Hotel Management System

The project submitted to the

SRM University – AP, Andhra Pradesh

for the partial fulfillment of the requirements to award the degree of

Bachelor of Technology

In

Computer Science and Engineering

School of Engineering and Sciences

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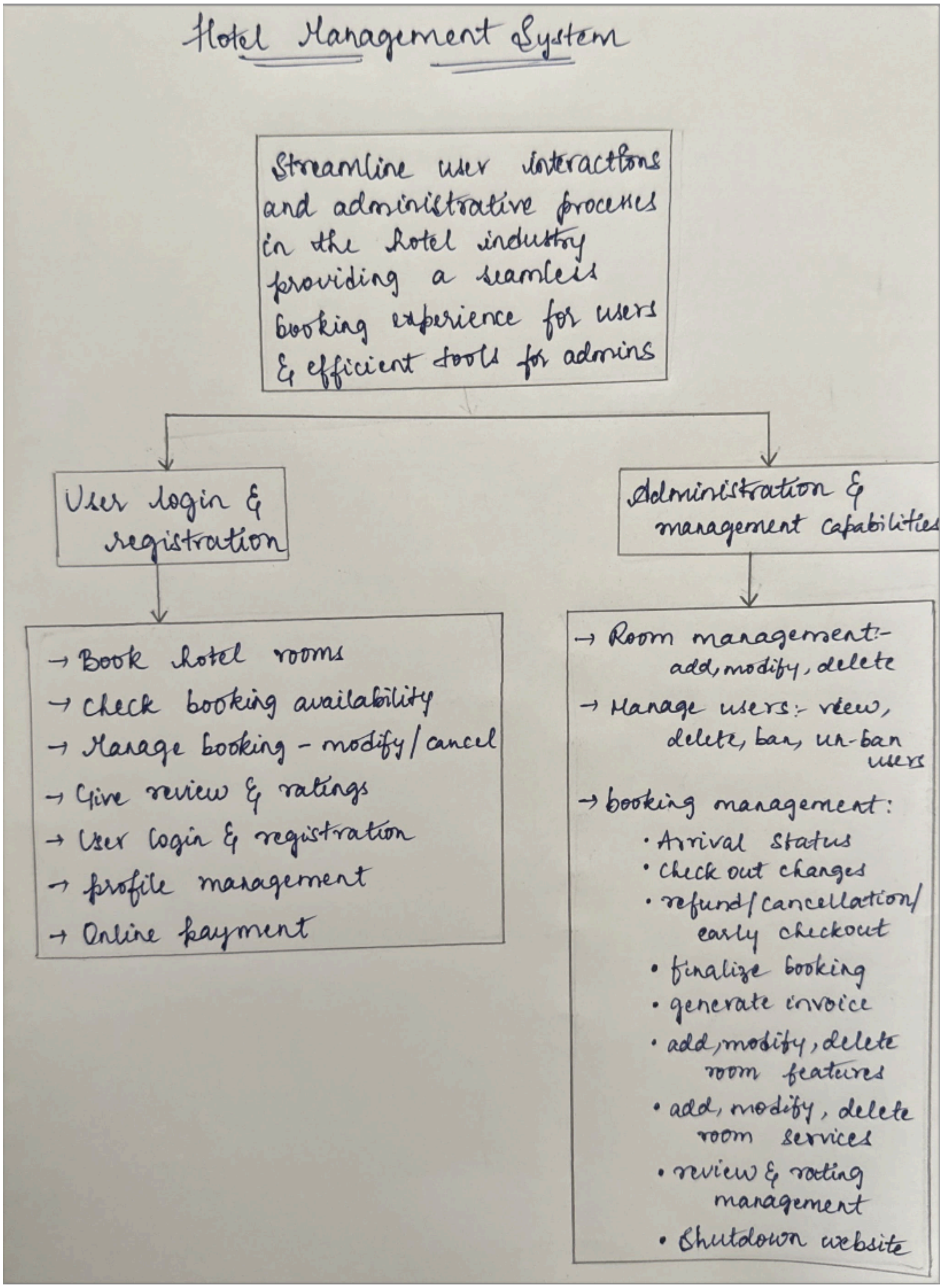
User Story:



Hotel Management System

Streamline user interactions and administrative processes in the hotel industry providing a seamless booking experience for users & efficient tools for admins

User login & registration

- → Book hotel rooms
- → Check booking availability
- → Manage booking - modify/cancel
- → Give review & ratings
- → User login & registration
- → profile management
- → Online payment

