The Gray Inn

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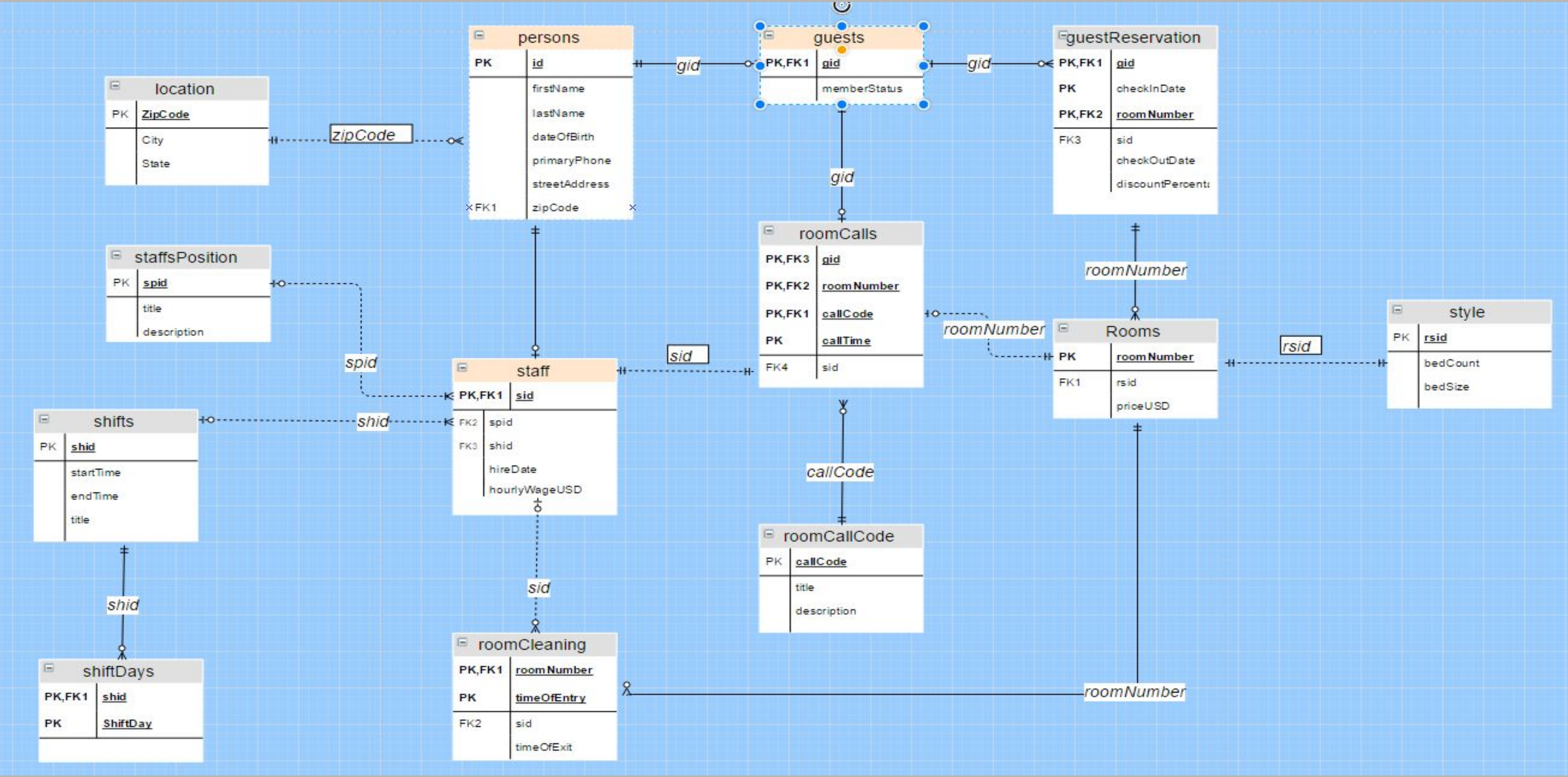
Executive Summary & Overview

The Gray Inn is a chain of hotels located all throughout the continental United States. This database in particular concentrates solely of just one hotel, however, an expanded database may be soon to come. The hospitality industry is a multi-billion dollar industry, on average hotel solely in the United States grossed over $175 billion in the year 2015 alone. As the average hotel room costing around $120 dollars per night, it is safe to say that the owning a hotel can prove to be a is a fairly lucrative business venture. In the year 2015 the average occupancy rate of hotels across the United States reached a staggering 65.6 percent, an increase of 11 percent from 2009. The purpose of this database is to track the daily operations within the hotel. The data can be used by people within the database, such as staff members, all through the use of queries. Through managing The Gray Inn, this database implementation will be able to track the hotels staff and guests in an accurately in a concise manner.

