

# Equity Portfolio Management and Valuation System for Individual Investors

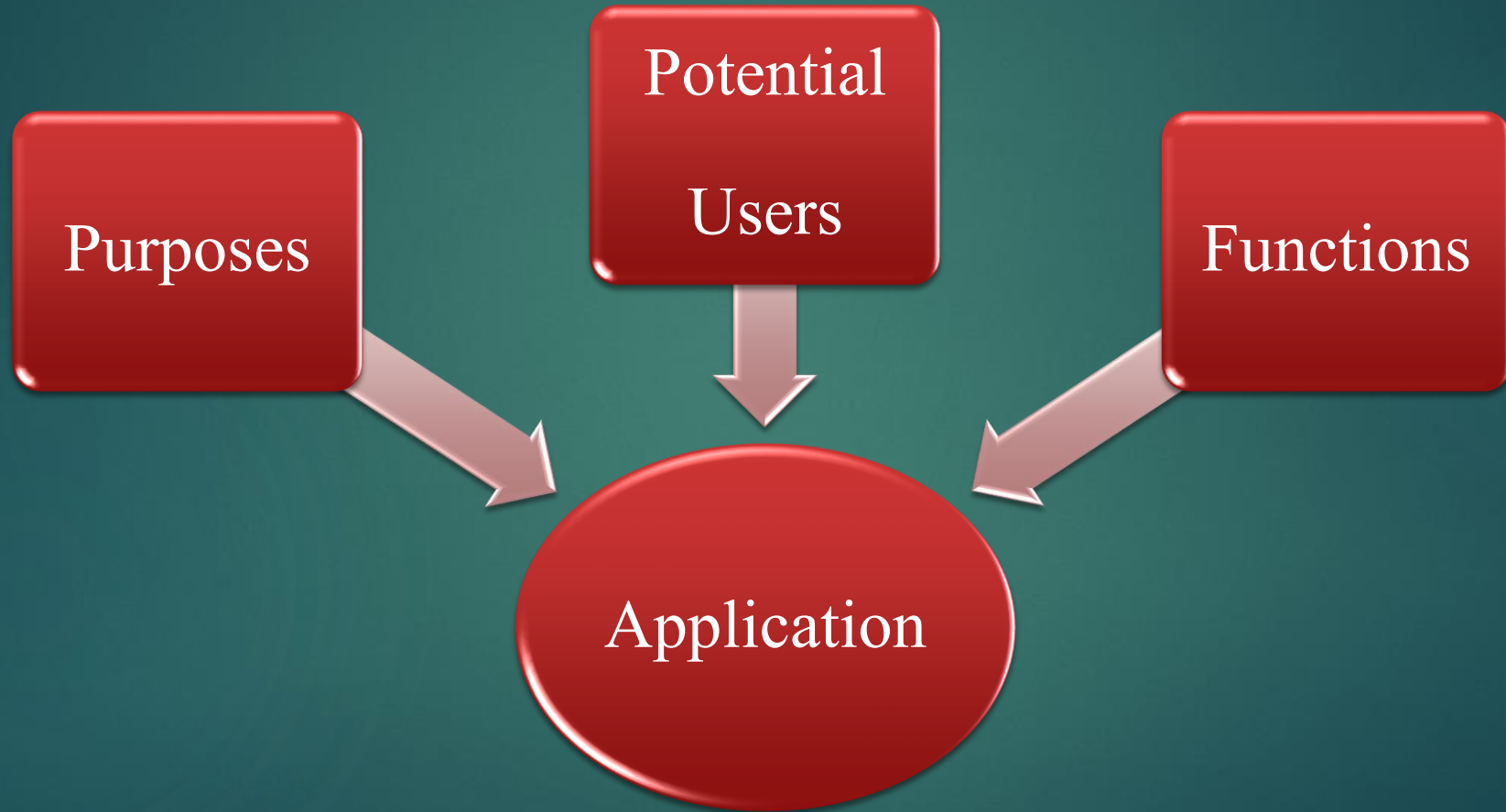
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# Introduction



# Introduction



Purposes: Why do we design this application?