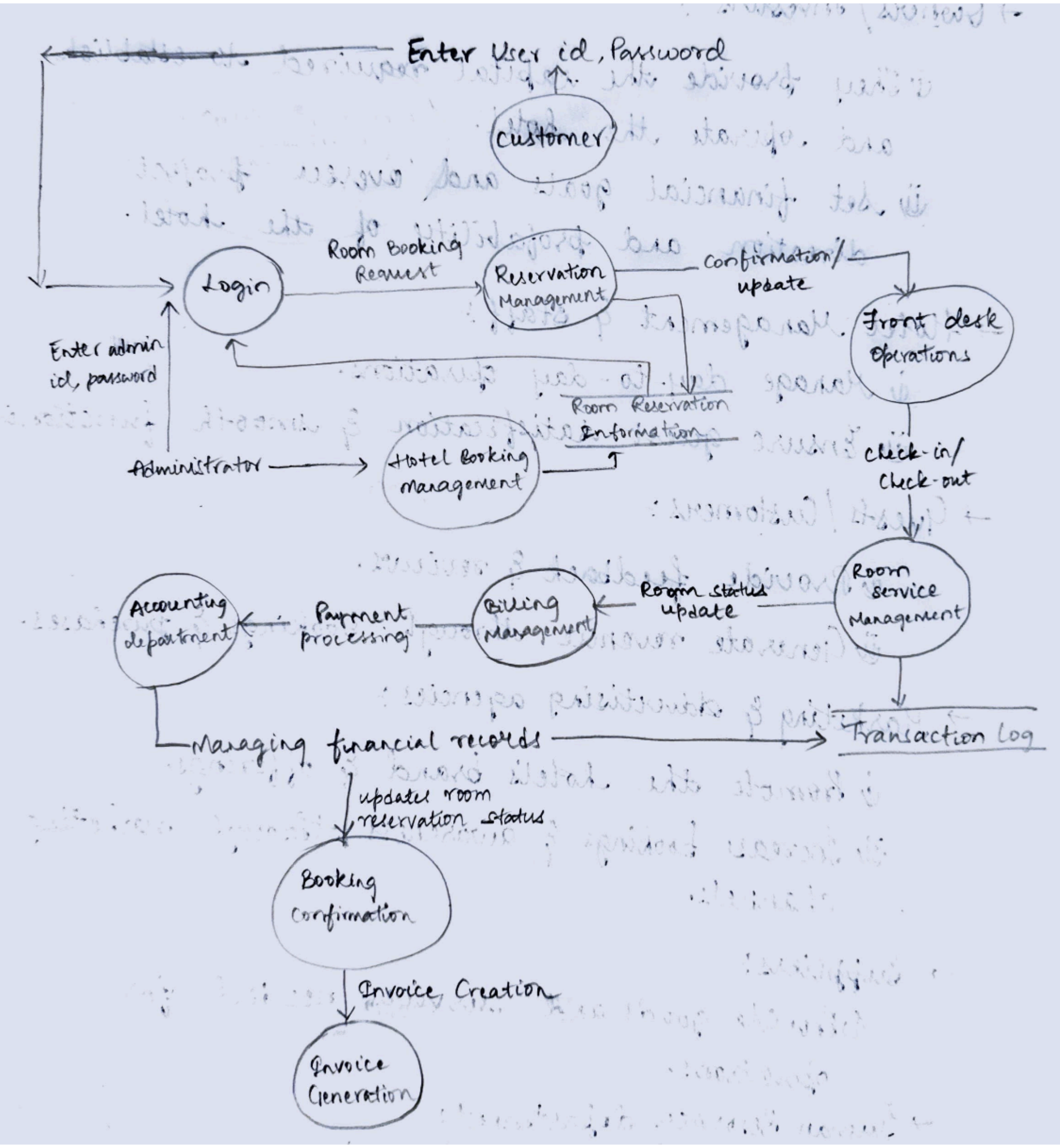
Administration & management capabilities

- → Room management:- add, modify, delete
- → Manage users:- view, delete, ban, un-ban users
- → booking management:
  - Arrival status
  - Check out changes
  - refund/cancellation/early checkout
  - finalize booking
  - generate invoice
  - add, modify, delete room features
  - add, modify, delete room services
  - review & rating management
  - Shutdown website

