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# Project: DBMS - Hotel Management System

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* This project is part of an academic assignment to practice database design and SQL operations using MySQL.

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   Detailed mapping of ER components to their corresponding SQL tables and usage.

1. Data Entry Forms:

## Guest Registration Form

|  |  |
| --- | --- |
| Guest ID | G001 |
| First Name | John |
| Last Name | Smith |
| Email Address | john.smith@email.com |
| Phone | (555) 123-4567 |
| Date of Birth | 1990-01-01 |
| Nationality | USA |
| Passport Number | P12345678 |
| Address ID | A100 |
| ID Type | Driver's License |
| ID Number | DL-12345678 |
| Created At | 2025-01-01 |
| Updated At | 2025-05-01 |
| Submit Guest | |

### Room Booking Form

|  |  |
| --- | --- |
| Booking ID | B101 |
| Guest ID | G001 |
| Hotel ID | H100 |
| Room Number | 205 |
| Booking Date | 2025-05-05 |
| Check-in Date | 2025-05-10 |
| Check-out Date | 2025-05-15 |
| Reservation Status ID | 1 |
| Discount ID | D10 |
| Total Amount | $1200 |
| Number of Guests | 2 |
| Special Requests | Late check-in |
| Created At | 2025-05-01 |
| Updated At | 2025-05-05 |
| Submit Room | |

### Staff Management Form

|  |  |
| --- | --- |
| Staff ID | S123 |
| First Name | Jane |
| Last Name | Doe |
| Position | Receptionist |
| Department | Front Office |
| Contact Number | (555) 987-6543 |
| Hotel ID | H100 |
| Hire Date | 2024-03-01 |
| Created At | 2024-03-01 |
| Updated At | 2025-01-01 |
| Submit Staff | |

### Service Order Form

|  |  |
| --- | --- |
| Usage ID | U789 |
| Booking ID | B101 |
| Room ID | 205 |
| Service ID | SVC02 |
| Staff ID | S123 |
| Quantity | 1 |
| Service Date | 2025-05-11 |
| Order Time | 2025-05-11 14:00 |
| Completion Time | 2025-05-11 14:45 |
| Total Price | $40.00 |
| Created At | 2025-05-11 |
| Updated At | 2025-05-11 |
| Submit Service | |

### 

### Invoice Entry Form

|  |  |
| --- | --- |
| Invoice ID | INV5002 |
| Booking ID | B101 |
| Amount | $1100 |
| Tax Amount | $100 |
| Total Amount | $1200 |
| Issue Date | 2025-05-12 |
| Due Date | 2025-05-15 |
| Payment Status | Paid |
| Payment Method | Credit Card |
| Payment Date | 2025-05-15 |
| Created At | 2025-05-12 |
| Updated At | 2025-05-15 |
| Submit Invoice | |

2. Reports

* standard reports to support operations and decision-making:
  + Daily Room Occupancy Report
  + Monthly Revenue Report
  + Guest Service Usage Report
  + Staff Assignment and Schedule Report
  + Outstanding Invoices Report

2. Data Dictionary

|  |  |  |  |
| --- | --- | --- | --- |
| **Field Name** | **Table Name** | **Data Type** | **Description** |
| address | Guest | VARCHAR(255) | Guest's full address |
| booking\_id | Bookings | INT | Unique booking identifier |
| check\_in\_date | Bookings | DATE | Guest check-in date |
| check\_out\_date | Bookings | DATE | Guest check-out date |
| completion\_time | Service Orders | DATETIME | Service completion timestamp |
| contact\_number | Staff | VARCHAR(20) | Staff member's contact number |
| department | Staff | VARCHAR(50) | Department of the staff |
| email | Guest | VARCHAR(100) | Guest email address |
| first\_name | Guest / Staff | VARCHAR(50) | First name |
| guest\_id | Guest | INT | Unique guest identifier |
| hire\_date | Staff | DATE | Date staff was hired |
| id\_number | Guest | VARCHAR(50) | Guest's ID document number |
| id\_type | Guest | VARCHAR(50) | Type of ID (e.g., Passport, Driver’s License) |
| invoice\_date | Invoice | DATE | Date invoice was issued |
| invoice\_id | Invoice | INT | Unique invoice identifier |
| last\_name | Guest / Staff | VARCHAR(50) | Last name |
| order\_id | Service Orders | INT | Unique service order ID |
| order\_time | Service Orders | DATETIME | Time the service was ordered |
| payment\_method | Invoice | VARCHAR(50) | Method of payment (e.g., cash, credit) |
| payment\_status | Invoice | VARCHAR(20) | Payment status (Paid / Unpaid) |
| phone | Guest | VARCHAR(20) | Guest phone number |
| position | Staff | VARCHAR(50) | Job title or role |
| quantity | Service Orders | INT | Number of units requested |
| room\_id | Rooms | INT | Room identifier |
| room\_number | Rooms | VARCHAR(10) | Visible room number |
| service\_id | Services | INT | Identifier for hotel service |
| staff\_id | Staff | VARCHAR(10) | Unique ID for staff member |
| total\_amount | Invoice | DECIMAL(10,2) | Total billed amount |

