# Stock Simulator

Overview

1. **Introduction and Context**

The stock simulator will simulate the experience of trading stocks in a controlled environment. It will provide users of the client software with experience of buying and selling a number of stocks from a simulated broker without the risk of actual financial loss. One of the challenges for users new to stock trading is that they are not familiar with how volatile the market can be. By creating a system to allow users to become familiar with the price swings, the transition to participation in the actual stock market can be eased into.

The system will be comprised of a data manager service, Broker, portfolio manager, and client. Users will only interact with the client directly. The data manager and broker will each be hosted on an individual server while the portfolio manager will be located on the server with the broker. The system will also provide a rudimentary leaderboard so that users can see their gains compared to other users.

To meet the requirements of the assignment, the Stock Simulator identifies the data manage, broker, and client as the three independent processes. The client process can have multiple instances created. At this time it is planned that each instance will have a unique user. The three shared resources are the stock data, the portfolio manager, and the leaderboard.

The currently planned protocols are:

1. Create a portfolio
2. Get a portfolio
3. Stock update
4. Leaderboard update
5. Stock history
6. Transaction

The resources needed to complete this project will be:

* Two or more hosting servers
* Simulated Stock Data

1. **Key Components**  
     
   **Stock Data Server**  
   Stores historical stock data of select stocks.  
   Broadcasts stock price updates via a multicast address. The client and broker listen to this multicast address.  
     
   **Market Simulator (broker)**  
   Receives buy/sell requests from the client during simulation.  
   Validates and executes a user's buy/sell requests by requesting data from the Portfolio Manager.  
   Maintains a leaderboard of highest-valued portfolios.  
     
   **Trade Simulator (Client)**  
   Listens to the Stock Data Server's multicast address for current stock prices.  
   Makes registration/authentication/buy/sell requests to the Broker for the simulation.  
   Can request the leaderboard data from the Broker.  
   Allows for the user interaction with the system.  
     
   **Portfolio Manager**  
   Stores User credentials.  
   Stores User accounts (cash and stocks)  
   Tracks past outcomes for users
2. Actor

User of the client software simulating transactions.