Potential users: Who will need this application?

Functions: What can we do with this application?

# Data Retrieval

➤ Goal: Create a stock data universe for the application

➤ Steps to achieve the goal:

Transfer data from  
a csv file to C++

- Read stock list into C++
- Read every stock's csv file into C++

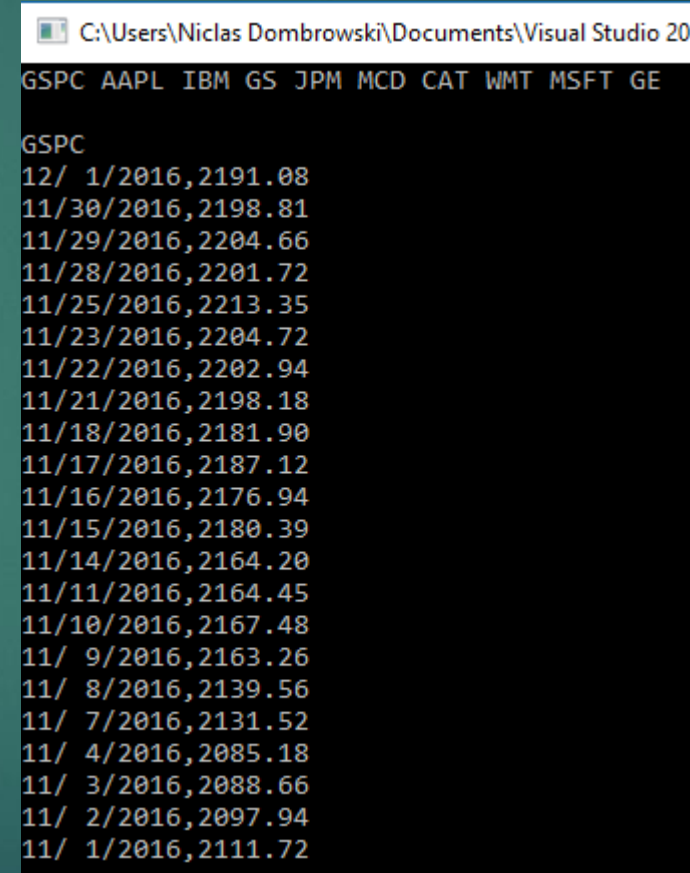
Read the data into  
vectors to be used  
in other classes

- Data retrieval

# Data Retrieval

## ➤ Details:

- ▶ Create/update a stock universe list
- ▶ Download stock data into separate CSV files (using the stock list and Matlab)
- ▶ Use stock list, iterations and in file stream to upload csv files to program
- ▶ Create stock objects
- ▶ Insert date and price vectors into constructed objects