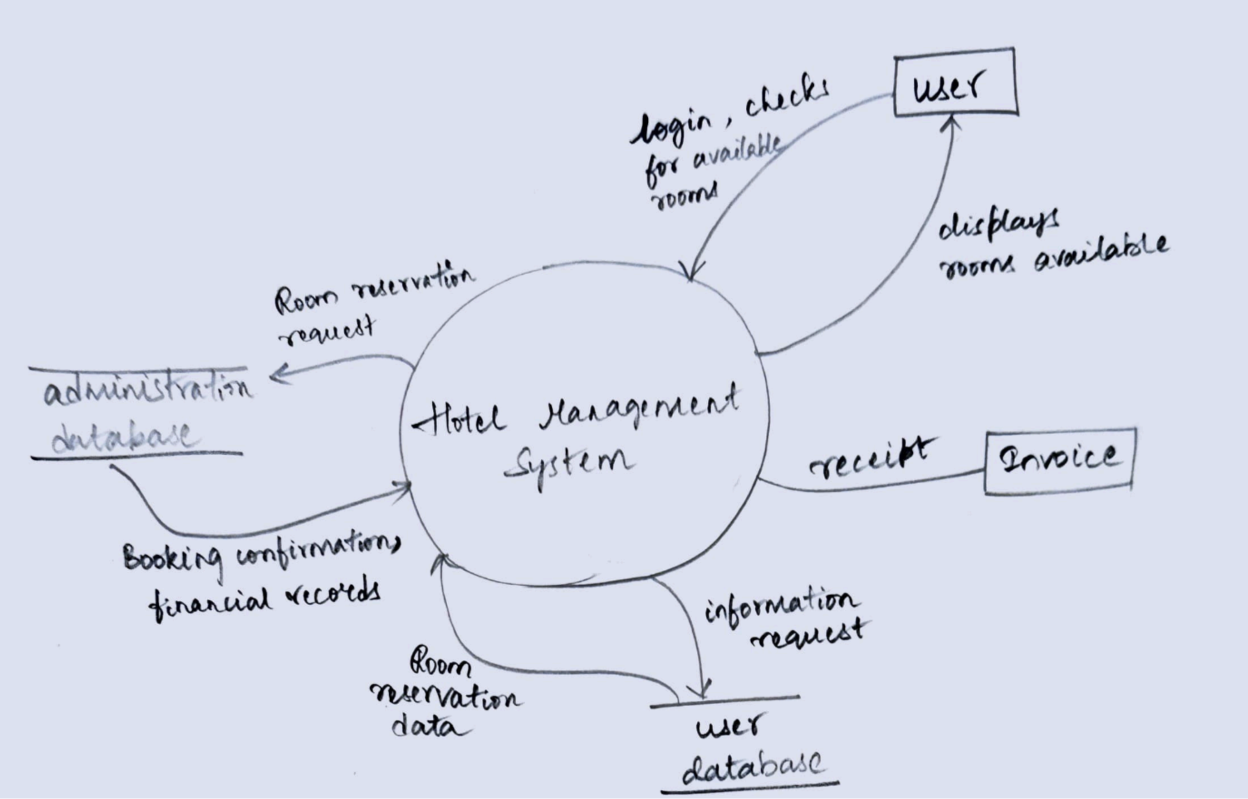
Finding out Stakeholders and their roles in Hotel Management System:

- Owners/ Investors :
    - They provide the capital required to establish and operate the hotel.
    - Set financial goals and oversee project direction and probability of the hotel.
- Hotel Management & Staff:
    - Manage day-to-day operations.
    - Ensure guest satisfaction & smooth functioning.
- Guests/ Customers:
    - Provide feedback & reviews.
    - Generate revenue through bookings & purchases.
- Marketing & Advertising agencies:
    - Promote the hotel's brand & offerings.
    - Increase bookings & awareness through marketing channels.
- Supplies:-
    - Provide goods and services needed for operations.
- Human Resources department:
    - Manages Employee information.
    - Payroll processing.

