DATABASE SYSTEMS

ASSIGNMENT 2

NOTES

- *Students should read everything presented below carefully.*
- *This assignment 2 is worth 15% of the overall grade.*
- *Appropriate softwares can be used to support your design.*
- *Plagiarism must be avoided. Otherwise, zero mark is given.*

1. REQUIREMENTS

- Groups are required to implement the database designed in **Assignment 1** on a specific DBMS (optional: SQL Server, MySQL, etc.) and create a simple application connecting to this database.
- Each group must perform the following tasks:

1.1. Create Tables and Sample Data (3 points)

1. **(2 points)** Write the SQL statements to create the tables, including primary keys, foreign keys, data constraints, and semantic constraints specified in **Assignment 1** (using CHECK or TRIGGER).
2. **(1 point)** Insert meaningful data for all tables (you can enter data through the interface or write SQL statements).

1.2. Implement application (7 points)

1. **(1 point)** Write procedures to insert, update, and delete data from **ONE** table. Note that:
   - Check all data constraints.
   - Output meaningful error messages that specify the exact issue (don't just say "Data input error!")

   Example: Check an employee's age is greater than 18, phone number and email formats are valid, and employee salary is less than the manager's salary, etc.

2. **(1 point)** Write **2 triggers** to control INSERT, UPDATE, DELETE statements on certain tables. Guarantee the following requirements:
   - At least one trigger must involve updating data in a table different from the one owns this trigger. (often related to derived attributes).
   - Please prepare the SQL statements and sample data to demonstrate the triggers when presenting assignment to your lecturer.
3. **(1 point)** Write **2 procedures** that only contain SELECT statements and use parameters in the WHERE and/or HAVING clauses (if applicable), including:
   - One query involves two or more tables using WHERE and ORDER BY.

- One query uses aggregate functions, GROUP BY, HAVING, WHERE, and ORDER BY, joining two or more tables.
- At least one procedure must be related to retrieving data from the table (specified in requirement 1.2.1)
- Please prepare the SQL statements and sample data to demonstrate the procedures when presenting assignment to your lecturer.

4. **(1 point)** Write **2 functions** guaranteeing the following requirements:
   - Contain IF and/or LOOP statements.
   - Contain queries, get data from queries to do other operations.
   - Have parameters and validate the parameters.
   - Please prepare SQL statements and sample data to demonstrate the functions when presenting assignment to your lecturer.
5. **(3 points)** Write an **application** (web or mobile app) for your database system.

   a) **(1 point)** Create an interface to demonstrate inserting, deleting, and updating data.

   b) **(1 point)** Create an interface to display the outputs of procedures in requirement **1.2.3**. The interface should allow updating and deleting data from the list, and include some additional features such as search, sorting, data validation, error handling when updating or deleting data, reporting meaningful error messages, …. Example: There is a form showing a list of products with search, filter, sorting,.. There is also a function for user to create new products, or delete/ update product information.

   c) **(1 point)** Create an interface to demonstrate at least one procedure from requirement **1.2.3** or one function from requirement **1.2.4** (you may reuse the interface from part b if it involves the same table).

Notes:

- The functions and procedures must be suitable for the business logic of the application.
- The function that displays data from procedures should allow users to input search criteria via textbox, combo box, or calendar picker,… (corresponding to common search functions in applications or websites...)
- The insert, update, and delete operations must call the procedures from requirement 1.2.1.

2. SUMBISSION DEADLINE

- 11pm, December 12th, 2024
- You have to present your assignment to me on December 12th, 2024.
- The group leader submits the report, source code to LMS before deadline.