3. Database Normalization

# First Normal Form (1NF)

## Bookings Table

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| booking\_id | guest\_name | guest\_email | guest\_phone | room\_number | room\_type | room\_price |
| 1 | John Smith | john.smith@email.com | 555-123-4567 | 102 | Standard | 99.99 |
| 2 | Emily Johnson | emily.j@email.com | 555-234-5678 | 302 | Suite | 249.99 |

## Service Orders Table

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| order\_id | booking\_id | service\_name | service\_price | staff\_name | staff\_position |
| 1 | 1 | Room Cleaning | 0.00 | Jennifer Thomas | Housekeeper |
| 2 | 1 | Breakfast | 15.00 | James Anderson | Chef |

# Second Normal Form (2NF)

## Guests Table

|  |  |  |  |
| --- | --- | --- | --- |
| guest\_id | guest\_name | guest\_email | guest\_phone |
| 1 | John Smith | john.smith@email.com | 555-123-4567 |
| 2 | Emily Johnson | emily.j@email.com | 555-234-5678 |

## Rooms Table

|  |  |  |
| --- | --- | --- |
| room\_number | room\_type | room\_price |
| 102 | Standard | 99.99 |
| 302 | Suite | 249.99 |

## Bookings Table

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| booking\_id | guest\_id | room\_number | check\_in\_date | check\_out\_date |
| 1 | 1 | 102 | 2025-05-01 | 2025-05-03 |
| 2 | 2 | 302 | 2025-05-02 | 2025-05-05 |

## Services Table

|  |  |  |
| --- | --- | --- |
| service\_id | service\_name | service\_price |
| 1 | Room Cleaning | 0.00 |
| 2 | Breakfast | 15.00 |

## Staff Table

|  |  |  |
| --- | --- | --- |
| staff\_id | staff\_name | staff\_position |
| 1 | Jennifer Thomas | Housekeeper |
| 2 | James Anderson | Chef |

## Service Orders Table

|  |  |  |  |
| --- | --- | --- | --- |
| order\_id | booking\_id | service\_id | staff\_id |
| 1 | 1 | 1 | 1 |
| 2 | 1 | 2 | 2 |

# Third Normal Form (3NF)

## Service Categories Table

|  |  |
| --- | --- |
| category\_id | category\_name |
| 1 | Housekeeping |
| 2 | Dining |

## Services Table (Updated)

|  |  |  |  |
| --- | --- | --- | --- |
| service\_id | service\_name | service\_price | category\_id |
| 1 | Room Cleaning | 0.00 | 1 |
| 2 | Breakfast | 15.00 | 2 |

4. ER Diagram

A diagram of a computer flowchart

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5. Mapping E-R to Tables

|  |  |  |
| --- | --- | --- |
| **E-R Concept** | **SQL Table(s)** | **Mapping Summary** |
| Entity: Guest | guests | Proper entity with attributes like name, contact, and ID. |
| Entity: Booking | bookings | Includes foreign key to guests and attributes like check-in/check-out dates. |
| Entity: Room | rooms | Linked with foreign keys to hotels and room\_types tables. |
| M:N Booking ↔ Room | booked\_rooms | Correct use of junction table to represent many-to-many relationships. |
| Entity: Hotel | hotels | Includes foreign key to addresses and star\_ratings. |
| M:N Hotel ↔ Chain | hotel\_chain\_hotels | Bridge table handles many-to-many relationship between hotels and hotel chains. |
| Entity: Staff | staff | Has a foreign key to hotel\_id, with standard personal and job-related attributes. |
| Entity: Service | hotel\_services | Includes foreign key to hotels and service information. |
| M:N Booking ↔ Service (with staff) | hotel\_service\_usages | Junction table with booking\_id, service\_id, and staff\_id to capture service usage. |
| Entity: Invoice | invoices | Linked to bookings, contains payment information like amount and status. |
| Entity: Feedback | feedbacks | Captures guest feedback for specific bookings. |
| Entity: Maintenance | maintenances | Tracks maintenance activity for rooms. |
| Lookup: Room Type | room\_types | Normalized reference for different types of rooms (e.g., Suite, Deluxe). |
| Lookup: Discounts | discounts, room\_rate\_discounts | Implements promotional and seasonal offers using M:N structure. |
| Lookup: Reservation Status | reservation\_statuses | Standardized booking status values (e.g., Confirmed, Cancelled). |
| Lookup: Star Rating | star\_ratings | Defines qualitative hotel rating scale (1 to 5 stars). |
| Lookup: Address | addresses | Shared between guests and hotels using a foreign key. |
| Entity: Hotel Chain | hotel\_chains | Stores chain-level metadata linked to hotels through a bridge table. |