DATABASE DESIGN AND PROTOTYPING

FINAL PROJECT- Hotel Management System

By Priyanshu Madan

PART 1.1 : DESCRIPTION

The owners of an old hotel chain want to optimize their internal operations and management of all the owners. They want to develop an entire data pipeline that is efficient and minimizes the paperwork of all the hotels. Currently the owners maintain all the records of the guests, rooms, staffs and employees on paper. It is not very efficient, reliable and it consumes a lot of time to maintain these records moreover it's not real time.

Apart from this, in today's day and age they want their own reservation portal for the guests to reserve their rooms and pay online for the same. This way they will also maintain a record of the previous loyal guests.

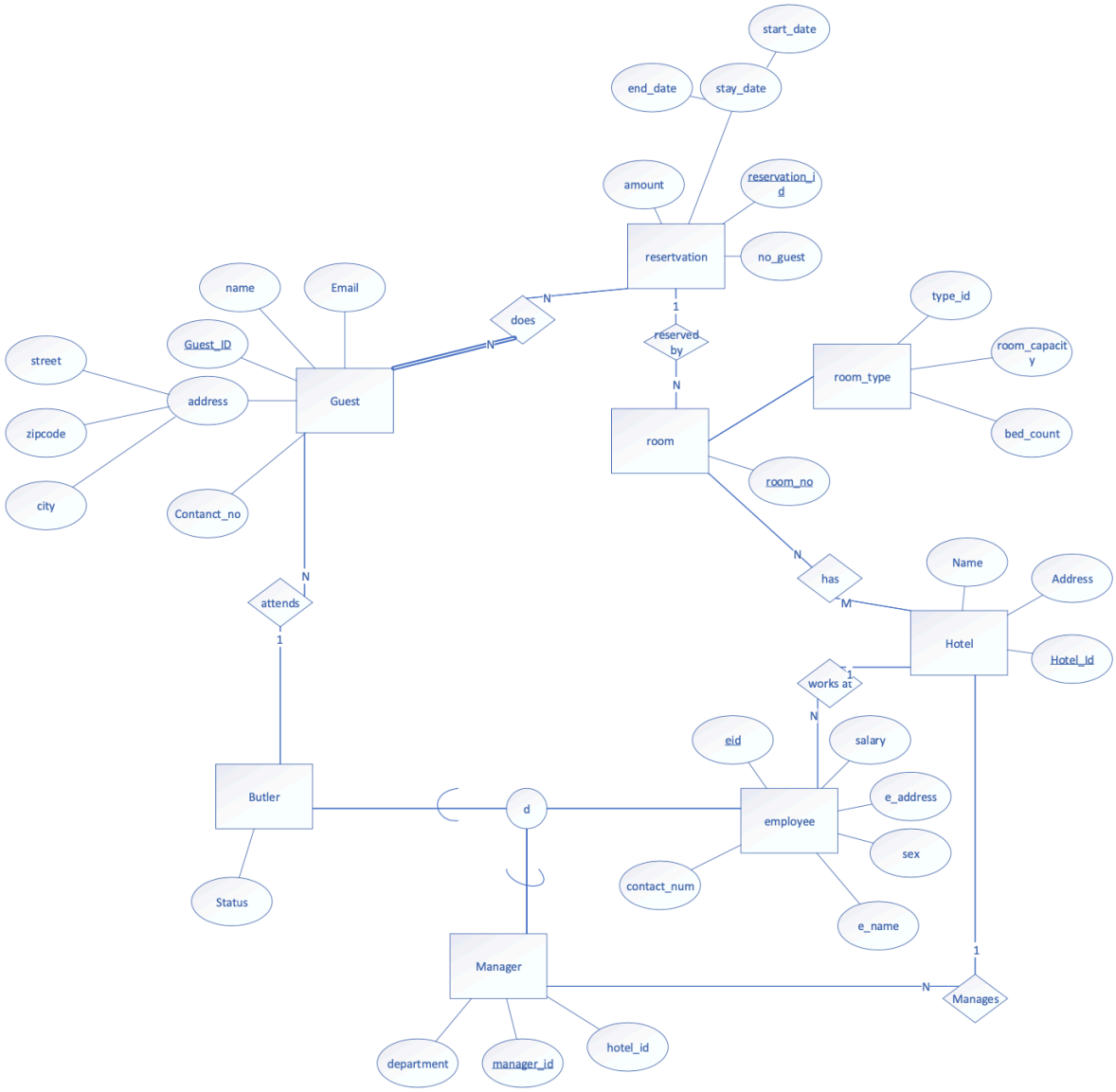
The hotel owners want you to develop a Hotel management system that can automate the whole record keeping process of all the hotels they own (of guests, staff and rooms) as well as handle their reservation portal.