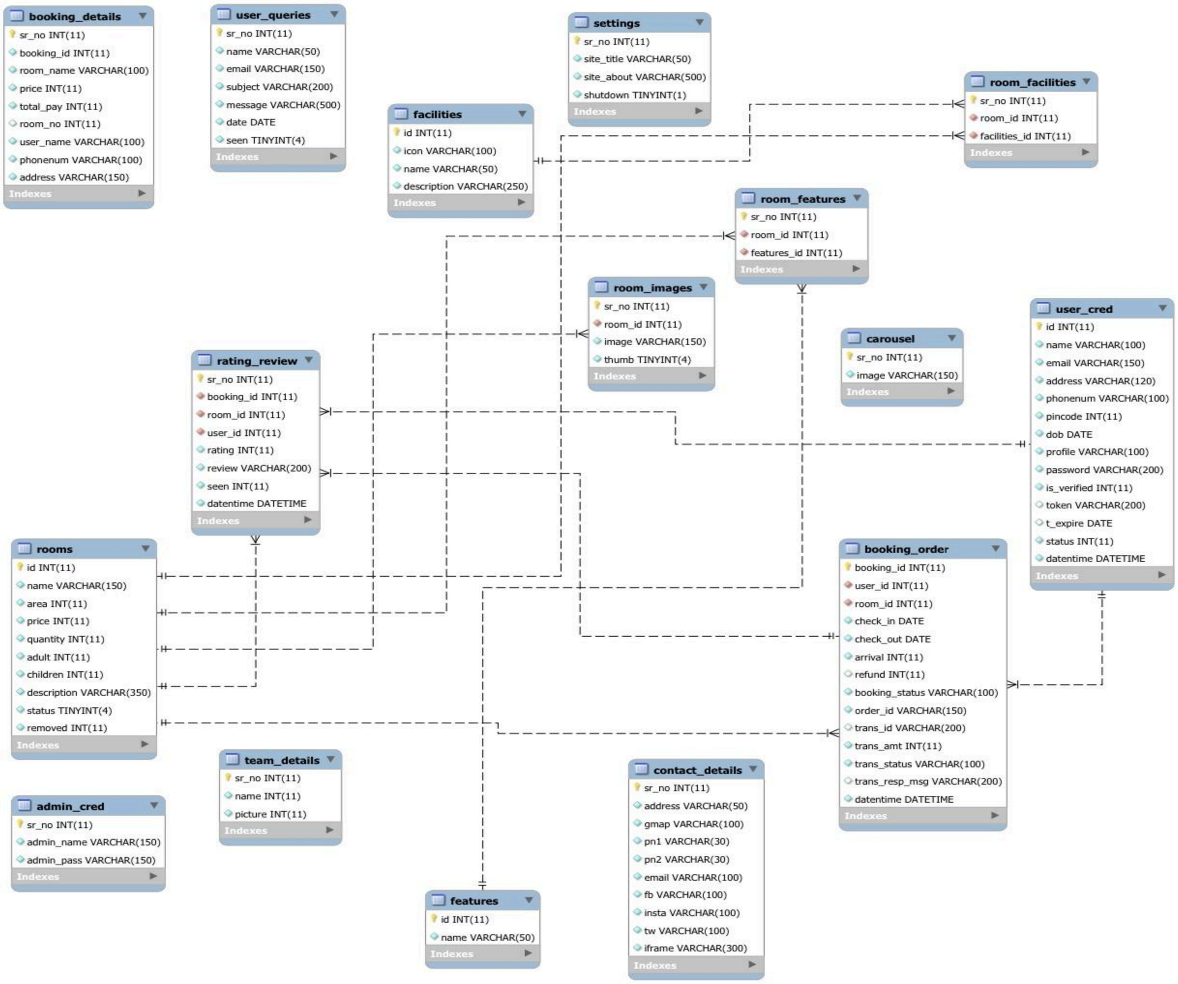
Data Flow diagram:



Context Diagram:



ER_Diagram Entities, and Attributes:



- Uses (Strong Entity)
  → Attributes: Username, Password, Email, firstname, Lastname, phone number, userID.
- Room (strong Entity)
  → Attributes: Room number, type, description price, capacity, availability.
- Facilities (Weak entity of room)
  → Attributes: name, decription, facility ID.
- Booking (Strong entity)
  → Attributes: booking ID, userID(foreignkey) , room number
  (forcin key) , check-in date, check-out date, total price, status.
- Review & Rating (Strong entity)
  → Attributes: reviewID, userID (foreign key) , room number (foreign key),
  rating, review text.
- About us (Strong entity)
  → Attributes: Team members, description
- Contact us (strong entity)
  → Attributes: address, phone number, email, map location,
  social accounts
- Login (Strong entity)
  → Attributes: loginID, user ID (foreign key) ,
- Registration (Strong entity)
  → Attributes: registrationID, registration method, userID (foreign key)

- Payment Gateway (Strong entity)
  → Attributes: paymentID, userID, bookingID (foreign key) ,
  payment method, amount, transactionID, status.
- Invoice (Strong entity)
  → Attributes: inovice ID, booking ID (foreign key) , total
  amount, date, payment status, description, customer name.
- Admin
  → Attributes: adminID, username, password, settings,
  dashboard.

