ECE 421 Project 1: Stock Market Monitor

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**Design Rationale:**

This application is designed to retrieve the latest stock shares data for the current trading day by using Alpha Vantage API then return the stock with the highest price, with a value less than 500. We will need to modify the code for APIFinance to account for the limitation of 5 API requests per minute and 500 requests per day.The original imperative code used for selecting high shares will be refactored to a functional style.

In the design of the program, we will be rewriting the PickShareImperative class to create a new class called pickShareFunctional. This class will feature a static method called findHighPriced, which takes a stream of strings as input. By utilizing the JDK's specialized functional-style method, we can more easily compare and filter the data.

To streamline the process, we first use the map() method to convert the input strings into ShareInfo objects, which are easier to work with for further comparison and filtering purposes. Next, we use the filter() method to eliminate shares with a price above 500 dollars. Finally, we utilize the max() method to identify the share with the highest price among the filtered results.

A new method has been added to the APIFinance class to handle the API request restriction. As the free API key permits only 5 requests per minute and 500 requests per day, the program will pause for one minute when the API returns a limit warning. After the pause, the program will make a re-request. If the second request receives a limit warning again, the 500 requests per day limit has been reached. The restriction is also handled when parallelstream is used. Semaphore is used to ensure that there can only be 5 threads waiting to send the re-request at any given time. Also, no other thread can get in to the function when there is at least one thread waiting to send the re-request. This makes the program thread safe.

**Testing**

**Defects**

Our code is perfect :D