The Scenario revolves around the Hotel, Guest, Rooms and the Employees. There are multiple hotels with multiple rooms. Each room has its own type (bed size, bed count). There can be multiple rooms of the same room type. The reservation of these rooms is done through a single reservation portal which is common for all the hotels. The guest can have multiple reservations with any hotel and can reserve multiple rooms. All the hotels have employees and among them is one manager for one hotel. One of the employees is a butler who assist a guest personally. One butler can only assist multiple guests at a time.

The owners want the following features:

1) Reservations: Keep record of all the reservations.
2) Estimate the number of guests staying per month.
3) Estimate the revenue generated by the hotels.
4) Keep past records: To know who the loyal customers are for implementing reward system.
5) Room management: To know which rooms are available to reserve and which are occupied.
6) Duty assignment: To know who manages the hotel and which staff attends which guest and what duties others are responsible for.

PART 1.2 : ENTITY-RELATIONSHIP DIAGRAM (EER)



PART 1.3 : RELATIONAL MODEL

Table 1: Guest

sql_ddl_assignment2.sql | *final_project_2.sql* | GUEST

Columns | Data | Model | Constraints | Grants | Statistics | Triggers | Flashback | Dependencies | Details | Partitions | Indexes | SQL

Actions...

	COLUMN_NAME	DATA_TYPE	NULLABLE	DATA_DEFAULT	COLUMN_ID	COMMENTS
1	GUEST_ID	NUMBER(38,0)	No	(null)	1	(null)
2	FIRST_NAME	CHAR(30 BYTE)	No	(null)	2	(null)
3	LAST_NAME	CHAR(30 BYTE)	No	(null)	3	(null)
4	EMAIL	VARCHAR2(30 BYTE)	No	(null)	4	(null)
5	PHONE_NO	NUMBER(38,0)	No	(null)	5	(null)
6	STREET_NM	CHAR(30 BYTE)	No	(null)	6	(null)
7	STREET_NO	VARCHAR2(30 BYTE)	No	(null)	7	(null)
8	CITY	CHAR(10 BYTE)	No	(null)	8	(null)
9	STATES	CHAR(10 BYTE)	No	(null)	9	(null)
10	ZIPCODE	NUMBER(38,0)	No	(null)	10	(null)

Table 2: Reservation

sql_ddl_assignment2.sql | *final_project_2.sql* | RESERVATION

Columns | Data | Model | Constraints | Grants | Statistics | Triggers | Flashback | Dependencies | Details | Partitions | Indexes | SQL

Actions...

	COLUMN_NAME	DATA_TYPE	NULLABLE	DATA_DEFAULT	COLUMN_ID	COMMENTS
1	RESERVATION_ID	NUMBER(38,0)	No	(null)	1	(null)
2	GUEST_ID	NUMBER(38,0)	No	(null)	2	(null)
3	START_DT	DATE	No	(null)	3	(null)
4	END_DT	DATE	No	(null)	4	(null)
5	TOTAL_COST	NUMBER(38,0)	No	(null)	5	(null)
6	NO_GUEST	NUMBER(38,0)	No	(null)	6	(null)

Table 3: Hotel

sql_ddl_assignment2.sql | *final_project_2.sql* | HOTEL

Columns | Data | Model | Constraints | Grants | Statistics | Triggers | Flashback | Dependencies | Details | Partitions | Indexes | SQL

Actions...

