Introduction

The purpose of this assignment is to provide you with experience in conceptual and relational database modelling. You are given a domain description for the SharePlus Online Trading (SOT) platform. There are 2 high level tasks in this assignment:

- Create an Entity Relationship Diagram (ERD) that captures the business concepts and requirements conveyed in this description,
- Translate your ER diagram into a logical database design including relational database schema creation, key constraints and integrity constraints.

Task 1: Domain Description for Entity Relationship Diagram (ERD) Modelling

The SharePlus Online Trading (SOT) is a leading platform owned by iTrade that specialises in low-cost investment and trading for Exchange-Traded Funds (ETFs). The company has assigned you the task of developing a conceptual model, described in an ER diagram, to capture all the requirements for their trading platform.

With the SOT platform, customers can view and trade (buy and sell) a broad range of investments online through one digital platform, specifically ETFs that trade on the Australian Stock Exchange (ASX). The database system you will design should include information about the ETFs, customers, their investments, and transactions history.

The platform offers trading against over 200 ETFs listed on the ASX. Each ETF can be categorised as: (1) Global Equity Index, (2) Global Equity Sectors, (3) Australian Equity Index, (4) Bonds, (5) Fixed Income, (6) Commodity, (7) Sustainable, (8) Currency. Each ETF has a name (e.g. iShares Global Healthcare ETF), is identified by a code (e.g. IXJ), and requires a minimum investment amount. The database also maintains a description of each ETF, the date when the ETF was first established, and the total number of units outstanding. The database keeps track of the closing price of each individual ETF at the end of each day. This price is used in the calculation of customers' total portfolio holdings and is viewable on the platform.

We need to store each customer's full name, address, email, mobile number, a unique login name, a password and a cash balance. Cash balance is the amount that has not been invested yet. ETFs are traded during business days between 10am and 4pm AEST. Every time a customer buys or sells units in an ETF, the customer has to pay a brokerage fee. The customer is required to pay for the purchased ETFs (including the brokerage fee) two business days after the day of the trade. When selling, the platform will credit the proceeds (minus the brokerage fee) to the customer's cash balance two business days after the day of the trade.

Customers can set up a regular investment that automatically contributes a set amount of money in ETFs every fortnight or month, by specifying how much they want to invest, the frequency, and start date. Customers may cancel their regular investments at any time. A regular investment has a default expiry of twelve months from the start date, unless the customer terminates it earlier. The platform will send a reminder via email and/or SMS to the customers a day before every investment cycle about their upcoming transactions.

We need to keep track of each administrator's unique login name, full name, address, email, password, and remuneration. Administrators also hold qualifications that are registered in the system. As part of staff development, administrators are encouraged to undertake the relevant qualifications in order to equip them with further knowledge and skills that they need to perform their jobs effectively and improve their performance.

Due to a number of reasons (auditing, compliance, statistical reporting, etc.), the company would like to keep track of the history of transactions. Every transaction is identified by a transaction ID. A transaction is either a deposit or a trade. A deposit transaction is for a customer depositing an amount of money for trading purposes. A trade transaction is for a customer selling or buying ETFs. This is indicated by action attribute of the transaction. A trade transaction has a specified number of ETF involved, price per ETF, and final (total) amount after the brokerage fee.

Task 2: Relational Database Design & Modelling

Your second task is to design and create a relational database schema based on the Entity Relationship Diagram (ERD) modelled from the first task. In particular, your solution should include:

- Tables and attributes with appropriate data types to capture all information in the model (please use the same names as in your ER diagram for naming tables and attributes);
- Appropriate PRIMARY KEY, UNIQUE, FOREIGN KEY constraints for all tables;
- Correct foreign key specifications including ON DELETE clauses where suitable;
- Appropriate additional integrity constraints expressed by means of NOT NULL or CHECK clauses;
- INSERT statements to populate each relation with at least one record, to demonstrate a database instance consistent with the ER model.

Additional details

In addition to the model captured through your ER diagram, the following details apply:

1. Attributes representing names should always have values.
2. Customers and administrators must have a specified email address.
3. Fields representing dates and/or times should always have values.
4. All attributes in a tuple relating to details about ETF should always have values. The administrator's remuneration should always be larger than nil.
5. The brokerage fee should always have values greater than or equal to $2 but not exceed $50 per trade. The minimum investment amount for an ETF is $500 or larger.