Problem Definition for Real-Time Stock Analysis Database

1. Background :

In the fast-paced world of stock trading and investment, real-time data and historical analysis are crucial for making informed decisions. Investors need to track stock performance, manage their portfolios, and stay updated with market trends to optimize their investment strategies. Additionally, features like dividend tracking, watchlists, and market indices are essential for a comprehensive understanding of market dynamics.

2. Objective :

The objective of this project is to design and implement a database schema that supports a real-time stock analysis system. This system will store and manage data related to users, stocks, historical prices, real-time prices, portfolios, transactions, price alerts, dividends, watchlists, market indices, and index components. The database will enable efficient retrieval and analysis of stock data to assist users in making well-informed investment decisions.

3. Scope :

The scope of this project includes:

Designing a relational database schema to support various functionalities required for stock analysis.
Implementing the database schema using SQL.
Populating the database with sample data to demonstrate its capabilities.
Writing advanced SQL queries to showcase data retrieval and analysis.

4. Requirements :

The database system should be able to:

Store User Information: Manage user profiles including their login details.

Track Portfolios: Allow users to create and manage multiple portfolios containing various stocks.

Record Transactions: Keep a detailed log of buy and sell transactions for each portfolio.

Set and Monitor Alerts: Enable users to set price alerts for specific stocks.

Track Dividends: Record dividend payments for stocks held in portfolios.

Manage Watchlists: Allow users to add stocks to their watchlist and monitor them.

Store Market Indices and Components: Maintain information about market indices and the stocks that comprise them.

Record Stock Information: Store metadata about each stock including company details, sector, and industry.

Store Historical Prices: Maintain historical price data for stocks to enable trend analysis.

Store Real-Time Prices: Keep track of real-time stock prices to support real-time analysis.

5. Database Schema :

The database schema includes the following tables:

1.Users: Stores user information.
2.Portfolios: Stores user portfolios.
3.Transactions: Stores transactions made by users.
4.Alerts: Stores price alerts set by users.
5.Dividends: Stores dividend payments for each stock.
6.Watchlist: Stores stocks that users are watching.
7.MarketIndices: Stores information about different market indices.
8.IndexComponents: Stores the components of each market index.
9.Stocks: Stores information about different stocks.
10.HistoricalPrices: Stores historical stock prices.
11.RealTimePrices: Stores real-time stock prices.

6. Example Queries:

The database will support advanced queries such as:

1.Retrieving all dividend payments for a specific stock.
2.Calculating the total dividend income for a user’s portfolio.
3.Getting the watchlist of a specific user and the latest price of each stock.
4.Retrieving the components of a specific market index.
5.Calculating the total value of each market index based on the latest real-time prices.
6.Analyzing the historical performance of a specific stock over the last year.
7.Finding the top 5 stocks with the highest average trading volume over the last month.

7. Conclusion :

This project aims to provide a robust and flexible database schema for real-time stock analysis, supporting a wide range of functionalities essential for investors and traders. The database will facilitate efficient data management and retrieval, enabling users to make data-driven investment decisions. By hosting this project on GitHub, we can demonstrate our SQL skills and provide a valuable resource for learning and collaboration in the field of data science and stock market analysis.