	COLUMN_NAME	DATA_TYPE	NULLABLE	DATA_DEFAULT	COLUMN_ID	COMMENTS
1	HOTEL_ID	NUMBER(38,0)	No	(null)	1	(null)
2	NAME	CHAR(30 BYTE)	No	(null)	2	(null)
3	ADDRESS	CHAR(100 BYTE)	No	(null)	3	(null)

Table 4: Hotel employee

sql_ddl_assignment2.sql | *final_project_2.sql* | HOTEL_EMPLOYEE

Columns | Data | Model | Constraints | Grants | Statistics | Triggers | Flashback | Dependencies | Details | Partitions

Actions...

	COLUMN_NAME	DATA_TYPE	NULLABLE	DATA_DEFAULT	COLUMN_ID	COMMENTS
1	EMP_ID	NUMBER(38,0)	No	(null)	1	(null)
2	HOTEL_ID	NUMBER(38,0)	No	(null)	2	(null)
3	EMP_SALARY	NUMBER(38,0)	No	(null)	3	(null)
4	FIRST_NAME	CHAR(30 BYTE)	No	(null)	4	(null)
5	LAST_NAME	CHAR(30 BYTE)	No	(null)	5	(null)
6	PHONE_NO	NUMBER(38,0)	No	(null)	6	(null)
7	ADDRESS	CHAR(100 BYTE)	No	(null)	7	(null)
8	GENDER	CHAR(1 BYTE)	No	(null)	8	(null)

Table 5: Hotel Manager

sql_ddl_assignment2.sql | *final_project_2.sql* | HOTELMANAGER

Columns | Data | Model | Constraints | Grants | Statistics | Triggers | Flashback | Dependencies | Details | Partitions | Indexes | SQL

Actions...

	COLUMN_NAME	DATA_TYPE	NULLABLE	DATA_DEFAULT	COLUMN_ID	COMMENTS
1	MANAGER_ID	NUMBER(38,0)	No	(null)	1	(null)
2	HOTEL_ID	NUMBER(38,0)	No	(null)	2	(null)
3	DEPT_NAME	CHAR(20 BYTE)	No	(null)	3	(null)

Table 6: Hotel room

sql_ddl_assignment2.sql | *final_project_2.sql* | HOTELROOM

Columns | Data | Model | Constraints | Grants | Statistics | Triggers | Flashback | Dependencies | Details | Partitions | Indexes | SQL

Actions...

	COLUMN_NAME	DATA_TYPE	NULLABLE	DATA_DEFAULT	COLUMN_ID	COMMENTS
1	ROOM_NO	NUMBER(38,0)	No	(null)	1	(null)
2	HOTEL_ID	NUMBER(38,0)	No	(null)	2	(null)
3	ROOM_TYPE	CHAR(2 BYTE)	No	(null)	3	(null)

Table 7: Room type

sql_ddl_ass Model t2.sql | final_project_2.sql | ROOMTYPE

Columns | Data | Model | Constraints | Grants | Statistics | Triggers | Flashback | Dependencies | Details | Partitions | Ir

Actions...

	COLUMN_NAME	DATA_TYPE	NULLABLE	DATA_DEFAULT	COLUMN_ID	COMMENTS
1	TYPE_ID	CHAR(2 BYTE)	No	(null)	1	(null)
2	NUMPEOPLE	NUMBER(38,0)	No	(null)	2	(null)
3	BED_COUNT	NUMBER(38,0)	No	(null)	3	(null)

Table 8: Reserved By

sql_ddl_assignment2.sql | final_project_2.sql | RESERVEDBY

Columns | Data | Model | Constraints | Grants | Statistics | Triggers | Flashback | Dependencies | Details | Partitions | Indexes | SQL

Actions...

	COLUMN_NAME	DATA_TYPE	NULLABLE	DATA_DEFAULT	COLUMN_ID	COMMENTS
1	RESERVATION_ID	NUMBER(38,0)	No	(null)	1	(null)
2	ROOM_NO	NUMBER(38,0)	No	(null)	2	(null)

Table 9: Butler

sql_ddl_assignment2.sql | final_project_2.sql | BUTLER

Columns | Data | Model | Constraints | Grants | Statistics | Triggers | Flashback | Dependencies | Details | Partitions | Indexes | SQL

Actions...

