**大作业的要求：**

1. **Objective:** Design and develop a web-based application for a real-world case study of your choice. The application should demonstrate your understanding of web development concepts, database design, and user experience.
2. **Requirement Analysis (十分):** Choose a case study that interests you, such as: - Online shopping platform, - Social media platform, - Event management system, - Restaurant management system, - Library management system, - Any other real-world scenario that can be solved using a web application and write up the detailed requirements in a clear to understandable manner.
3. **Database Design Requirements:** Design a relational database schema to support your web application. Your database design should include:

* **Logical Data Model (LDM) (十分):**
  + Create a comprehensive LDM using a modeling tool like PowerDesigner or ERwin Data Modeler.
  + Ensure the LDM includes at least 10 entities to capture the complexity of the chosen case study.
  + Define clear relationships between entities, including at least one one-to-one, one-to-many, many-to-one, and many-to-many relationships.
  + Specify cardinality constraints to accurately represent the data relationships.
* **Physical Data Model (PDM) (十分):**
  + Translate the LDM into a PDM, considering MySQL-specific optimizations and performance tuning techniques.
  + Normalize the data to reduce redundancy and improve data integrity.
  + Design efficient indexes to accelerate query performance.
* **MySQL Script Generation:** **(十分)**
  + Generate a MySQL script from the PDM using a database design tool or manually write the SQL statements.
  + The script should include:
  + CREATE TABLE statements for each table in the PDM.
  + ALTER TABLE statements to add primary keys, foreign keys, and constraints.
  + CREATE INDEX statements for appropriate indexes.
  + Optional INSERT INTO statements to populate the database with sample data.

1. **Functional Requirements:** Your web application should have the following features:

1. User management (login, registration, etc.) **(十分)**

2. Data management such as Create, Read, Update and Delete operations for any one entity is sufficient (**十分)**

3. Demonstrate proficiency in SQL by writing complex search queries, having at least one query for each of the following list: **(二十分)**

* + Single-table queries
  + Join queries (inner, outer, self)
  + Aggregate functions with GROUP BY and ORDER BY clauses
  + Date and time functions
  + Subqueries
  + Correlated subqueries
  + Set operations (UNION, INTERSECT, EXCEPT)
  + Multi-table join queries
  + Division queries

1. **Technical Requirements** Your web application should be built using:   
   1. Front-end: HTML, CSS, JavaScript, and a CSS framework (e.g., Bootstrap)  
   2. Back-end: A server-side programming language (e.g., PHP, Python, Ruby)  
   3. Database: A relational database management system (e.g., MySQL, PostgreSQL)
2. **Final Presentation:**
3. **Prepare a Comprehensive Report:** (**十分)**
   * + - * Document the entire development process, including:

Database design (LDM, PDM, and MySQL script)

Web application architecture and implementation details

User interface design and user experience considerations

* + - * + Include screenshots of the application's interface and SQL query execution results.

1. **Create a Compelling Presentation:** (**十分)**
   * Clearly articulate the project's goals and objectives.
   * Present the database design and implementation process in a clear and concise manner.
   * Demonstrate the functionality of the web application, highlighting key features and user interactions.
   * Discuss the challenges faced and solutions implemented.
   * Conclude with a summary of the project's achievements and potential future improvements.