1. Project Objectives, Concept, and Methodology

The main goal of this work was to create a reservation system similar to those used by room or house rental platforms, focusing on the underlying database structure. In particular, our goals, modeled after the Airbnb model, included the following:

- **Goal:** Provide a platform where users (stored in the **user_account** table) can register, then choose to either act as a guest (by making reservations) or as a host (by listing properties) or both.
- **Idea and Concept:** Design a relational database capable of managing reservations, cancellation policies, payment processes, communication (conversations & messaging), and reviews, all consistently integrated.
- **Methodology:**
  1. Began with a requirement analysis and conceptual modeling (ER Diagram). To relate each table, Crow's foot notation was used. Relationships such as 1:N, 1:1 were shown between tables.
  2. Then moved to the relational model to add properties, columns specific to each table. "CREATE" queries were written and tables and columns were created.
  3. The tables were then populated with test data (INSERT statements), which form the rows of the tables. Entries were added according to each table and tested for functionality through various SELECT queries

This approach covered both theoretical (data modeling) and practical (SQL querying and data insertion) stages, ensuring the final schema would be robust, consistent, and easily scalable for an Airbnb-like platform. The data modeling phase included conceptual and logical design steps, reducing redundancy and defining clear relationships between 20 entities. By striking a balance between design principles and hands-on implementation, we confirmed that the schema could be readily adopted in modern relational database management systems, such as MySQL or PostgreSQL.

2. Resources, Tools, and Implementation Steps

- **Sources/References:** Documentation on MySQL and data modeling, plus to get information about entities, website of Airbnb was used.

- **Software and Tools:** MySQL Workbench was used for development, testing, a local database installation and SQL tools.
- **Implementation Breakdown:**
    1. **Conceptual Design (ER Diagram):** Identified 20 core entities (user_account, host, guest, booking, payment_method, property, house_rule, etc.) and their relationships.
    2. **Relational Model Conversion:** Transformed each entity into a table, defining primary and foreign keys.
    3. **Data Insertion and Testing:** Added at least 20 entries per table to test fundamental operations like making a reservation, sending messages, or processing payments.
    4. **Validation and Optimization:** Minimized data redundancy, and checked query performance and results.

3. Reflection on Our Performance: Insights

- Simultaneously managing multiple tables and tracking foreign keys made the design process more complex. Additionally, working with MySQL Workbench for the first time added challenges to the learning phase. Building the tables offered an opportunity to better understand Crow's Foot relationships, and the complexity of writing and organizing queries proved to be a significantly instructive step.

4. Potential Gaps

- Advanced performance tuning (e.g., load testing, concurrency in a live environment) was not a primary focus at these stages.

5. Conclusion

- In summary, this database design lays the groundwork for an Airbnb-like accommodation reservation platform. Most essential features have been successfully implemented, with opportunities to further refine performance and add new functionalities in the future. The experience highlighted the importance of clearly defining project scope, adhering to sound design principles, and conducting iterative testing—valuable lessons for any similar endeavor moving forward.