	COLUMN_NAME	DATA_TYPE	NULLABLE	DATA_DEFAULT	COLUMN_ID	COMMENTS
1	BUTLER_ID	NUMBER(38,0)	No	(null)	1	(null)
2	STATUS_LEVEL	CHAR(2 BYTE)	Yes	(null)	2	(null)
3	GUEST_ID	NUMBER(38,0)	Yes	(null)	3	(null)

PART 1.4 : FUNCTIONAL DEPENDENCIES

Guest(GUEST_ID, FIRST_NAME, LAST_NAME, EMAIL, PHONE_NO, STREET_NM, STREET_NO, CITY, STATES, ZIPCODE)

FD1: GUEST_ID -> {FIRST_NAME, LAST_NAME, EMAIL, PHONE_NO, STREET_NM, STREET_NO, CITY, STATES, ZIPCODE}

reservation(reservation_id, guest_id, start_dt, end_dt, total_cost, no_guest)

FD2: {reservation_id, guest_id} -> {start_dt, end_dt, total_cost, no_guest}

HOTEL (HOTEL_ID, NAME, ADDRESS)

FD3: HOTEL_ID -> { NAME, ADDRESS}

HOTEL_EMPLOYEE (EMP_ID, HOTEL_ID, EMP_SALARY, FIRST_NAME, LAST_NAME, PHONE_NO, ADDRESS, GENDER)

FD4: {EMP_ID, HOTEL_ID} -> {EMP_SALARY, FIRST_NAME, LAST_NAME, PHONE_NO, ADDRESS, GENDER}

HOTELMANAGER (MANAGER_ID, HOTEL_ID, DEPT_NAME)

FD5: {MANAGER_ID, HOTEL_ID} -> DEPT_NAME

HOTELROOM (ROOM_NO, HOTEL_ID, ROOM_TYPE)

FD6: {ROOM_NO, HOTEL_ID} -> ROOM_TYPE

ROOMTYPE(TYPE_ID, NUMPEOPLE, BED_COUNT)

FD7: TYPE_ID -> {NUMPEOPLE, BED_COUNT}

reservedBy(reservation_id, room_no)

Butler(butler_ID, status_level, GUEST_ID)