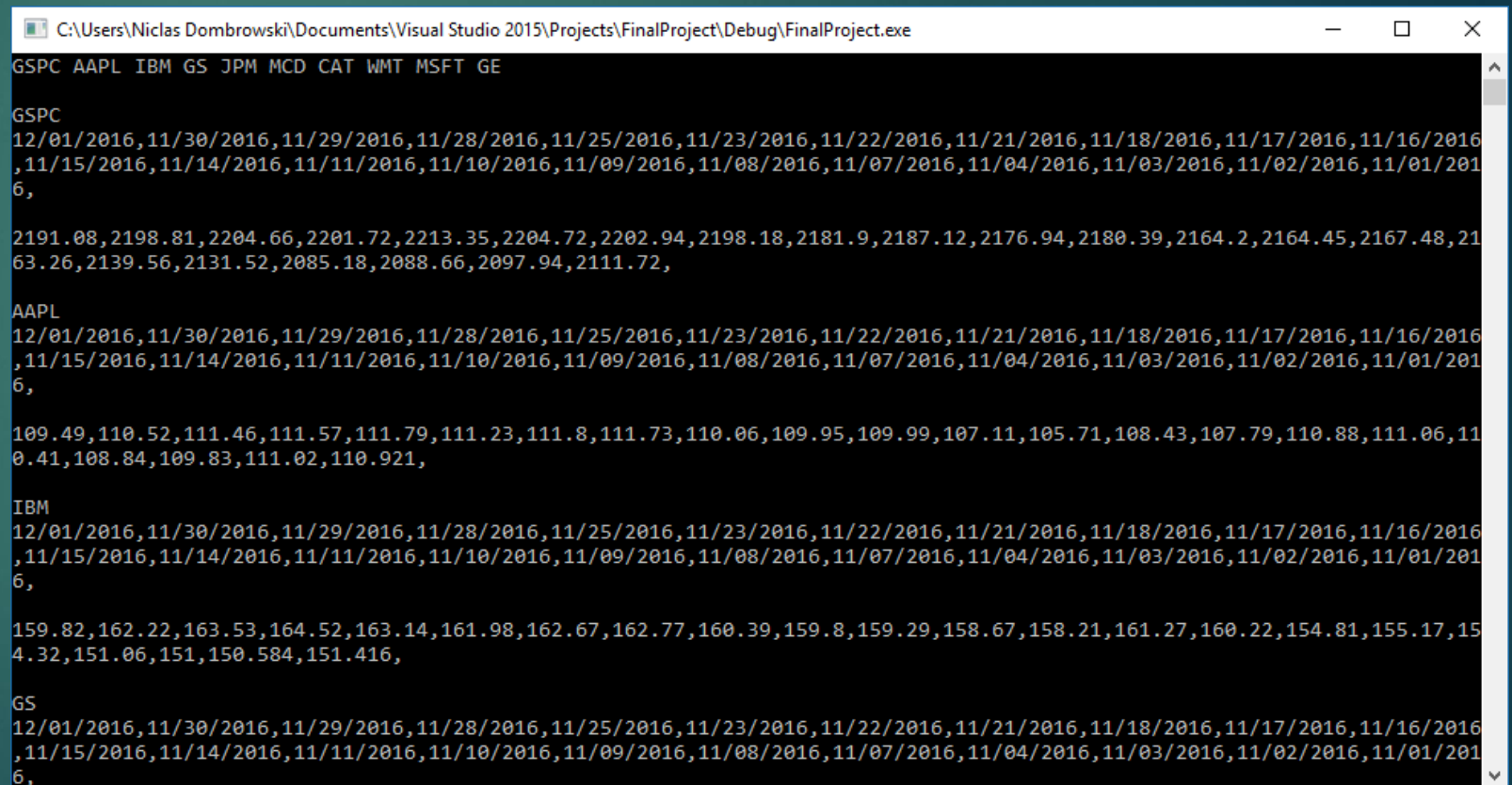


```
C:\Users\Niclas Dombrowski\Documents\Visual Studio 2010\
GSPC AAPL IBM GS JPM MCD CAT WMT MSFT GE
GSPC
12/ 1/2016,2191.08
11/30/2016,2198.81
11/29/2016,2204.66
11/28/2016,2201.72
11/25/2016,2213.35
11/23/2016,2204.72
11/22/2016,2202.94
11/21/2016,2198.18
11/18/2016,2181.90
11/17/2016,2187.12
11/16/2016,2176.94
11/15/2016,2180.39
11/14/2016,2164.20
11/11/2016,2164.45
11/10/2016,2167.48
11/ 9/2016,2163.26
11/ 8/2016,2139.56
11/ 7/2016,2131.52
11/ 4/2016,2085.18
11/ 3/2016,2088.66
11/ 2/2016,2097.94
11/ 1/2016,2111.72
```

