

SNS Hotel Management System

CPS 510 – Section 04

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Assignment 1: Week of Sep. 8

Application Description: Finalize the application in consultation with the lab TA. Prepare a report to clearly describe about the application, its functions and information you expect from it, at the level of a technical report, and submit it to the TA (6 Marks)

Overview

The chosen project topic is **Hotel Management System**. It will be designed to handle the daily operations of a hotel, providing functionality for handling rooms, employees, guests, bookings, additional services and keeping track of payments. Additionally, it will have functionality for enforcing business rules through constraints to ensure data consistency and good structure. For example, to avoid duplicating Customer records, it will restrict the creation of Customers that have identical contact information.

The report is broken into 6 sections:

- Overview: The current section, a brief introduction to the report.
- Entities: This section will expand on the core entities for the DB.
- Potential Operations: A list of potential query and update operations that may be performed.
- Relationships: This section will go over the various relationships between the previously mentioned entities.
- Constraints: This section will go over constraint/business rules for how data will be recorded.
- Potential Users & Interface Requirements: This will cover the potential types of users of the system and what kind of interface they may require.

Entities

ROOM

Room ID	RoomNum	Floor	Type	MaxCapacity	PricePerNight	Status
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CUSTOMER

CustomerID	Name	PhoneNum	Email	IDType
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EMPLOYEE

EmployeeID	Name	Role	PhoneNum	Email	Salary
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BOOKING

Booking ID	CustomerID	Room ID	NumGuests	CheckIn Date	CheckOut Date	Status	TotalPrice
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PAYMENT

PaymentID	BookingID	Method	Date	Amount
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SERVICE

ServiceID	ServiceName	Price
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SERVICE_BOOKING

ServiceBookingID	BookingID	ServiceID	Quantity	Total Price
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Potential Operations

Queries:

- List the names of all guests currently staying on Floor 2 of the hotel

- List all employee salaries
- Obtain the room number of a guest with the name “John Wood”

Update:

- After a guest has checked in, update the Status of their booking to “CheckedIn”.
- After a guest has checked out, update the Status of their booking to “Completed”.
- Change the Status of a room to “Maintenance” if it is undergoing maintenance and is thus unavailable.

Relationships

- Each BOOKING record is related to one CUSTOMER record and one ROOM record.
- Each PAYMENT record is related to one BOOKING record.
- Each SERVICE_BOOKING is related to one BOOKING record and one SERVICE record.

Constraints

General Constraints

- The initial ID column of each table must be unique. (PK)
- No fields can be NULL.

ROOM Constraints

- The RoomNum should be unique for each ROOM record.
- The MaxCapacity must be at least 1.
- The Price must be a non-negative number.
- The Type must be one of the allowed values:
 - a. Single
 - b. Double
 - c. Family
- The Status must be one of the allowed values:
 - a. Available

- b. Unavailable
- c. Maintenance

CUSTOMER Constraints

- Customers must provide both forms of contact (PhoneNum + Email).
- Email field must be unique for each record.
- PhoneNum must be unique for each record.
- The combination of PhoneNum and Email must be unique for each record.
- Email addresses must be in email format
- Phone numbers must only contain digits

EMPLOYEE constraints

- The Role type must be one of the allowed roles:
 - Receptionist
 - HouseKeeper
 - Cook
 - Manager
 - Owner
- The Salary must be a non-negative number.
- Email field must be unique for each record.
- PhoneNum must be unique for each record.
- The combination of PhoneNum and Email must be unique for each record.

BOOKING Constraints

- Each record must be linked to a valid CUSTOMER and ROOM record.
- The CheckInDate must be before the CheckOutDate.
- The NumGuests must be at least 1.
- The NumGuests must not exceed the MaxCapacity number of the associated ROOM record.
- The Status must be one of the allowed values:
 - Pending
 - Confirmed
 - CheckedIn
 - Completed

- Cancelled
- Total amount must be a non-negative number
- A ROOM record cannot be associated with a BOOKING record that is not Cancelled and has overlapping CheckInDate/CheckOutDate.

PAYMENT Constraints

- Each record must be associated with a valid BOOKING record.
- The Method must be one of the allowed values:
 - Cash
 - Credit
 - Debit
- The Amount must be a non-negative number.
- The Date cannot be in the future.

SERVICE Constraints

- The ServiceName must be unique.

SERVICE_BOOKING

- Each record must be associated with a valid BOOKING record and valid SERVICE record.
- The Quantity must be at least 1.

Potential Users and Interface Requirements

Customer / Guest

- Tasks:
 - Search for available rooms
 - Limit results with filters selected by the guest
 - Make a booking
 - Add extra services not their booking
 - View booking history and invoices
- Interface Requirements:
 - Forms to select filters when searching for rooms, or booking history
 - Tables to show results
 - Payment Portal

Receptionists

- Tasks / Applications:
 - Check room availability
 - Create new bookings for walk-in customers
 - Update booking status (check-in, check-out, cancellation, no-show)
 - Record payments (cash, card, debit)
 - Assign services (e.g., room service, laundry)
- Interface:
 - Desktop application or web dashboard with:
 - Room availability view (calendar-style)
 - Booking management form
 - Payment entry form

Housekeepers

- Tasks / Applications:
 - Update room status (Available, Occupied, Cleaning, Maintenance).
 - Report issues with a room (broken equipment, cleaning required).
- Interface:
 - Simple mobile/tablet interface with:
 - Room list (with status filters).
 - Quick update buttons for changing Room Status

Manager

- Tasks / Applications:
 - Manage employees (roles, salaries).
 - Monitor all available rooms and booking histories.
 - Adjust room rates and service prices.
 - Create reports using data from previous bookings
- Interface:
 - Management dashboard with more information than Receptionists
 - Forms to update prices, manage employees, adjust services.

Owner

- Same as Manager