FD8: butler_ID -> status_level

All the tables are in 3NF form

PART 1.5 : SQL STATEMENTS

```
CREATE TABLE GUEST (
GUEST_ID int primary key,
FIRST_NAME CHAR(30) NOT NULL ,
LAST_NAME CHAR(30) NOT NULL ,
EMAIL VARCHAR2(30) NOT NULL ,
PHONE_NO int NOT NULL ,
STREET_NM CHAR(30) NOT NULL ,
STREET_NO VARCHAR2(30) NOT NULL ,
CITY CHAR(10) NOT NULL ,
STATES CHAR(10) NOT NULL ,
ZIPCODE int NOT NULL
);

create table reservation(
reservation_id int primary key,
guest_id int not null,
start_dt date not null,
end_dt date not null,
total_cost int not null,
no_guest int not null,
CONSTRAINT FK_6 FOREIGN KEY (guest_id) REFERENCES guest(guest_id)
);

CREATE TABLE HOTEL (
HOTEL_ID int primary key,
NAME CHAR(30) NOT NULL ,
ADDRESS CHAR(100) NOT NULL
)


CREATE TABLE HOTEL_EMPLOYEE (
EMP_ID int primary key,
HOTEL_ID int NOT NULL ,
EMP_SALARY int NOT NULL ,
FIRST_NAME CHAR(30) NOT NULL ,
LAST_NAME CHAR(30) NOT NULL ,
PHONE_NO int NOT NULL ,
ADDRESS CHAR(100) NOT NULL ,
GENDER CHAR(1) NOT NULL ,
CHECK (gender in ('M','F')) ,
CONSTRAINT FK_1 FOREIGN KEY (HOTEL_ID) REFERENCES HOTEL (HOTEL_ID)
);

CREATE TABLE HOTELMANAGER (
MANAGER_ID int primary key,
HOTEL_ID int NOT NULL ,
```

```
DEPT_NAME char(20) NOT NULL ,
CONSTRAINT FK_2 FOREIGN KEY (MANAGER_ID) REFERENCES HOTEL_EMPLOYEE (EMP_ID) ,
CONSTRAINT FK_3 FOREIGN KEY (HOTEL_ID) REFERENCES HOTEL (HOTEL_ID)
);


CREATE TABLE HOTELROOM (
ROOM_NO int primary key,
HOTEL_ID int NOT NULL ,
ROOM_TYPE char(2) NOT NULL ,
CONSTRAINT FK_4 FOREIGN KEY (ROOM_TYPE) REFERENCES ROOMTYPE (TYPE_ID) ,
CONSTRAINT FK_5 FOREIGN KEY (HOTEL_ID) REFERENCES HOTEL (HOTEL_ID)
  );

CREATE TABLE ROOMTYPE(
TYPE_ID char(2) primary key,
NUMPEOPLE int NOT NULL ,
BED_COUNT int NOT NULL
  );

Create table reservedBy(
reservation_id int not null,
room_no int not null,
CONSTRAINT FK_7 FOREIGN KEY (reservation_id) REFERENCES reservation(reservation_id),
CONSTRAINT FK_8 FOREIGN KEY (room_no) REFERENCES HOTELROOM(room_no)
);

Create table Butler(
butler_ID int primary key,
status_level char(2),
GUEST_ID int,
CONSTRAINT FK_9 FOREIGN KEY (butler_ID) REFERENCES HOTEL_EMPLOYEE (EMP_ID),
CONSTRAINT FK_10 FOREIGN KEY (GUEST_ID) REFERENCES GUEST (GUEST_ID)
);


Insert into GUEST values ('00001' ,'Priyanshu' ,'Madan' ,'pm@gmail.com', '9915031150','Gregory Towers
apt28','123' ,'Champaign', 'Illinois' ,'61820');
Insert into GUEST values ('00002' ,'Swati' ,'Bishnoi','sb@gmail.com' , '7493749347','Twin Towers','234'
,'Champaign', 'Illinois' ,'61821');
Insert into GUEST values ('00003' ,'Shubham' ,'Rawlani' ,'sr@gmail.com', '8563847388','1107 S 4th','345'
,'Champaign', 'Illinois' ,'61820');
Insert into GUEST values ('00004' ,'Tom' ,'Cruiz' ,'tc@gmail.com', '7485739397','57 E 1st','567' ,'Champaign',
'Illinois' ,'61830');
Insert into GUEST values ('00005' ,'Vibhor' ,'Khetan' ,'vk@gmail.com', '3458749579','48 E John','678'
,'Champaign', 'Illinois' ,'61822');
Insert into GUEST values ('00006' ,'vikki' ,'Khet' ,'vk23@gmail.com', '3476449579','89 E Jack','638'
,'Champaign', 'Illinois' ,'61822');

Insert into reservation values ('101','00001','2019-07-01','2019-10-01',30000,4);
```