# Data Retrieval

## ➤ Details:

- ▶ Stock quote objects need to be set up
- ▶ No have a mechanism to create objects whose types are determined at runtime



```
C:\Users\Niclas Dombrowski\Documents\Visual Studio 2015\Projects\FinalProject\Debug\FinalProject.exe
GSPC AAPL IBM GS JPM MCD CAT WMT MSFT GE
GSPC
12/01/2016,11/30/2016,11/29/2016,11/28/2016,11/25/2016,11/23/2016,11/22/2016,11/21/2016,11/18/2016,11/17/2016,11/16/2016,
11/15/2016,11/14/2016,11/11/2016,11/10/2016,11/09/2016,11/08/2016,11/07/2016,11/04/2016,11/03/2016,11/02/2016,11/01/2016,
2191.08,2198.81,2204.66,2201.72,2213.35,2204.72,2202.94,2198.18,2181.9,2187.12,2176.94,2180.39,2164.2,2164.45,2167.48,2163.26,2139.56,2131.52,2085.18,2088.66,2097.94,2111.72,
AAPL
12/01/2016,11/30/2016,11/29/2016,11/28/2016,11/25/2016,11/23/2016,11/22/2016,11/21/2016,11/18/2016,11/17/2016,11/16/2016,
11/15/2016,11/14/2016,11/11/2016,11/10/2016,11/09/2016,11/08/2016,11/07/2016,11/04/2016,11/03/2016,11/02/2016,11/01/2016,
109.49,110.52,111.46,111.57,111.79,111.23,111.8,111.73,110.06,109.95,109.99,107.11,105.71,108.43,107.79,110.88,111.06,110.41,108.84,109.83,111.02,110.921,
IBM
12/01/2016,11/30/2016,11/29/2016,11/28/2016,11/25/2016,11/23/2016,11/22/2016,11/21/2016,11/18/2016,11/17/2016,11/16/2016,
11/15/2016,11/14/2016,11/11/2016,11/10/2016,11/09/2016,11/08/2016,11/07/2016,11/04/2016,11/03/2016,11/02/2016,11/01/2016,
159.82,162.22,163.53,164.52,163.14,161.98,162.67,162.77,160.39,159.8,159.29,158.67,158.21,161.27,160.22,154.81,155.17,154.32,151.06,151.150.584,151.416,
GS
12/01/2016,11/30/2016,11/29/2016,11/28/2016,11/25/2016,11/23/2016,11/22/2016,11/21/2016,11/18/2016,11/17/2016,11/16/2016,
11/15/2016,11/14/2016,11/11/2016,11/10/2016,11/09/2016,11/08/2016,11/07/2016,11/04/2016,11/03/2016,11/02/2016,11/01/2016,
```

