**Course:** CS345: Database Lab
**Type of database:** Relational
**Implementation:** MYSQL

The assignments before the Mid-semester will consist of four stages that will lead you to implement one of the following three projects. Each stage will focus on learning a specific concept as described below.

**Stage 1:** Learning to identify entities, relationships, basic DDL and DML commands and integrity data constraints.
**Stage 2:** Designing of the database with appropriate ER Diagram, Implementation of the ER diagram with relevant tables.
**Stage 3:** Join and Aggregate operations. Various SELECT clauses (WHERE, GROUP BY, ORDER etc.)
**Stage 4:** Index, Alter Tables, Views.

---

**Stage 1:** Learning to identify entities, relationships, basic DDL and DML commands and integrity data constraints (NOT NULL, UNIQUE, PRIMARY KEY, FOREIGN KEY, DEFAULT, CHECK).

**You need to perform Sub-tasks (a) and (b) for all the projects and rest for any project of your choice.**

Q1. A university consists of a number of departments. Each department offers several courses. A number of modules make up each course. Students enrol in a particular course and take modules towards the completion of that course. Each module is taught by a lecturer from the appropriate department, and each lecturer tutors a group of students.

(a) Identify the main entities needed for the project.
(b) Identify the main relationships connecting the entities
(c) Create the tables associated with the entities and relationships with appropriate **integrity constraints.** NOT NULL, UNIQUE, PRIMARY KEY, FOREIGN KEY, DEFAULT, CHECK constraints should be explored.
(d) Insert some records in all the tables
(e) Search records satisfying specific attribute values.
(f) Delete few records
(g) Delete some of the tables that you have created with appropriate DDL command.

Q2. Assume you have been contracted by a university to develop a database system to keep track of student registration and accommodation records. The university courses are offered by faculties. There are no limitations to how many courses a student can enroll in. The faculties are not responsible for student accommodation. The university owns a number of hostels and each student is given a shared room key after enrollment. Each room has furniture attached to it.

(a) Identify the main entities needed for the project.
(b) Identify the main relationships connecting the entities
(c) Create the tables associated with the entities and relationships with appropriate **integrity constraints.** NOT NULL, UNIQUE, PRIMARY KEY, FOREIGN KEY, DEFAULT, CHECK constraints should be explored.
(d) Insert some records in all the tables
(e) Search records satisfying specific attribute values.
(f) Delete few records
(g) Delete some of the tables that you have created with appropriate DDL command.

Q3. Read the following case study, which describes the data requirements for a DVD rental company. The DVD rental company has several branches throughout the United States. The data held on each branch is the branch address made up of street, city, state, and zip code, and the telephone number. Each branch is given a branch number, which is unique throughout the company. Each branch is allocated staff, which includes a Manager. The Manager is responsible for the day-to-day running of a given branch. The data held on a member of staff is his or her name, position, and salary. Each member of staff is given a staff number, which is unique throughout the company. Each branch has a stock of DVDs. The data held on a DVD is the catalog number, DVD number, title, category, daily rental, cost, status, and the names of the main actors and the director. The catalog number uniquely identifies each DVD. However, in most cases, there are several copies of each DVD at a branch, and the individual copies are identified using the DVD number. A DVD is given a category such as Action, Adult, Children, Drama, Horror, or Sci-Fi. The status indicates whether a specific copy of a DVD is available for rent. Before borrowing a DVD from the company, a customer must first register as a member of a local branch. The data held on a member is the first and last name, address, and the date that the member registered at a branch. Each member is given a member number, which is unique throughout all branches of the company. Once registered, a member is free to rent DVDs, up to a maximum of ten at any one time.

The data held on each DVD rented is the rental number, the full name and number of the member, the DVD number, title, and daily rental, and the dates the DVD is rented out and returned. The DVD number is unique throughout the company.

(a) Identify the main entities needed for the project.
(b) Identify the main relationships connecting the entities
(c) Create the tables associated with the entities and relationships with appropriate **integrity constraints.** NOT NULL, UNIQUE, PRIMARY KEY, FOREIGN KEY, DEFAULT, CHECK constraints should be explored.
(d) Insert some records in all the tables
(e) Search records satisfying specific attribute values.
(f) Delete few records
(g) Delete some of the tables that you have created with appropriate DDL command.