Applying normalization on tables:

Table 1: **admin_cred**

- Step 1: Analyze Functional Dependencies:
    - Primary Key: sr_no
    - Attributes: admin_name, admin_pass
    - Functional Dependencies: { sr_no } -> { admin_name, admin_pass }
- Step 2: Normalize to First Normal Form (1NF):
    - Table already in 1NF as it has a primary key (sr_no) and atomic attribute values.
- Step 3: Normalize to Second Normal Form (2NF):
    - No partial dependencies observed, so the table remains in 2NF.
- Step 4: Normalize to Third Normal Form (3NF):
    - No transitive dependencies found, thus the table remains in 3NF.
- Final Normalized admin_cred Table:
    - admin_cred (sr_no PK, admin_name, admin_pass)

Table 2: **booking_details**

- Step 1: Identify Functional Dependencies:
    - Primary Key: sr_no
    - Attributes: booking_id, room_name, price, total_pay, room_no, user_name, phonenum, address
    - Functional Dependency: { sr_no } -> { booking_id, room_name, price, total_pay, room_no, user_name, phonenum, address }
- Step 2: Normalize to First Normal Form (1NF):
    - No changes needed as the table already has a primary key (sr_no) and atomic attribute values.
- Step 3: Normalize to Second Normal Form (2NF):
    - No partial dependencies observed, so the table remains in 2NF.
- Step 4: Normalize to Third Normal Form (3NF):
    - No transitive dependencies found, thus the table remains in 3NF.
- Final Normalized booking_details Table:
    - booking_details (sr_no PK, booking_id, room_name, price, total_pay, room_no, user_name, phonenum, address)

Table 3: **booking_order**

- Step 1: Analyze Functional Dependencies:
    - Primary Key: booking_id
    - Attributes: user_id, room_id, check_in, check_out, arrival, refund, booking_status, order_id, trans_id, trans_amt, trans_status, trans_resp_msg, datetime
    - Functional Dependencies:

  - { booking_id } -> { user_id, room_id, check_in, check_out, arrival, refund, booking_status, order_id, trans_id, trans_amt, trans_status, trans_resp_msg, datetime }
- Step 2: Normalize to First Normal Form (1NF):
  - No changes needed as the table already has a primary key (booking_id) and atomic attribute values.
- Step 3: Normalize to Second Normal Form (2NF):
  - No partial dependencies observed, so the table remains in 2NF.
- Step 4: Normalize to Third Normal Form (3NF):
  - No transitive dependencies found, thus the table remains in 3NF.
- Step 5: Introduce Foreign Key Constraints:
  - Add foreign key constraints to maintain referential integrity:
    - user_id references user_cred.id
    - room_id references rooms.id
- Final Normalized booking_order Table:
  - booking_order (booking_id PK, user_id FK, room_id FK, check_in, check_out, arrival, refund, booking_status, order_id, trans_id, trans_amt, trans_status, trans_resp_msg, datetime)

Table 4: **carousel**

- Step 1: Analyze Functional Dependencies:
  - Primary Key: sr_no
  - Attributes: image
  - Functional Dependencies: { sr_no } -> { image }
- Step 2: Normalize to First Normal Form (1NF):
  - No changes needed as the table already has a primary key (sr_no) and atomic attribute values.
- Step 3: Normalize to Second Normal Form (2NF):
  - No partial dependencies observed, so the table remains in 2NF.
- Step 4: Normalize to Third Normal Form (3NF):
  - No transitive dependencies found, thus the table remains in 3NF.
- Final Normalized carousel Table:
  - carousel (sr_no PK, image)

Table 5: **contact_details**

- Step 1: Analyze Functional Dependencies:
  - Primary Key: sr_no
  - Attributes: address, gmap, pn1, pn2, email, fb, insta, tw, iframe
  - Functional Dependencies: { sr_no } -> { address, gmap, pn1, pn2, email, fb, insta, tw, iframe }

- Step 2: Normalize to First Normal Form (1NF):
    - No changes needed as the table already has a primary key (sr_no) and atomic attribute values.
- Step 3: Normalize to Second Normal Form (2NF):
    - No partial dependencies observed, so the table remains in 2NF.
- Step 4: Normalize to Third Normal Form (3NF):
    - No transitive dependencies found, thus the table remains in 3NF.
- Final Normalized contact_details Table:
    - contact_details (sr_no PK, address, gmap, pn1, pn2, email, fb, insta, tw, iframe)