# Portfolio Setup

- 
- Initial balance

- 
- Assets buying and selling

- 
- Assets position and account balance position

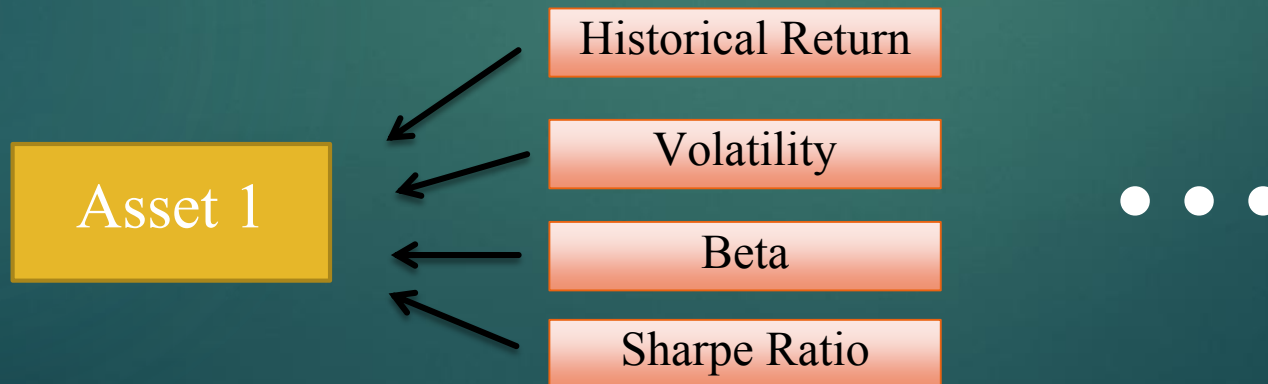
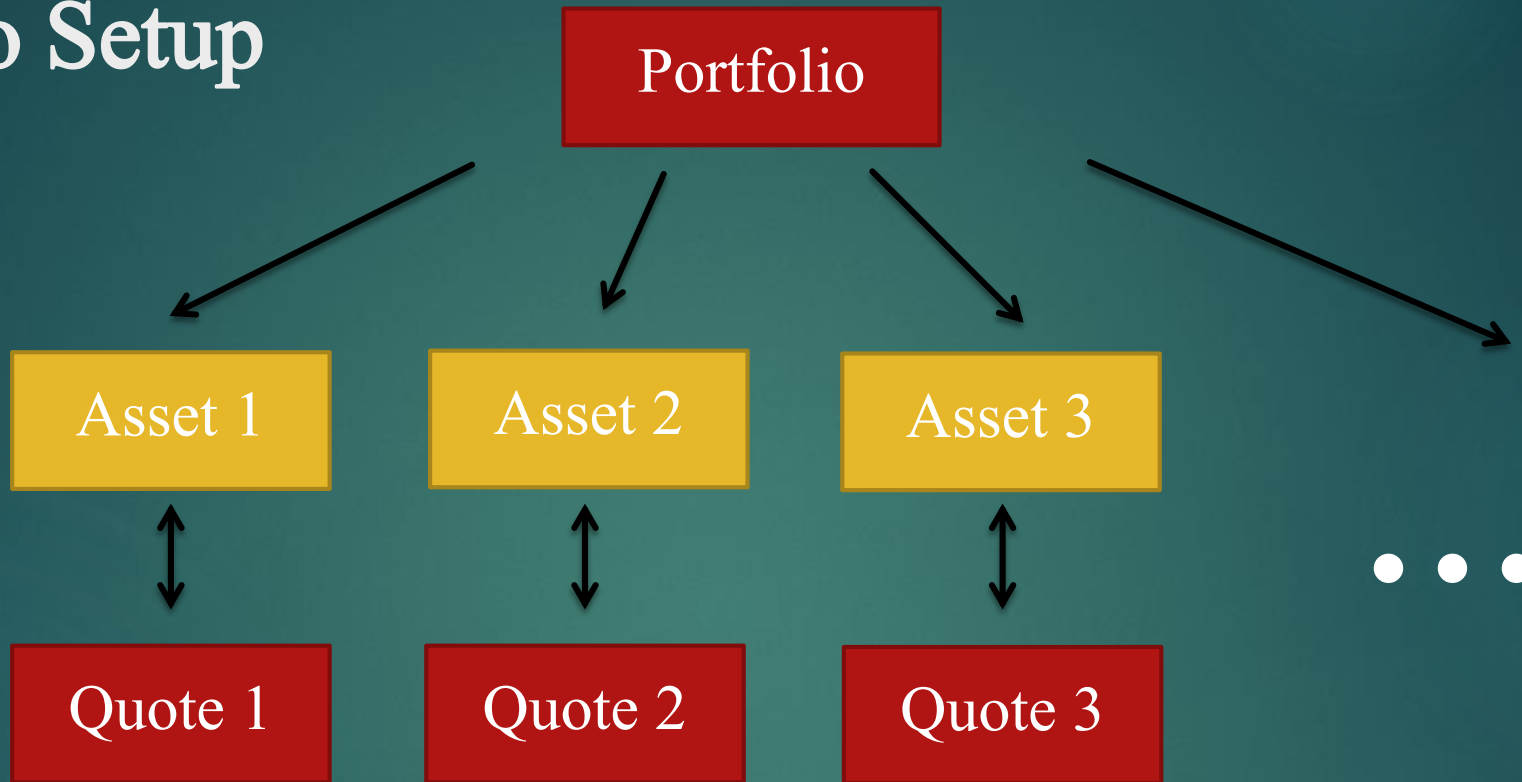


# Portfolio Setup

- ▶ Set up the initial balance of the account.
- ▶ Decide on what assets to buy or sell and how many shares to trade.
- ▶ Calculate the position of the assets in the portfolio and the position of cash in the account.