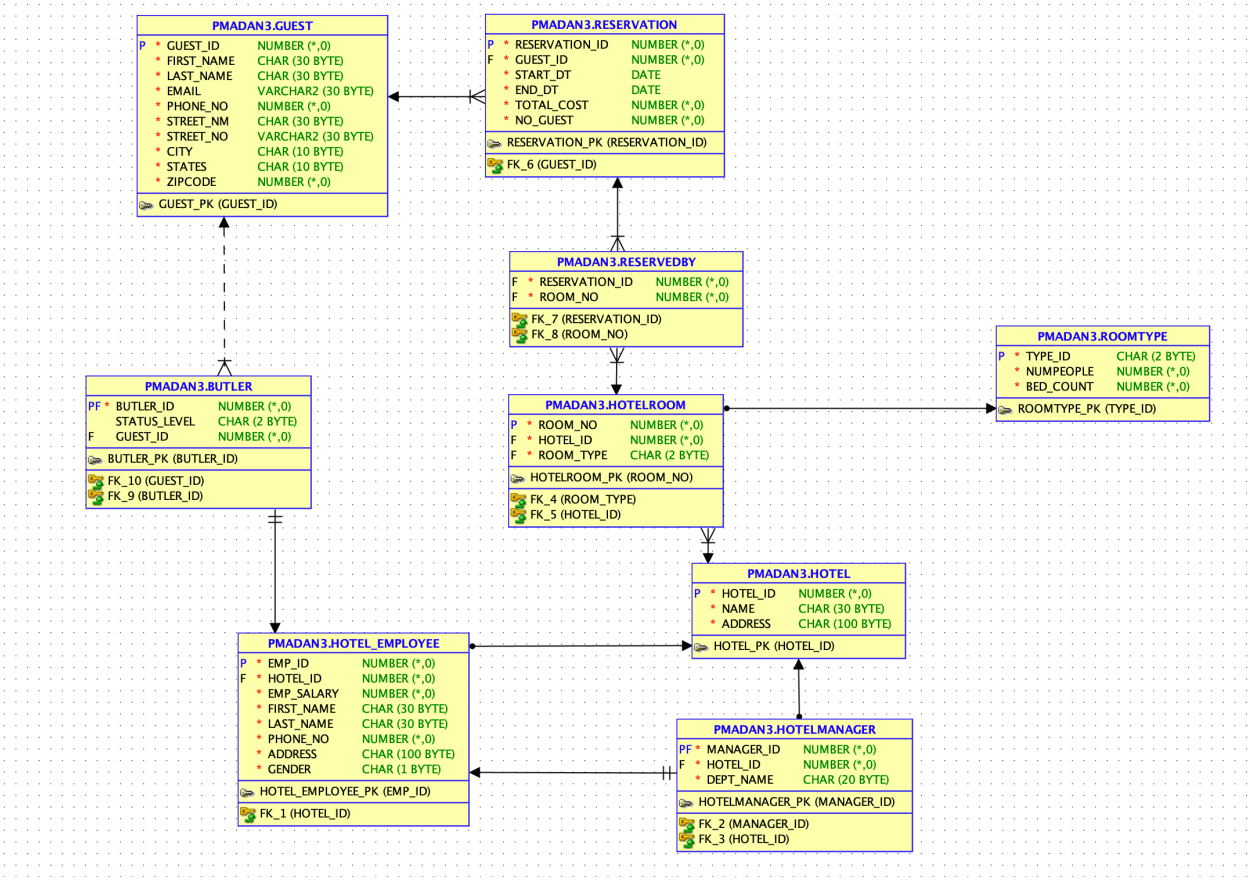
```
Insert into reservation values ('102','00002','2019-07-02','2019-10-10',70000,3);
Insert into reservation values ('103','00003','2019-06-01','2019-10-01',10000,1);
Insert into reservation values ('104','00004','2019-12-01','2019-12-10',100000,6);
Insert into reservation values ('105','00005','2019-10-15','2019-10-20',30000,4);
Insert into reservation values ('106','00006','2019-06-01','2019-6-30',80000,2);
Insert into reservation values ('107','00006','2019-05-01','2019-5-30',90000,6);
Insert into reservation values ('108','00001','2019-04-01','2019-04-15',45000,6);
Insert into reservation values ('109','00002','2019-04-07','2019-04-17',40000,4);
Insert into reservation values ('110','00003','2019-04-10','2019-04-15',20000,2);
Insert into reservation values ('111','00004','2019-05-15','2019-05-20',20000,3);
Insert into reservation values ('112','00005','2019-02-15','2019-02-20',20000,6);

Insert into Hotel values ('2001','Hotel Rawlu','Rawlu st, champaign, 61820');
Insert into Hotel values ('3001','Hotel Chandu','Chandu st, champaign, 61820');
Insert into Hotel values ('4001','Hotel khetu','khetu st, champaign, 61820');


INSERT INTO HOTEL_EMPLOYEE VALUES (21,2001,40000,'Priya' ,'Balgi' ,'9095069294','#227 sec 15-a,
61820','F');
INSERT INTO HOTEL_EMPLOYEE VALUES (22,2001,40000,'Aria' ,'yu' ,'9095349294','#74 sec 13-a, 61820','F');
INSERT INTO HOTEL_EMPLOYEE VALUES (23,2001,50000,'Ara' ,'yun' ,'9095347894','#77 sec 12-a, 61830','F');
INSERT INTO HOTEL_EMPLOYEE VALUES (24,2001,70000,'Aran' ,'ya' ,'9095347892','#1 sec 12-a, 61880','M');

INSERT INTO HOTEL_EMPLOYEE VALUES (31,3001,100000,'Priyansh' ,'Bal' ,'9095529294','#27 sec 15-a,
61820','F');
INSERT INTO HOTEL_EMPLOYEE VALUES (32,3001,20000,'Aaron' ,'yuun' ,'9345349294','#79 sec 13-a,
61820','M');
INSERT INTO HOTEL_EMPLOYEE VALUES (33,3001,57000,'Arak' ,'pal' ,'9045347894','#70 sec 12-a, 61830','M');
INSERT INTO HOTEL_EMPLOYEE VALUES (34,3001,79000,'Alo' ,'kal' ,'9093447892','#123 sec 12-a, 61880','M');

INSERT INTO HOTEL_EMPLOYEE VALUES (41,3001,200000,'Pranay' ,'Bal' ,'9095529294','#27 sec 15-a,
61820','F');
INSERT INTO HOTEL_EMPLOYEE VALUES (42,3001,20000,'madhu' ,'yn' ,'9345349294','#79 sec 13-a,
61820','F');
INSERT INTO HOTEL_EMPLOYEE VALUES (43,3001,89000,'rohan' ,'pal' ,'9045347894','#70 sec 12-a,
61830','F');
INSERT INTO HOTEL_EMPLOYEE VALUES (44,3001,89900,'gobi' ,'kal' ,'9093447892','#123 sec 12-a,
61880','M');