Table 6: **facilities**

- Step 1: Analyze Functional Dependencies:
    - Primary Key: id
    - Attributes: icon, name, description
    - Functional Dependencies: { id } -> { icon, name, description }
- Step 2: Normalize to First Normal Form (1NF):
    - No changes needed as the table already has a primary key (id) and atomic attribute values.
- Step 3: Normalize to Second Normal Form (2NF):
    - No partial dependencies observed, so the table remains in 2NF.
- Step 4: Normalize to Third Normal Form (3NF):
    - No transitive dependencies found, thus the table remains in 3NF.
- Final Normalized facilities Table:
    - facilities (id PK, icon, name, description)

Table 7: **features**

- Step 1: Analyze Functional Dependencies:
    - Primary Key: id
    - Attributes: name
    - Functional Dependencies: { id } -> { name }
- Step 2: Normalize to First Normal Form (1NF):
    - No changes needed as the table already has a primary key (id) and atomic attribute values.
- Step 3: Normalize to Second Normal Form (2NF):
    - No partial dependencies observed, so the table remains in 2NF.
- Step 4: Normalize to Third Normal Form (3NF):
    - No transitive dependencies found, thus the table remains in 3NF.
- Final Normalized features Table:
    - features (id PK, name)

Table 8: **rating_review**

- Step 1: Analyze Functional Dependencies:
  - Primary Key: sr_no
  - Attributes: booking_id, room_id, user_id, rating, review, seen, datetime
  - Functional Dependencies:
  - { sr_no } -> { booking_id, room_id, user_id, rating, review, seen, datetime }
- Step 2: Normalize to First Normal Form (1NF):
  - No changes needed as the table already has a primary key (sr_no) and atomic attribute values.
- Step 3: Normalize to Second Normal Form (2NF):
  - No partial dependencies observed, so the table remains in 2NF.
- Step 4: Normalize to Third Normal Form (3NF):
  - No transitive dependencies found, thus the table remains in 3NF.
- Step 5: Introduce Foreign Key Constraints:
  - Add foreign key constraints to maintain referential integrity:
    - booking_id references booking_order.booking_id
    - room_id references rooms.id
    - user_id references user_cred.id
- Final Normalized rating_review Table:
  - rating_review (sr_no PK, booking_id FK, room_id FK, user_id FK, rating, review, seen, datentime)

Table 9: **rooms**

- Step 1: Analyze Functional Dependencies:
- Primary Key: id
- Attributes: name, area, price, quantity, adult, children, description, status, removed
- Functional Dependencies: { id } -> { name, area, price, quantity, adult, children, description, status, removed }
- Step 2: Normalize to First Normal Form (1NF):
  - No changes needed as the table already has a primary key (id) and atomic attribute values.
- Step 3: Normalize to Second Normal Form (2NF):
  - No partial dependencies observed, so the table remains in 2NF.
- Step 4: Normalize to Third Normal Form (3NF):
  - No transitive dependencies found, thus the table remains in 3NF.
- Final Normalized rooms Table:
  - rooms (id PK, name, area, price, quantity, adult, children, description, status, removed)

Table 10: **room_facilities**

- Step 1: Analyze Functional Dependencies:
  - Identify primary key: sr_no.
  - Identify attributes: room_id, facilities_id.
  - Functional Dependencies: { sr_no } -> { room_id, facilities_id }.
- Step 2: Normalize to First Normal Form (1NF):
  - No changes needed; the table already has a primary key (sr_no) and atomic attribute values.
- Step 3: Normalize to Second Normal Form (2NF):
  - No partial dependencies observed, so the table remains in 2NF.
- Step 4: Normalize to Third Normal Form (3NF):
  - No transitive dependencies found, thus the table remains in 3NF.
- Step 5: Add Foreign Key Constraints:
  - Add foreign key constraint to room_id referencing id in the rooms table.
  - Add foreign key constraint to facilities_id referencing id in the facilities table.
- Final Normalized room_facilities Table:
  - room_facilities (sr_no PK, room_id FK, facilities_id FK)

Table 11: **room_features**

- Step 1: Analyze Functional Dependencies:
  - Identify primary key: sr_no.
  - Identify attributes: room_id, features_id.
  - Functional Dependencies: { sr_no } -> { room_id, features_id }.
- Step 2: Normalize to First Normal Form (1NF):
  - No changes needed; the table already has a primary key (sr_no) and atomic attribute values.
- Step 3: Normalize to Second Normal Form (2NF):
  - No partial dependencies observed, so the table remains in 2NF.
- Step 4: Normalize to Third Normal Form (3NF):
  - No transitive dependencies found, thus the table remains in 3NF.
- Step 5: Add Foreign Key Constraints:
  - Add foreign key constraint: room_id references rooms.id.
  - Add foreign key constraint: features_id references features.id.
- Final Normalized room_features Table:
  - room_features (sr_no PK, room_id FK, features_id FK)

Table 12: **room_images**

- Step 1: Analyze Functional Dependencies:
  - Identify primary key: sr_no.
  - Identify attributes: room_id, image, thumb.

