**DATA MANAGEMENT and DATABASE DESIGN INFO 6210**

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**Assignment - 2**

**Database Topic**

Stock Trading Application

**Mission Statement**

The purpose of the Stock trading database is to track prices of different stocks across different stock exchanges, as well as monitor trades made by users. It will be used by investors to understand historical performance of stocks, review history of trades and evaluate performance of their portfolio.

**Mission Objective**

* To maintain (enter, update, and delete) data on historical pricing information.
* To maintain (enter, update, and delete) data on countries.
* To maintain (enter, update, and delete) data on user stock information.
* To maintain (enter, update, and delete) data on user bank information.
* To maintain (enter, update, and delete) data on trading laws.
* To maintain (enter, update, and delete) data on securities.
* To maintain (enter, update, and delete) data on derivatives.
* To maintain (enter, update, and delete) data on user stock watchlists.
* To maintain (enter, update, and delete) data on sec types.
* To maintain (enter, update, and delete) data on transaction.
* To perform searches on historical pricing information.
* To perform searches on countries.
* To perform searches on user stock information.
* To perform searches on user bank information.
* To perform searches on trading laws.
* To perform searches on securities.
* To perform searches on derivatives.
* To perform searches on user stock watchlists.
* To perform searches on sec types.
* To perform searches on transaction.
* To track the prices of stocks.
* To execute trades

**Business Problems Addressed**

* Allow users to easily execute trades.
* Allow users to easily transfer cash in and out of their account.
* Prevent users from violating regulatory laws.
* Allow users to view and manage their portfolio, including their historical transactions and trades.
* Allows users to convert foreign securities into USD.
* Keeps tracks on device details used for logging the account.
* Allows users to track the prices of a specific list of securities that they do not hold (Watch List)

**List Entities**

* **Security** - Contains information related to securities (i.e. Stocks) so that there can be a single master record for each security that can be referenced anytime it is traded or held by any individual user.
* **Country -** Contains information related to countries where securities might be domiciled. This is necessary because countries might have different trade settlement schedules, different currencies or other key information.
* **User\_profile -** Contains information about users of the application so that an account can be maintained for multiple users and the application can retrieve user-specific information or settings. Also, user information can be used by the company for necessary outreach or marketing.
* **Trades -** Contains information regarding current trades that users are executing in the marketplace. This table would be blank if no users were executing trades
* **Derivatives** - Contains information related to stock options. Since every stock can also have multiple different options, it makes sense to store this information in a separate entity.
* **User\_Watchlist** - Contains list of securities that a user is watching if they are interested specific stocks for various reasons.
* **Trade\_History** - Contains information of historical trades that can be associated to specific users. This will allow for users to view their specific trade history.
* **Account\_Transaction** - Contains information on historical credits and debits to the account. This will allow users to see when money has moved into and out of their account and from which bank account it came from.
* **Current price** - Contains the current security price and and other realtime information. This is necessary to allow users to view the current security data in real-time for any securities they are watching or holding.
* **Historical price -** Contains historical price of security on daily basis. This will allow users to view the price history of any security that they are watching of holding.
* **Bank\_accounts**- Contains banking info so that users can connect their bank accounts to transfer funds into or out of their application account
* **Device\_Information** - Contains electronic device info for each user, so that a user can set up and connect from multiple devices.
* **Holdings** - Contains user holding information so that users can view their portfolio and evaluate the performance of their holdings.
* **Currency Info** - Contains currency info so that the prices of foreign securities can be converted into USD
* **Terms & Conditions Agreement Details** - Stores historical information about user’s acceptance of Terms & Conditions, so that the database/application can comply with privacy regulations

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| --- | --- | --- |
| **Entity Name** | **Attributes** | **Entity Relationships** |
| Security | SecurityID (PK), Security description, EarningsDate  EarningsResult, CountryCode(FK), CurrencyCode(FK), Industry | Country, Trades, Derivatives, User\_Watchlist, CurrentPrice, Historical\_Price, Holdings, Currency |
| Country | countryCode (PK), CountryName, SettlementSchedule | Currency, Security |
| User\_profile | UserID (PK), firstName, lastName, middleName, DateofBirth | User\_watchlist, Trades, Bank\_Accounts,Trade\_History, Holdings, Device\_information, TCAgreementDetails |
| Trades | TradeID (PK), UserID (FK) SecurityID, BuyOrSell, shares, limitPrice, Amount, price. | User\_profile, Trade\_History |
| Derivatives | DerivativeID (PK), SecurityID (FK), strikePrice, expirationDate, DaysToSettle | Security, Holdings, |
| User\_Watchlist | UserID (PK), SecurityID(FK), entryPrice, exitPrice, price | User\_Profile, Security |
| Trade\_History | TradeHistID (PK), UserID (FK), TradeID (FK), Security, date, amount, BuyOrSell | Trades, User\_Profile |
| Account\_Transactions | TransactionID (PK), TransactionDate, amount, TransType, BankAcctID (FK) | Bank\_Accounts |
| Current\_price | SecurityID (FK), Price, Volume, openingPrice, ClosingPrice | Security |
| Historical\_price | Date, SecurityID (FK) OpeningPrice, ClosingPrice, volume | Security |
| Bank\_accounts | BankAccountID (PK), AccountHolderName, AccountNo, RoutingNo, UserID (FK) | User\_Profile, Account\_Transaction |
| Device\_Information | Device ID (PK), Device Name, DeviceType, UserID (FK) | User\_Profile, TCAgreementDetails |
| Holdings | BuyingDate, durationHeld, BuyingPrice, Quantityheld, UserID (FK), SecurityID (FK), DerivativeID (FK) | User\_profile, Security, Derivatives |
| Currency | CurrencyCode (PK), spotRate | Country, Security |
| TCAgreementDetails | TCAgreementDetailsID (PK), UserID (FK), DeviceID (FK), DateofAgreement | User\_Profile, Device\_Information |

**Key Design Decisions**

* The application will not maintain historical address for users (Users will only have one address).
* A user might have many devices and the database should be able to store information for many devices per user
* A user might have many bank accounts, the database should be able to store information for many bank accounts per user
* Limit scope to US, Canada and Mexican trading, but be designed to expand scope.
* Limit scope to Stocks and Options trading only but be designed to expand scope.
* Limit scope to US-based users only but be designed to expand scope.
* Maintains history of securities and derivatives traded.
* Since Moving Day Averages based off historical stock performance are very important in the stock market for predicting the trend, the database is designed to store historical trade information that will allow for calculation of these values
* In order to avoid duplicate data, the database was designed to have distinct entities for both historical and current prices of securities