INSERT INTO HOTELMANAGER VALUES (21,2001,'hotel operations');
INSERT INTO HOTELMANAGER VALUES (31,3001,'hotel operations');
INSERT INTO HOTELMANAGER VALUES (41,4001,'hotel operations');

INSERT INTO ROOMTYPE VALUES ('R1',1,1);
INSERT INTO ROOMTYPE VALUES ('R2',2,1);
INSERT INTO ROOMTYPE VALUES ('R3',2,2);
INSERT INTO ROOMTYPE VALUES ('R4',4,2);
INSERT INTO ROOMTYPE VALUES ('R5',4,4);
INSERT INTO ROOMTYPE VALUES ('R6',6,3);
INSERT INTO ROOMTYPE VALUES ('R7',6,6);
```

```
INSERT INTO HOTELROOM VALUES (201,2001,'R1');
INSERT INTO HOTELROOM VALUES (202,2001,'R2');
INSERT INTO HOTELROOM VALUES (203,2001,'R3');
INSERT INTO HOTELROOM VALUES (204,2001,'R4');
INSERT INTO HOTELROOM VALUES (205,2001,'R5');
INSERT INTO HOTELROOM VALUES (206,2001,'R6');
INSERT INTO HOTELROOM VALUES (207,2001,'R7');
INSERT INTO HOTELROOM VALUES (208,2001,'R1');
INSERT INTO HOTELROOM VALUES (209,2001,'R2');
INSERT INTO HOTELROOM VALUES (210,2001,'R3');
INSERT INTO HOTELROOM VALUES (211,2001,'R4');
INSERT INTO HOTELROOM VALUES (212,2001,'R5');
INSERT INTO HOTELROOM VALUES (213,2001,'R6');
INSERT INTO HOTELROOM VALUES (214,2001,'R7');

INSERT INTO HOTELROOM VALUES (301,3001,'R1');
INSERT INTO HOTELROOM VALUES (302,3001,'R2');
INSERT INTO HOTELROOM VALUES (303,3001,'R3');
INSERT INTO HOTELROOM VALUES (304,3001,'R4');
INSERT INTO HOTELROOM VALUES (305,3001,'R5');
INSERT INTO HOTELROOM VALUES (306,3001,'R6');
INSERT INTO HOTELROOM VALUES (307,3001,'R7');

INSERT INTO HOTELROOM VALUES (308,3001,'R1');
INSERT INTO HOTELROOM VALUES (309,3001,'R2');
INSERT INTO HOTELROOM VALUES (310,3001,'R3');
INSERT INTO HOTELROOM VALUES (311,3001,'R4');
INSERT INTO HOTELROOM VALUES (312,3001,'R5');
INSERT INTO HOTELROOM VALUES (313,3001,'R6');
INSERT INTO HOTELROOM VALUES (314,3001,'R7');

INSERT INTO HOTELROOM VALUES (401,4001,'R1');
INSERT INTO HOTELROOM VALUES (402,4001,'R2');
INSERT INTO HOTELROOM VALUES (403,4001,'R3');
INSERT INTO HOTELROOM VALUES (404,4001,'R4');
INSERT INTO HOTELROOM VALUES (405,4001,'R5');
INSERT INTO HOTELROOM VALUES (406,4001,'R6');
INSERT INTO HOTELROOM VALUES (407,4001,'R7');

INSERT INTO reservedBy VALUES (101,205);
INSERT INTO reservedBy VALUES (102,204);
INSERT INTO reservedBy VALUES (103,301);
INSERT INTO reservedBy VALUES (104,307);
INSERT INTO reservedBy VALUES (105,305);
INSERT INTO reservedBy VALUES (106,202);
INSERT INTO reservedBy VALUES (107,407);
INSERT INTO reservedBy VALUES (108,406);
INSERT INTO reservedBy VALUES (109,205);
INSERT INTO reservedBy VALUES (110,203);
```