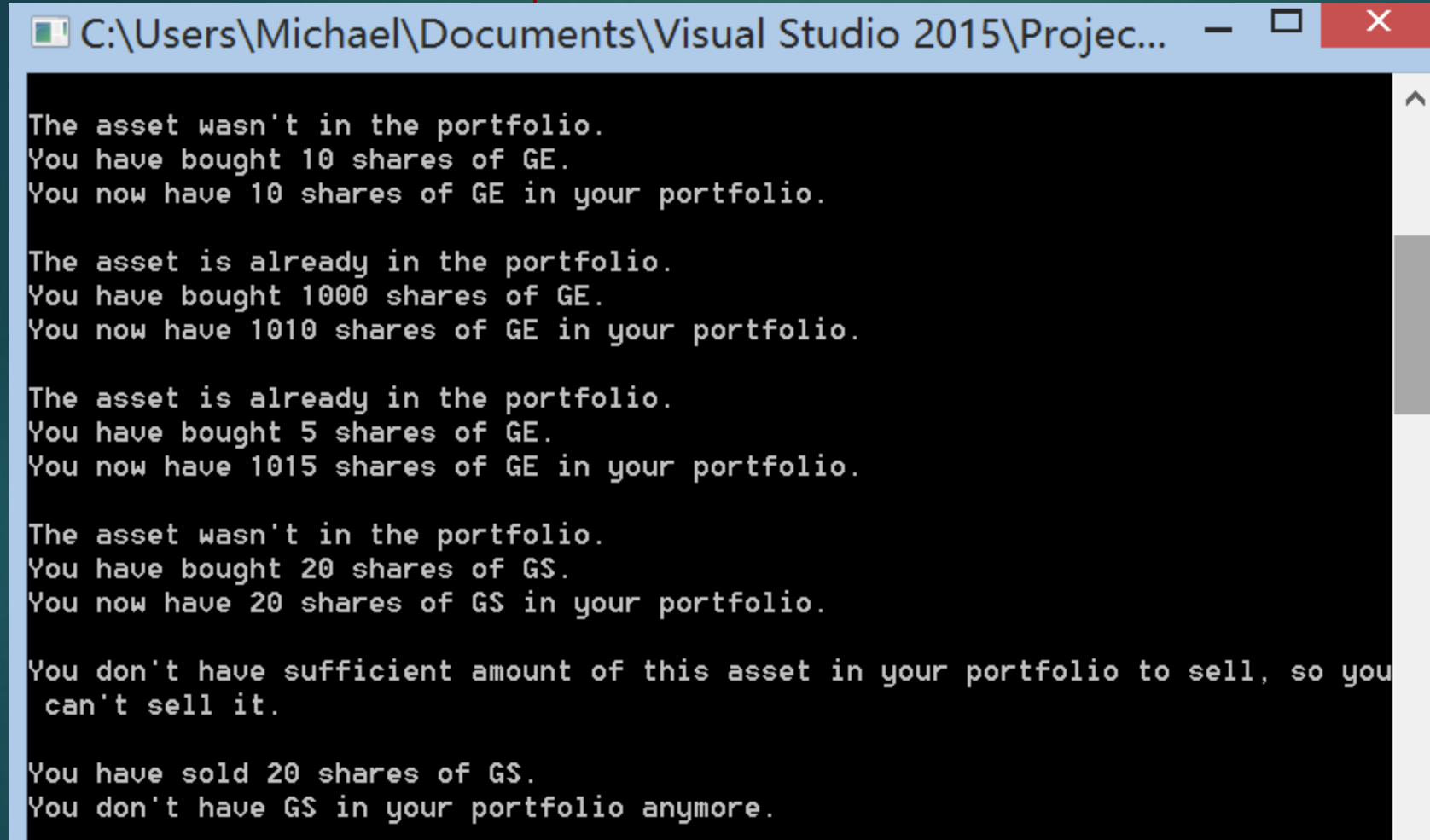


# Portfolio Setup



# Portfolio Setup

Buy assets and add them into the portfolio.



