companies and index fund.

The **Actual Gain/Loss** is the amount of money you made or lost. You will need to display a plus ('+') sign to represent a positive gain or a minus ('-') sign to represent a negative loss.

The **Percent Gain/Loss** is the percent gain or loss. You will need to display a plus ('+') sign to represent a positive gain or a minus ('-') sign to represent a negative loss. To calculate percent gain/loss, the formula is:

$$(\text{current_value} - \text{cost_basis}) / \text{cost_basis} * 100 = \text{percent_gain_loss} \%$$

For the report, you only need to display the dollar sign '\$' for **Price Paid**.

For the report, you do not need to display commas in the dollar amounts.