# Phase-1: Hotel Chain Database Management System

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## Overview

The mini world chosen for this project is a Hotel chain.

This database aims to provide all the functionalities that may be required in a generic hotel chain. The chain itself may consist of several branches situated in various locations headed by a hotel manager and consisting of various staff members. Guests have a choice of rooms to book at various different price points and also have the option to affiliate themselves to the chain by acquiring a membership.

The database keeps a record of all related information pertaining to the efficient functioning of the chain and the branches it handles. This requires tracking room occupancies, employee and guest data, financial data as well as other services provided by the hotels.

The userbase targeted to by this DBMS involve the employees who are required to access and modify the stored information for accomplishing various tasks, some of which are:

- Hiring a new employee and tracking the hierarchy of the employee system which involve supervisors and subordinates.
- Allocating a room for a guest and generating the final bill for the stay by tracking the clubs and recreation services availed by the guest.
- Recording the monthly finances of the hotel chain branches which incorporates several basic expenditures (such as employee salary and electricity expenses) and the profits acquired.

## Entities:

1. Hotel
    a. Hotel Branch ID (Pkey)
    b. Hotel branch name
    c. Hotel Manager's employee id (Foreign Key)
    d. Hotel Location (Composite Attribute {Street Adress, City, Country})
    e. Hotel stars

2. Employee:
    I. Employee ID (PKey)
    II. Employee Name (Composite Attribute {F.name, M.name, L.name})
    III. Employee Phone Number (candidate key)
    IV. Employee E-mail Address (candidate key)
    V. Employee D.O.B (Composite Attribute {DD, MM, YY})
    VI. Employee Joining date
    VII. Employee Salary

VIII. Employee Position (Subclass Identifier)
IX. Employee status
X. Respective Manager ID

**Subclass (disjoint):**

I. Service Staff
   a. Service Staff ID
   b. Service Staff Division ({RC, BC, FC, Reception, Club})

II. Supervisor
   a. Supervisor ID
   b. Supervisor Department

III. Hotel Manager
   a. Hotel ID

3. Rooms (Weak Entity with Pkey = Hotel ID + Room Number):
   I. Room Number
   II. Pkey
   III. Room Type
   IV. Room per night rate
   V. Room status
   VI. Max no. of Guests
   VII. Check-in/ Check-out date
   VIII. Hotel ID (Foreign Key)
   IX. Service Staff ID ({Multivalued})

4. Members
   a. Member ID (Primary Key)
   b. Member tier
   c. Member Name (Composite Attribute {F.name, M.name, L.name})
   d. Email ID
   e. Member D.O.B (Composite Attribute {DD, MM, YY})
   f. No. of Stays

5. Guests (Weak Entity with PKey = Is Member + HotelID + Room No) (Only Head Guest)
   a. Is Member
   b. Member ID (Can be NULL)
   c. PKey
   d. Hotel ID (Foreign Key)
   e. Room ID
   f. Check in Date
   g. Cost (Derived from Check in – check out * room cost and a discount factor depending on member (count of stays and DOB), room type, facilities (derived from the club hours)
   f. Club hours Used ({Club Pkey, No. of Hours})

6. Clubs and recreation (Weak Entity with Pkey = Hotel ID + Type)
   a. Pkey

b. Type
c. Service Expenditure
d. Total Income (Composite: {M, Income})
e. Supervisor ID (Foreign Key)
f. Cost per hour

7. Hotel Finances (Weak Entity Type with Pkey = Hotel ID + Month + Year)
   a. Pkey
   b. Month
   c. Year
   d. Electricity Bill
   e. Water Bill
   d. Total Expenditure (Derived data type: Total Employee salary + Clubs service expenditure + Electricity Bill + Water Bill)
   e. Total Income (Club Income + Room Income)
   f. Profit (Total Income – Total Expenditure)

## Relationships:

1. Supervisor -------- SUPERVISES -------- Employee. (0..1).....(1..n)
   CA: Employee ID
2. N>3 Relationship: Guest -> Room -> Employee > Hotel-Branch
3. Guest ----------USES ---------- Recreation and Club Services. (0..n)......(0..m)
   CA: Club Pkey
4. Service staff ---------- ASSIGNED TO ---------- Rooms. (0..n)......(1..m)
   CA: Service staff ID
5. Supervisor --------- MANAGES --------- Clubs and Recreations (1..1)......(1..1)
   CA: Supervisor ID
6. Employee -------- BELONGS TO --------- Hotel (0..n)......(p..q)
   CA: Hotel ID
7. Hotel Manager --------- MANAGES ------- Hotel (1..1)......(1..1)
   CA: Manager ID
8. Guest ---------USES---------- Rooms (1..n)......(1..m)
   CA: Room ID
9. Hotel Finance---> Employee-> Clubs and Recreation---> Guests)

## Functional Requirement:

1. Selection
   **Select all member guests from a list of guests staying in the hotel.**
   **Select all Expenditure from Finances.**

2. Projection

**Select rooms where RatePerNight is between <lower bound> and <upper bound>**
**Select the months with electricity bill and water bill over 10L rupees.**

3. Aggregate Function
   **Sum of all expenditures over the year <year>**

4. Search Function
   **Search for <guestName> in guests**

5. Analysis Reports
   **Years where the hotel's expenditure was above average. Report will include total expenditure, total profit, utilities, and net employee salaries over the year.**

   **The profit % of clubs and recreation's profit shares wrt to the net hotel profit.**

5. Modification
   Insertion: Insert <entity type> object
   Deletion: Delete <entity type> object
   Updation: update <entity type> object