Assignment: HOTEL MANAGEMENT SYSTEM

Q. *You are tasked with developing a basic hotel management system that includes both frontend and backend components. The system should allow hotel staff to perform the following operations:*

1. **Room Management**: Add, update, or delete room information (e.g., room number, type, status, and price).
2. **Booking Management**:
    a. Create, update, or cancel reservations for guests, including capturing guest details, check-in, and check-out dates.
    b. Allow users to view, modify, or cancel their bookings from their account.
    c. Provide real-time updates on booking status and any changes (e.g., flight delays).
3. **Payment Processing**: Record payments from guests, with options for different payment methods (e.g., credit card, cash, etc.).
4. **User Authentication**: Implement a login system with different user roles (e.g., admin, receptionist) and permissions.
5. **Reporting**: Generate basic reports, such as occupancy rates and revenue over a selected period.
6. **Notifications and Alerts**:
    a. Implement email or SMS notifications for booking confirmations, reminders, and updates.

The frontend should be user-friendly and responsive, ensuring accessibility across different devices. The backend should be robust, secure, and able to handle multiple simultaneous users.

Considerations:

- **Technology Stack**: You may choose technologies such as HTML/CSS/JavaScript for the frontend, and Node.js, Python, or Java for the backend. Use a relational database like MySQL.
- **Security**: Implement basic security measures such as input validation, password hashing, and session management.
- **Scalability**: While the system is basic, consider future scalability in your design.

Deliverables:

- Lab_1:
    - ER Diagram **[10 points]**
    - Table creation, insertion of dummy records in all tables - using Python interface with SQL **[30 points]**
    - Making sure that all tables are atleast in 2NF; identify trade offs between taking it up to 3NF / BCNF or letting the tables be at 2NF. **[10 points]**

- Study and write a short note on the hashing and indexing schemes underlying MYSQL **[5 points]**
- Design a hash function (using Python) - that take into consideration alphabets common in all the roll numbers of the group-members - for effective storage/retrieval of data - on the 'Room Management' table **[10 points]**
- Apply clustering indexing on the data (using Python) in the 'Room Management' table. **[10 points]**
- Apply secondary indexing on the data (using Python) in the 'Room Management' table. **[10 points]**
- Compare and contrast between the storage and execution time of the clustering vs secondary indexing schemes designed by you **[20 points]**
- Besides the SQL queries for the aforementioned operations, write queries to: **[15 points]**
  - Add information about the inclusion of a new wing comprising 5 deluxe suites
  - Prepare a report on all guest bookings and cancellations in the month of August, 2024
  - Cancel all guest bookings made after 7PM for August 15, 2024.

Rubric:
Deliverables as asked: 120 points
Web interface: 5 points