A screenshot of a Windows command prompt window. The title bar shows the file path "C:\Users\Michael\Documents\Visual Studio 2015\Projec...". The window has standard Windows window controls (minimize, maximize, close). The command prompt displays a series of text messages representing portfolio transactions. A red line from the "Buy assets" instruction points to the first transaction. A purple line from the "Sell assets" instruction points to the last transaction.

```
The asset wasn't in the portfolio.  
You have bought 10 shares of GE.  
You now have 10 shares of GE in your portfolio.  
  
The asset is already in the portfolio.  
You have bought 1000 shares of GE.  
You now have 1010 shares of GE in your portfolio.  
  
The asset is already in the portfolio.  
You have bought 5 shares of GE.  
You now have 1015 shares of GE in your portfolio.  
  
The asset wasn't in the portfolio.  
You have bought 20 shares of GS.  
You now have 20 shares of GS in your portfolio.  
  
You don't have sufficient amount of this asset in your portfolio to sell, so you  
can't sell it.  
  
You have sold 20 shares of GS.  
You don't have GS in your portfolio anymore.
```

Sell assets and remove them from the portfolio.

# Portfolio Setup

Current balance and component assets in the portfolio.

```
C:\Users\Michael\Documents\Visual Studio 2015\Projec... - □ ×
The current balance of the portfolio is 68734.2.
GE: 1015 shares, current price: $ 28.88, current position: $ 29313.2
GS: 11 shares, current price: $ 177.51, current position: $ 1952.61
The price on 12/01/2016: $2524.32.
The price on 11/30/2016: $2442.95.
The price on 11/29/2016: $2360.3.
The price on 11/28/2016: $2337.95.
The price on 11/25/2016: $2349.44.
The price on 11/23/2016: $2359.53.
The price on 11/22/2016: $2346.21.
The price on 11/21/2016: $2345.58.
The price on 11/18/2016: $2337.37.
The price on 11/17/2016: $2329.59.
The price on 11/16/2016: $2292.59.
The price on 11/15/2016: $2346.66.
The price on 11/14/2016: $2324.38.
The price on 11/11/2016: $2267.12.
The price on 11/10/2016: $2233.15.
The price on 11/09/2016: $2142.01.
The price on 11/08/2016: $2024.36.
The price on 11/07/2016: $2019.42.
The price on 11/04/2016: $1957.58.
The price on 11/03/2016: $1960.6.
The price on 11/02/2016: $1964.87.
The price on 11/01/2016: $1981.49.
You don't have sufficient amount of cash to withdraw.
You only have $68734.2 in your portfolio.
```

Historical performance the portfolio.

Add / withdraw money from / to the portfolio.

# Risk Matrix

Value at Risk

Expected Shortfall

# Performance Parameters



Historical return



Volatility



Beta



Tracking error



Sharpe ratio

# Performance Parameters

- ▶ Historical return
- ▶ Volatility
- ▶ Beta:  $(\text{portfolio return} - r_f) / (\text{market return} - r_f)$
- ▶ Tracking error
- ▶ Sharpe ratio:  $(\text{portfolio return} - r_f) / \text{sigma}$

# Performance Parameters

```
the historical return is 0.00992443  
the beta is -0.0726248  
the Tracking error is -0.00111614  
the Volatility is 70.5905  
the sharpe ratio is -1.07056e-06
```



# Conclusion

Easy to use

Efficient for analysis

Portfolios dynamically adjustable

Codes expandable