**Stock Monitoring Platform Documentation**

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**Introduction**

The Stock Monitoring Platform is a Java application designed to provide users with the ability to monitor real-time stock data, manage their own stocks, and create watchlists. The application aims to be user-friendly, efficient, and easily extensible.

**Design Choices**

**Programming Language**

Java was chosen as the programming language for the Stock Monitoring Platform due to its platform independence, robustness, and extensive ecosystem. Java's object-oriented nature allows for modular and scalable code, making it suitable for building a complex application like this.

**Architecture**

The application follows the Model-View-Controller (MVC) architectural pattern. This separation of concerns promotes code organization and maintainability. The model represents the data and business logic, the view handles the user interface, and the controller manages the interaction between the model and view.

**Database**

A MySQL database was chosen to store user data, including registered users, user stocks, and watchlists. The use of a relational database allows for efficient data storage, retrieval, and management. The JDBC API is used to establish a connection with the database and perform necessary operations.

**API Integration**

The Alpha Vantage API was integrated into the Stock Monitoring Platform to retrieve real-time stock data. This API provides a rich set of features for accessing financial market data. The platform fetches stock information using the API, enabling users to view up-to-date stock prices, market trends, and other relevant data.

**Implementation Details**

**Login and Registration**

The login and registration functionality allows users to create an account and securely log in to the platform. User credentials, including usernames and hashed passwords, are stored in the database. During registration, input validation is performed to ensure data integrity. The password is hashed using a strong cryptographic hashing algorithm before being stored.

**Stock Data Display**

The stock data display section of the application fetches real-time stock data from the Alpha Vantage API. The data is retrieved based on user input, such as a stock symbol. The fetched data includes stock prices, volume, market trends, and other relevant information. The retrieved data is then presented to the user in a user-friendly format.

**User Stocks**

The user stocks functionality enables users to manage their own stocks. Users can add stocks to their portfolio by entering the stock symbol. The platform validates the input and retrieves the relevant stock data from the API. The user's stock portfolio is stored in the database and can be accessed for future reference. Users can also view and manage their existing stocks, such as removing stocks from their portfolio.

**Watchlists**

The watchlist feature allows users to create watchlists and add stocks to them. Users can create multiple watchlists and add stocks of interest to each watchlist. The platform stores the watchlists and associated stocks in the database, allowing users to view and manage their watchlists at any time. This feature provides users with a convenient way to track specific stocks without necessarily owning them.

**Setup and Requirements**

To set up the Stock Monitoring Platform, the following requirements must be met:

* Java Development Kit (JDK) installed on the system.
* MySQL database set up and configured with the appropriate credentials.
* An Alpha Vantage API key to fetch real-time stock data. Replace **YOUR\_API\_KEY** in the code with your actual API key.

After meeting the requirements, follow these steps:

1. Clone the repository or download the source code files.
2. Configure the database connection settings in the code by updating the connection string and providing the correct database credentials.
3. Replace **YOUR\_API\_KEY** in the code with your actual Alpha Vantage API key.
4. Compile the Java files.
5. Run the application.

**Future Improvements**

* Implement additional authentication mechanisms, such as OAuth or two-factor authentication, to enhance security.
* Enhance the user interface with more intuitive and interactive elements, such as graphs and charts to visualize stock data.
* Implement real-time notifications and alerts for stock price changes or other significant events.
* Provide more advanced stock analysis tools and insights to assist users in making informed investment decisions.
* Enable users to import/export their stock portfolios and watchlists for easy migration or sharing.

**Conclusion**

The Stock Monitoring Platform provides users with a convenient way to monitor stock data, manage their own stocks, and create watchlists. The application's design choices, such as using Java, following the MVC pattern, integrating a database, and utilizing the Alpha Vantage API, contribute to its functionality and scalability. By following the setup instructions and requirements, users can easily deploy and utilize the application to enhance their stock monitoring and investment management activities.