Project Description

A stock market is a market where investors trade (buy and sell) stock (shares, fund participation units). A market should have a name, country, trading currency, city, address, list of stock market indexes, andpercentage margin (cost) for each trading operation. A stock market indexis a named collection of companies belonging to the market the index ispart of. Each company can be part of one or more indexes. A company-index assignment can be constant (set by the index creator) or based on a condition (e.g., an index of 20 largest companies listed on the market). Index values are defined by the sum of share values of all the companies listed in a given index.

Each company is characterized by its name, IPO date, IPO share value, opening price, current price, minimal price, maximal price, profit, revenue, capital, trading volume (the number of times equity was bought or sold), total sales (the value of equity bought or sold).

Apart from stock markets, there are markets that allow investors to trade other assets like currencies and commodities. On currency markets, each currency has its current exchange rates (buy and sell prices in another currency). Additionally, each currency is defined by a list of countries where it is used as legal tender. Each commodity has a name, trading unit (e.g. ounce for gold), trading currency, current price, minimal and maximal price. Just like stock markets, currency and commodity markets have their transaction margins.

Investors buy and sell assets (shares, commodities, currencies) directly or through units of investment funds. Each investor has a first name, last name, trading identifier, and an investment budget. Investment funds also buy and sell assets, but only directly from markets. Each investment fund is characterized by a name and the first and last name of the fund's manager.

Functional requirements

- The user can create markets, indexes, companies, currencies, commodities, investors, and funds through a separate **control panel**
- Markets, indexes, currencies, and commodities are created on the user's command, whereas investors and funds should appear automatically, proportionally to the number of assets available on the markets
- The control panel can be used to set world parameters, such as the number of transactions per minute, or the bear/bull ratio
- When created, each company/currency/commodity/investor/fund should have their properties filled out automatically with semi-random values (even when they are created upon the user's command)
- The main window should have a list of all assets available on the markets
- Selecting an asset from the list should show a **plot of the asset's prices over time**
- There should be an option of **drawing multiple assets on one plot on a percentage scale**
- Every investor, fund, company is a **separate thread**
- The investors'/funds' threads are responsible for generating buy or sell transactions at random time intervals; moreover, an investor can increase their budget at a random moment in time
- The buy-sell price should depend on the number of investors buying/selling particular assets (or you can come up with your own rule governing the market)
- Company threads generate revenue and profit at regular time intervals
- A company thread can randomly increase its total number of shares
- The user should be able to force a buy out operation by the company (where the company buys its own shares) of a user-specified share amount; share reclaimed by the company disappear form the market
- The user can read about the basic properties of an object (investor, fund, company) in a separate **information window/panel**, which appears after selecting an object on a list
- to make multithreaded trading safe, use **semaphores or monitors.**

- The application does not need to solve any deadlock problems; if there is a deadlock it will be resolved by removing a company/investor.