**Hotel Management System - Project Documentation**

**Project Overview**

The Hotel Management System is a Java-based desktop application built with Swing for the user interface and SQLite for data persistence. The system provides a comprehensive solution for managing hotel operations including guest management, room reservations, housekeeping, inventory management, billing, and reporting.

**System Architecture**

The project follows a layered architecture pattern with clear separation of concerns:

1. **User Interface (UI) Layer**: Java Swing components that handle user interaction
2. **Data Access Layer**: DAO (Data Access Object) classes that manage database operations
3. **Model Layer**: Plain Java objects representing business entities
4. **Database Layer**: SQLite database for data persistence

**Package Structure**

**1. Main Package (main)**

Entry point and core application files:

* **HotelManagementApp.java**: Main entry point that initializes the database
* **MainMenu.java**: Dashboard UI with access to all system functions
* **Test classes**: Various test classes for different modules

**2. Database Package (db)**

Database connection and data access objects:

* **DBConnection.java**: Singleton for managing database connections
* **DBInitializer.java**: Creates database schema and tables
* **DAO classes**: Data access objects for each entity (e.g., GuestDAO, RoomDAO, ReservationDAO)

**3. Models Package (models)**

Entity classes representing business objects:

* **Guest.java**: Represents hotel guests
* **Room.java**: Represents hotel rooms
* **Reservation.java**: Represents room bookings
* **User.java**: System users (Admin, Receptionist)
* **HousekeepingTask.java**: Tasks for housekeeping staff
* **InventoryItem.java**: Items in hotel inventory
* **Invoice.java**: Billing information
* **Promotion.java**: Discount offerings
* **GroupReservation.java**: Group bookings with multiple rooms
* **GroupReservationRoom.java**: Individual rooms in a group booking

**4. UI Package (ui)**

User interface screens and forms:

* **LoginScreen.java**: Authentication interface
* **GuestForm.java**: Guest management interface
* **RoomForm.java**: Room management interface
* **ReservationForm.java**: Booking interface
* **BillingScreen.java**: Invoice generation interface
* **HousekeepingForm.java**: Housekeeping task management
* **InventoryForm.java**: Inventory management
* **PromotionForm.java**: Promotion management
* **ReportScreen.java**: Reporting interface
* **SearchFilterScreen.java**: Search functionality
* **GroupReservationForm.java**: Group booking management
* **GroupBillingScreen.java**: Group billing interface

**Database Schema**

**Main Tables**

1. **Guests**: Guest information storage
2. **Rooms**: Room details and status
3. **Reservations**: Individual room bookings
4. **Users**: System user accounts and roles
5. **Invoices**: Billing records
6. **Inventory**: Hotel supplies and equipment
7. **GroupReservations**: Group booking information
8. **GroupReservationRooms**: Rooms associated with group bookings
9. **Housekeeping**: Cleaning and maintenance tasks
10. **Promotions**: Discount and promotional offers

**Key Features**

**User Authentication and Role Management**

* Role-based access control (Admin vs. Receptionist)
* Secure login with username/password
* Different UI options based on user role

**Guest Management**

* Add, update, delete guest records
* View guest history
* Search and filter guest data

**Room Management**

* Add, update, delete room records
* Track room status (Available, Occupied, Maintenance)
* Assign room types and pricing

**Reservation System**

* Book individual rooms
* Group bookings with multiple rooms
* Check-in/check-out date management
* Special requests handling

**Group Reservation System**

* Create group bookings with multiple rooms
* Assign different guests to rooms in the same group
* Shared contact information

**Billing and Invoicing**

* Generate invoices for individual bookings
* Group billing options (shared or individual)
* Track payment status
* Apply promotions and discounts

**Housekeeping Management**

* Track room cleaning status
* Schedule deep cleaning
* Maintenance task management

**Inventory Management**

* Track hotel supplies
* Monitor inventory levels
* Reorder notifications

**Reporting**

* Occupancy reports
* Revenue analysis
* Guest statistics

**Implementation Details**

**Data Access Pattern**

* Each model has a corresponding DAO class
* DAOs encapsulate SQL operations and return model objects
* Connection management via singleton pattern

**User Interface**

* Java Swing components for desktop GUI
* Consistent layout and navigation
* Form validation and error handling

**Group Reservation with Shared Billing**

One of the advanced features is the ability to book multiple rooms as a group with shared billing options:

1. **Group Creation**: The system allows creating a group with contact information
2. **Room Assignment**: Multiple rooms can be added to a group with different guests
3. **Billing Options**:
   * Shared billing: One invoice for the entire group
   * Individual billing: Separate invoices for each room

**Data Flow Example: Group Reservation**

1. User creates a new group with contact information
2. User adds multiple rooms to the group with check-in/check-out dates
3. For each room, a guest is assigned
4. User selects billing preference (shared or individual)
5. On check-out, invoices are generated based on billing preference
6. If shared billing, one invoice shows the total for all rooms
7. If individual billing, separate invoices are created for each room

**Integration Points**

**Database Integration**

* SQLite embedded database with JDBC driver
* Transaction management for multi-step operations
* Prepared statements for SQL injection prevention

**User Interface Integration**

* Main menu serves as the central navigation hub
* Each form/screen returns to the main menu when closed
* Data passed between screens via model objects

**Future Enhancement Opportunities**

1. **Mobile App Integration**: API for mobile access
2. **Payment Processing**: Integration with payment gateways
3. **Email Notifications**: Automated emails for confirmations
4. **Online Booking**: Web interface for direct bookings
5. **Analytics Dashboard**: Enhanced reporting and analytics
6. **Staff Scheduling**: Employee shift management
7. **Customer Loyalty Program**: Points and rewards system

**Conclusion**

The Hotel Management System provides a comprehensive solution for hotel operations with a strong focus on data integrity, usability, and expandability. The modular design allows for easy maintenance and future enhancements.