INSERT INTO reservedBy VALUES (111,404);
INSERT INTO reservedBy VALUES (112,207);

INSERT INTO Butler VALUES (22,'A1',00006);
INSERT INTO Butler VALUES (33,'A3',00003);
INSERT INTO Butler VALUES (23,'A1',00002);
INSERT INTO Butler VALUES (43,'A2',00004);
INSERT INTO Butler VALUES (34,'A3',00005);

DATA MODELER SCREENSHOT



PART 1.6: SQL STATEMENTS TO QUERY THE DATABASE

-- Q1. Tell the name, salary of the manager of a particular hotel.

```
Select e.FIRST_NAME,e.Last_name,e.EMP_SALARY
from hotel_employee e join hotelmanager m on e.EMP_ID = m.manager_ID join hotel h on m.hotel_ID = h.hotel_id
where h.name = 'Hotel Rawlu';
```

--Q2. Tell the room numbers available in each hotel.

```
select  h.name,hr.ROOM_NO, rt.TYPE_ID, rt.BED_COUNT
from hotel h join hotelroom hr on h.hotel_id = hr.hotel_id join ROOMTYPE rt on hr.room_type = rt.type_id
where hr.room_no not in (select room_no from reservedby);
```

--Q3. Give reservation ID, guest_name, no of guest, room no,room_type of guests staying in a particular month.

```
select rev.reservation_id,rev.start_dt,g.FIRST_NAME,g.LAST_NAME,rev.no_guest,rb.room_no,hr.room_type
from guest g, reservation rev, hotelroom hr, reservedBy rb
where rev.GUEST_ID = g.GUEST_ID and rb.reservation_id = rev.reservation_id and rb.room_no = hr.room_no and
rev.start_dt like '%-04-%';
```

--Q4. Tell the revenue generated by each room type.

```
select hr.room_type,sum(rev.total_cost)
from reservation rev, reservedby rb, hotelroom hr
where rb.reservation_id = rev.reservation_id and rb.room_no = hr.room_no group by hr.room_type;
```

--Q5. who are the loyal customers of each hotel (guests who stay more than 1)?

```
select g.FIRST_NAME,count(g.first_name),g.LAST_NAME,hr.hotel_id
from guest g,reservation rev, reservedby rb, hotelroom hr
where rev.GUEST_ID = g.GUEST_ID and rb.reservation_id = rev.reservation_id and rb.room_no = hr.room_no
group by g.first_name,g.last_name, hr.hotel_id
having count(g.first_name)>1;
```