- Functional Dependencies: { sr_no } -> { room_id, image, thumb }.

- Step 2: Normalize to First Normal Form (1NF):
  - No changes needed; the table already has a primary key (sr_no) and atomic attribute values.
- Step 3: Normalize to Second Normal Form (2NF):
  - No partial dependencies observed, so the table remains in 2NF.
- Step 4: Normalize to Third Normal Form (3NF):
  - No transitive dependencies found, thus the table remains in 3NF.
- Step 5: Add Foreign Key Constraints:
  - Add foreign key constraint: room_id references rooms.id.
- Final Normalized room_images Table:
  - room_images (sr_no PK, room_id FK, image, thumb)

Table 13: **settings**

- Step 1: Analyze Functional Dependencies:
  - Identify primary key: sr_no.
  - Identify attributes: site_title, site_about, shutdown.
  - Functional Dependencies: { sr_no } -> { site_title, site_about, shutdown }.
- Step 2: Normalize to First Normal Form (1NF):
  - No changes needed; the table already has a primary key (sr_no) and atomic attribute values.
- Step 3: Normalize to Second Normal Form (2NF):
  - No partial dependencies observed, so the table remains in 2NF.
- Step 4: Normalize to Third Normal Form (3NF):
  - No transitive dependencies found, thus the table remains in 3NF.
- Final Normalized settings Table:
  - settings (sr_no PK, site_title, site_about, shutdown)

Table 14: **team_details**

- Step 1: Analyze Functional Dependencies:
  - Identify primary key: sr_no.
  - Identify attributes: name, picture.
  - Functional Dependencies: { sr_no } -> { name, picture }.
- Step 2: Normalize to First Normal Form (1NF):
  - No changes needed; the table already has a primary key (sr_no) and atomic attribute values.
- Step 3: Normalize to Second Normal Form (2NF):
  - No partial dependencies observed, so the table remains in 2NF.
- Step 4: Normalize to Third Normal Form (3NF):
  - No transitive dependencies found, thus the table remains in 3NF.

- Final Normalized team_details Table:
    - team_details (sr_no PK, name, picture)

Table 15: **user_cred**

- Step 1: Analyze Functional Dependencies:
    - Identify primary key: id.
    - Identify attributes: name, email, address, phonenum, pincode, dob, profile, password, is_verified, token, t_expire, status, datentime.
    - Functional Dependencies: { id } -> { name, email, address, phonenum, pincode, dob, profile, password, is_verified, token, t_expire, status, datentime }.
- Step 2: Normalize to First Normal Form (1NF):
    - No changes needed; the table already has a primary key (id) and atomic attribute values.
- Step 3: Normalize to Second Normal Form (2NF):
    - No partial dependencies observed, so the table remains in 2NF.
- Step 4: Normalize to Third Normal Form (3NF):
    - No transitive dependencies found, thus the table remains in 3NF.
- Final Normalized user_cred Table:
    - user_cred (id PK, name, email, address, phonenum, pincode, dob, profile, password, is_verified, token, t_expire, status, datentime)

Table 16: **user_queries**

- Step 1: Analyze Functional Dependencies:
    - Identify primary key: sr_no.
    - Identify attributes: name, email, subject, message, date, seen.
    - Functional Dependencies: { sr_no } -> { name, email, subject, message, date, seen }.
- Step 2: Normalize to First Normal Form (1NF):
    - No changes needed; the table already has a primary key (sr_no) and atomic attribute values.
- Step 3: Normalize to Second Normal Form (2NF):
    - No partial dependencies observed, so the table remains in 2NF.
- Step 4: Normalize to Third Normal Form (3NF):
    - No transitive dependencies found, thus the table remains in 3NF.
- Final Normalized user_queries Table:
    - user_queries (sr_no PK, name, email, subject, message, date, seen)

Architectural Design Analysis for Hotel Management System:

