LAB 7 - TASK 13
Stocks

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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 (2013), a 5 year period (2018), or year to date (YTD) by running:

% stocks 2014 ← 10 year period

% stocks 2019 ← 5 year period

% stocks 2024 ← Year to Date

If the user doesn't provide a year or the year isn't 2014, 2019, or 2024, you will need to display the following error messages:

john@oho:~/LAB4$ **stocks**
Usage:
    stocks YYYY
where
    YYYY represents 2014 (10 year), 2019 (5 year), or 2024 (YTD).

john@oho:~/LAB4$ **stocks 1999**
ERROR: Year not 2014, 2019, or 2024.
Usage:
    stocks YYYY
where
    YYYY represents 2014 (10 year), 2019 (5 year), or 2024 (YTD).

There are three input files: 2014.txt, 2019.txt, and 2024.txt. These files contain the opening stock price on January 1, 2014 (10 years), January 1, 2019 (5 years), and January 1, 2024 (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 1rst for the year specified.

Below are the contents for 2014.txt, 2019.txt, and 2024.txt for the symbols APPL, DIS, FXAIX, NIO, and TSLA.

```
root@comp232:~/LAB7# more 2014.txt
APPL    10      19.034  Apple Inc.
DIS     10      75.39   Walt Disney Company
FXAIX   10      65.30   Fidelity 500 Index Fund
TSLA    10      9.715   Tesla Inc.

root@comp232:~/LAB7# more 2019.txt
APPL    10      38.072  Apple Inc.
DIS     10      112.65  Walt Disney Company
NIO     10      7.88    NIO Inc.
FXAIX   10      90.26   Fidelity 500 Index Fund
TSLA    10      23.151  Tesla Inc.

root@comp232:~/LAB7# more 2024.txt
APPL    10      187.15  Apple Inc.
DIS     10      90.35   Walt Disney Company
NIO     10      7.89    NIO Inc.
FXAIX   10      166.06  Fidelity 500 Index Fund
TSLA    10      218.89  Tesla Inc.
```

You can download 2014.txt, 2019.txt, and 2024.txt in the /home/LAB7 directory on comp232.com.

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];
```

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

> john@oho:~/LAB4$ **stocks 2024**
> Symbol=:APPL:, Number of Shares=10, Price/Share = 187.15, Name=:Apple Inc.:
> Symbol=:DIS:, Number of Shares=10, Price/Share = 90.35, Name=:Walt Disney Company:
> Symbol=:FXAIX:, Number of Shares=10, Price/Share =174.62, Name=:Fidelity 500 Index Fund:
> Symbol=:NIO:, Number of Shares=10, Price/Share =5.80, Name=:NIO Inc.:
> Symbol=:TSLA:, Number of Shares=10, Price/Share = 175.34, 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 2014.txt, 2019.txt, and 2024.txt, 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 March 30, 2024. 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 03/07/2023.

The prices.txt file, which you cannot modify, contains the closing prices for ten symbols, including APPL, DIS, FXAIX, NIO, and TSLA, as of 3/7/2024.

```
root@comp232:~/LAB7# more prices.txt
APPL    03/11/2024      170.73
BAC     03/11/2024      35.60
CAT     03/11/2024      339.19
DIS     03/11/2024      110.32
FXAIX   03/11/2024      174.62
NIO     03/11/2024      5.80
NVDA    03/11/2024      875.28
QQQ     03/11/2024      439.02
T       03/11/2024      17.20
TSLA    03/11/2024      175.34
```

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 have been able to read in the 2014.txt, 2019.txt, and 2024.txt files and the prices.txt file, we can generate the three reports for 2014, 2019, and 2024.

The format for the report is below. This is for last year's 2023 output. Your output will be for 2024.

```
john@oho:~/OHO2022/LAB7/STOCKS$ stocks 2023

Stock Price Gains/Losses From 1/1/2023 to 03/07/2023.
--------------------------------------------------------------------------------------
Symbol  Shares  Price/    Cost     Last    Current  Total      Company
        Owned   Share     Basis    Price   Value    Gain/Loss  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 1/1/2023 to 3/7/2023. Your report will be for 1/1/2024 to 3/11/2024.

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 1/1/2023.

The **Cost Basis** is how much you paid for the shares. For APPL, 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 on 3/7/2023.

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 on 3/7/2023 is $1,516.00 - $1,241.70 = +$270.30.

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:

$$(current\_value - cost\_basis) / cost\_basis * 100 = percent\_gain\_loss \%$$

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.