Simple Airline Management System (SAMS)

CS 4400: Introduction to Database Systems
Course Project: Spring 2023 Semester

Project Purpose

In this project you will analyze, specify, design, implement, and document an online system based on the provided scenario description. You are required to use the classical methodology for relational database development. The system will be implemented using a relational DBMS that supports standard SQL queries. You will use your localhost MySQL Server (Version 8.0 or above) to implement your database and the application. You cannot use any other software like Access or SQLite. Please ask the Instructors and TAs if you have questions.

Project Phases

Inputs (we provide to you…)

Phase I	Phase II	Phase III
• Scenario Description • Sample Data Elements	• Enhanced ERD • Initial Data Set (in a Non-Normalized Format)	• Physical Database Schema with Initial Data Set • Stored Procedure Shells
• Enhanced Entity Relationship Diagram (ERD) • List of Assumptions (optional)	• Relational Schema • Physical Database Schema with Initial Data Set • Unhandled Constraints List	• Implemented Procedures • Any Supporting Views and Related Structures

Outputs (…you turn in to us)

Phase II Directions

In Phase II, your tasks are to:

- Translate the given EERD into a set of **relational schema**
- Translate the relational schema into **create table statements** with the appropriate data types, primary and unique keys, and foreign keys
- Write **insert statements** to import the initial data into the tables you've created
- Document all **unhandled constraints** based on your design & implementation choices

Relational Schema [35%]

Convert the Enhanced Entity-Relationship Diagram (EERD) that we've provided into a set of relational schema. Identify primary keys, discriminants, and foreign keys using either:

1. [preferred] The text-based notation introduced in class and the conversion slides; or,
2. The more graphically oriented "boxes and arrows" notation shown in the textbook.

*** ***DO NOT USE YOUR EERD FROM PHASE I.*** We require you to **use the provided EERD** for this assignment, where the focus is on making sure that you understand and can apply the conversation process correctly. This will also give us time to evaluate the Phase I EERD that you have submitted.*

Create Table Statements [35%]

Provide the MySQL CREATE TABLE statements, including domain constraints, integrity constraints, primary keys and uniqueness constraints, and foreign key constraints. You do not need to specify ON UPDATE and ON DELETE clauses and can leave them to their default behaviors. **You must submit the original MySQL statements that you've hand typed, NOT the SQL dump/export file**.

Insert Statements [15%]

You must insert all information from the provided initial data file into the tables you constructed in the previous section. You must submit the MySQL INSERT statements that accomplish this along with the CREATE TABLE statements.

The data is provided in a "non-normalized" manner, meaning that it is not structured in a way that can naturally and easily be imported directly into your final table structures. You will have to manipulate the data to get it into a format that is useable.

Unhandled Constraints [15%]

List all the constraints expressed in the written requirements and enhanced entity-relationship diagram that are not supported by the components that you've implemented in your physical schema. If a constraint is already being handled by one of the following components, then you should NOT list it as an unhandled constraint:

- data type declaration
- check constraint declaration
- default null or not null declaration
- primary key declaration
- unique key declaration
- foreign key declaration

The relational model is powerful, but it is not powerful enough to express all constraints. The intent of this portion of the assignment is for you to determine the other constraints that will need to be accounted for as you continue to develop the system. You do NOT need to provide solutions for managing the unhandled constraints that you've identified – you only have to acknowledge them in a clear, concise, and unambiguous manner. You will implement solutions for these constraints in later phases of the project.

How should you list your unhandled constraints? Here are some examples from the company database example from class (*using the Company_ERD_Map_Schema file from Module M13 as a reference*):

- Ensure that each department has at least one employee that works for that department.

- Ensure that employee works on at least one project.
- Ensure that each project has at least one employee working on that project.

Here are some other possible constraints that aren't required by the company database example from class, but they are reasonably realistic and will give you an idea of other possibilities:

- Ensure that an employee doesn't supervise (directly) more than seven other employees.
- Ensure that no supervisee makes more (i.e., has a higher salary) than their supervisor.
- Ensure that the manager for a department also works for that department.

Submission Checklist

Each team needs **one of its members** to upload the deliverables to Canvas. The other team members should log in and check to ensure that all files have been uploaded correctly. Please include your team numbers in the file names.

Your submission must include the following deliverables compiled into **two distinct documents (do not zip them together)**:
- A file named **cs4400_phase2_schema_team#.pdf** containing your relational schema and unhandled constraints
- A file named **cs4400_phase2_database_team#.sql** containing your create table and insert statements
- **Your SQL file must run in MySQL Workbench without error for you to receive credit for these statements**

Version History

Version	Date	Notes
0	January 30, 2023	Initial Release