1. **Collect Scenarios:**
    - User End:
      • Scenario 1: A guest registers on the platform, providing personal information for booking.
      • Scenario 2: A guest searches for available rooms, filtering by date, room type, and amenities.
      • Scenario 3: A guest makes a reservation, selecting room preferences and specifying check-in/check-out dates.
      • Scenario 4: User gives reviews and ratings for booked rooms and services.
      • Scenario 5: A guest checks in at the hotel, confirming their reservation and providing identification.
      • Scenario 6: User makes online payments using the Paytm payment gateway.
    - Admin End:
      • Scenario 1: Admin manages room details, including adding, modifying, or deleting room information.
      • Scenario 2: Admin manages users, including viewing, deleting, banning, or un-banning users.
      • Scenario 3: Admin manages bookings, handles arrival status, changes check-out, and processes refunds on cancellations or early check-outs.
      • Scenario 4: Admin finalizes bookings, generates invoices, and manages room features and services.
      • Scenario 5: Admin manages reviews and ratings.
      • Scenario 6: Admin has the ability to shut down the website
2. **Elicit Requirements, Constraints, and Environment Description:**
    - Requirements:
      • Secure user authentication and authorization.
      • Efficient room search and booking functionality.
      • Smooth reservation process with various room options and pricing.
      • Scalability to handle peak booking periods.
      • Usability with a user-friendly interface.
    - Constraints:
      • Limited budget for infrastructure.
      • Use of specific technologies for front end (HTML, CSS, JavaScript, AJAX, Bootstrap 5) and back end (PHP, MySQL).
      Environment:
      • Cloud-based hosting with expected high traffic during peak booking Periods.

3. **Describe Architectural Styles/Patterns:**
    - Module View:
        - Divided into modules such as user management, room management, reservation processing, check-in/out, payment processing, and administrative tasks.
    - Process View:
        - Processes include user registration, room search, booking management, check-in/out procedures, payment processing, review management.
    - Data Flow View:
        - Data flows from the user interface to the server, database queries for room availability, reservation updates, payment processing and check-in/out processes.
4. **Evaluate Quality Attributes:**
    - Security:
      - Ensure secure authentication, encryption of sensitive data, and protection against common web vulnerabilities.
    - Performance:
      - Support efficient room search and booking processes, fast payment processing with minimal latency during peak booking periods.
    - Scalability:
      - Ability to scale horizontally to handle increased booking traffic during peak seasons.
    - Usability:
      - Provide a user-friendly interface with intuitive navigation and responsive design.
5. **Identify Sensitivity of Quality Attributes:**
    - Choice of database affects scalability and performance.
    - Modular architecture allows for scalability but requires careful consideration of data consistency and transaction management.
    - Front-end caching improves performance but may require synchronization with backend updates.
6. **Critique Candidate Architectures:**
    - Candidate 1:
      - Monolithic architecture with relational databases.
      - **Pros:** Simplified development and deployment, lower operational overhead.
      - **Cons:** Limited scalability, potential single point of failure, difficulty in updating individual components.
    - Candidate 2:

- Microservices architecture with NoSQL database.
- **Pros:** Improved scalability, flexibility to update and deploy individual services.
- **Cons:** Increased complexity in development and deployment, higher operational overhead, potential consistency issues with eventual consistency of NoSQL databases.

Based on this analysis, a hybrid approach combining aspects of both architectures might be beneficial, leveraging the simplicity of a monolithic architecture for certain modules while adopting microservices
for scalability-critical components. Additionally, implementing robust security measures and performance optimizations would be essential for ensuring a reliable and efficient hotel management system.

User Interface Designing:

1. Stakeholders:
   → Developers
   → Customers
   → Hotel Owners
   → Payment Gateway providers
   → Investors

2. Requirement Analysis:
   → Home page: provides overview of hotels offering.
   → Room detail page: displaying pricing information & any special offers available for the rooms.
   → User account Management: enable users to create
   accounts or log in with existing accounts & access information.
   → contact and support: link or button in the navigation menu for easy access & provides links to social media platforms and customer support contacts.
   → About us, Facilities: provides information about hotel,
   such as amenities, services & commitment to customer satisfaction. Also displays user feedback & ratings.

- In admin side:
  → Room management
  → Booking management
  → Shutdown festare.

3. Strategies for designing,
   - User- Centered design :
     → Prioritize the needs of both users & administrators when designing.
     → Conduct user research, surveys & usability testing to gather information.
   - Consistent Branding :
     → reflects hotels' brand identity; like colors, topography, logos.
   - Security Measures:
     → Implement robust security to protect users' data.
   - Regular Maintenance & Updates:
     → Establish maintenances schedules for regular
     updates & bug fixes.

4. Quality Attributes:
   → Security
   → Reliability
   → Usability
   → Performance
   → Maintainability
   → Flexibility
   → User Experience

5. Evaluation Techniques :
   → Usability testing
   → Performance testing
   → Code review
   → User acceptance testing
   → User surveys & feedback
   → Continuous monitoring

6. Types of interfaces:
   → GUI
   → Touch screen interface