**Advanced Database Management Systems - Project 1**

Due date: 11:59 pm Friday Jul 14, 2023.

**General information**

This is a take home project to help you having more time understanding the questions and preparing the answers.

You can use all available resourses: notes, AI apps, Google search... But you need to do all the work on your own. You cannot discuss or share your work with your friends or classmates.

The instructor and TA will not provide any clarification or suggestions. You should work with the best of your knowledge and understanding.

You need to submit 1) a report documenting your process and designs; 2) the code (Java, SQL...) written for the project and the binary database file, 3) a screen recording showing how you test your database and software application.

**Task**

1. You need to design a database for an online shopping system. This system has the following requirements:

- A user has id, username, password, full name, address, phone number, email

- A user can login into the system (assuming that he/she has already registered).

- A user can list a product for sale. A product has: id, name, description, price, quantity. It is assumed that each product is listed by only a user. However, products can have similar name and description. For example, two users can sell the same Apple iPhone 13. However, those products will have different id numbers and potentially different price or quantity.

- A user can buy a listed product. After the order is made, the product quantity will be deducted accordingly. Note: a user can sell multiple products at the same time. And a user can buy multiple products (from different sellers) in the same order.

In your design document, you need to:

a (5 pt). Identify the entities, attributes, and relationships. Determine the data type (domain) for each attribute.

b (2 pt). Draw an entity-relationship diagram.

b (3 pt). Write SQL code to create the tables for this database.

2 (15 pt). You need to enter the data into this database. However, we want to make a reasonably big database with at least 1000 users, 2000 products, and 10,000 orders. Each order might have up to 10 products bought.

Write a program to randomly generate data for this database. You should generate data that is realistic. For example, users' full name or products' name should be similar to ones in the real world. Products' prices are reasonable.

3 (15 pt). Develop a GUI-based software application to demonstrate this online shopping system.

The user can:

a (2 pt) Login to the system with his/her username and password;

b (3 pt) List a new product for sale;

c (4 pt) update a product listed by this user;

d (6 pt) make an order to buy some products.