Electronic Stock Markets

Each day, trillions of dollars in stock market trades are made, but not by human beings. Well trained computers, operating over the Internet, are deciding upon stock trades and executing them without our knowledge. In this class we will learn about how they work by creating some of the key components real digital stock markets need.

Each stage of this project will build up to form a simulated, virtual stock exchange where buyers actively accumulate stocks then sell them, based on a strategy. The strategy we'll formulate will be simple yet realistic, based upon the performance of an industry, and the stocks residing in it. Your stock bot, as we'll call it, will make decisions based upon the behavior of stocks in the active market, buying, selling and making money along the way.

Phase 1. Making Building Blocks: a Stock, a Buyer, a Transaction and the Portfolio

Create a **stock**. The stock should belong to an industry, have a symbol, start with a random price. Generate its information randomly.

Craft a **Buyer**, with a budget, name, and a **portfolio**. Add a random number of stock to the portfolio, subtracting the price of the transaction from his or her budget.

A **transaction** is present to handle the information on the trade. Who bought what, for how much is saved.

Phase 2: Making the Market

Make 100,000 Buyers. Have them purchase between 5 and 25 stocks. Make them participate in one market where:

- offer each stock as an IPO, or initial public offering. When a stock enters the market, a buyer can buy it into their portfolio
- there is a price index, storing the prices of all stocks. The index also stores the specifics on the stock, for example, its industry.
- when a buyer buys, the stock price goes up slightly
- once a buyer makes his/her portfolio, sell off stocks which have gone up in value
- there exists a list of **holdings for sale** (these are stock bundles, which were once purchased by a Buyer, but are now up for sale)
- once a stock sells out of its IPO, and a buyer wishes to buy it, he/she must buy that stock from the for-sale market (holdings for sale)

Phase 3: Making the Stock Bot

Your program seeks stocks to buy, based upon their industry. An industry is chosen based upon which industry is hot, or moving up in price. (Or which is cheap to buy)

This app should group stocks by momentum pricing, or average gain-in-price between transactions.

Output the industrial average of the price index, showing:
top N gainers, by