The Gray Inn - ER Diagram



persons

PK	id
	firstName
	lastName
	dateOfBirth
	primaryPhone
	streetAddress
FK1	zipCode

location

PK	ZipCode
	City
	State

guests

PK,FK1	gid
	memberStatus

guestReservation

PK,FK1	gid
PK	checkInDate
PK,FK2	roomNumber
FK3	sid
	checkOutDate
	discountPercent

staffsPosition

PK	spid
	title
	description

staff

PK,FK1	sid
FK2	spid
FK3	shid
	hireDate
	hourlyWageUSD

roomCalls

PK,FK3	gid
PK,FK2	roomNumber
PK,FK1	callCode
PK	callTime
FK4	sid

Rooms

PK	roomNumber
FK1	rsid
	priceUSD

style

PK	rsid
	bedCount
	bedSize

shifts

PK	shid
	startTime
	endTime
	title

roomCallCode

PK	callCode
	title
	description

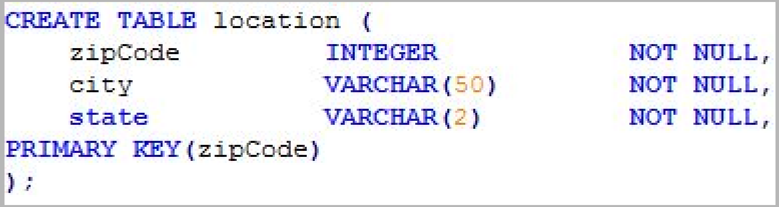
shiftDays

PK,FK1	shid
PK	ShiftDay

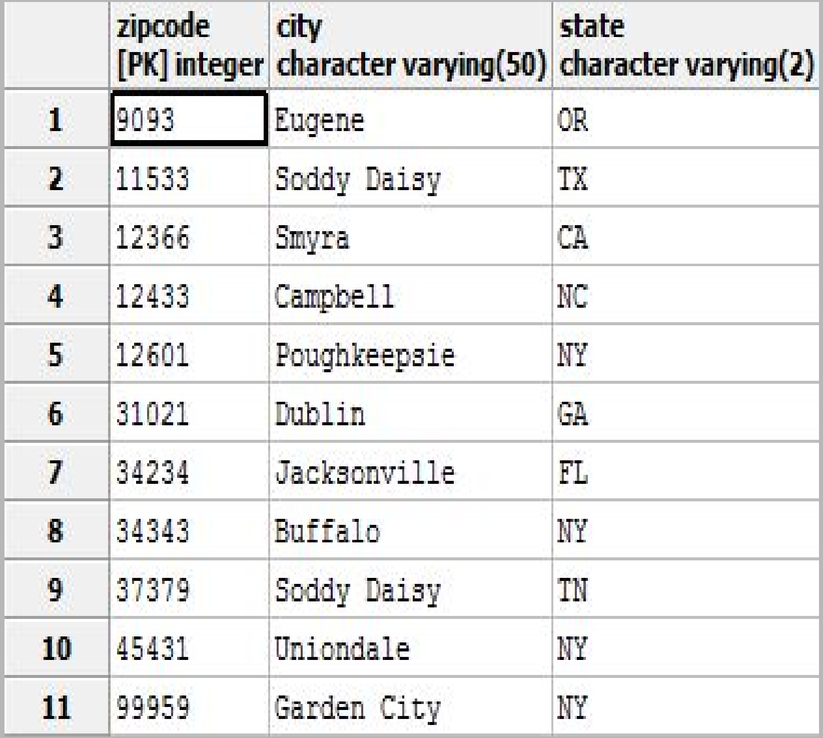
roomCleaning

PK,FK1	roomNumber
PK	timeOfEntry
FK2	sid
	timeOfExit

Locations -The locations table stores the city and state for its given zip code.



```
CREATE TABLE location (
    zipCode          INTEGER           NOT NULL,
    city             VARCHAR(50)       NOT NULL,
    state            VARCHAR(2)        NOT NULL,
PRIMARY KEY(zipCode)
);
```

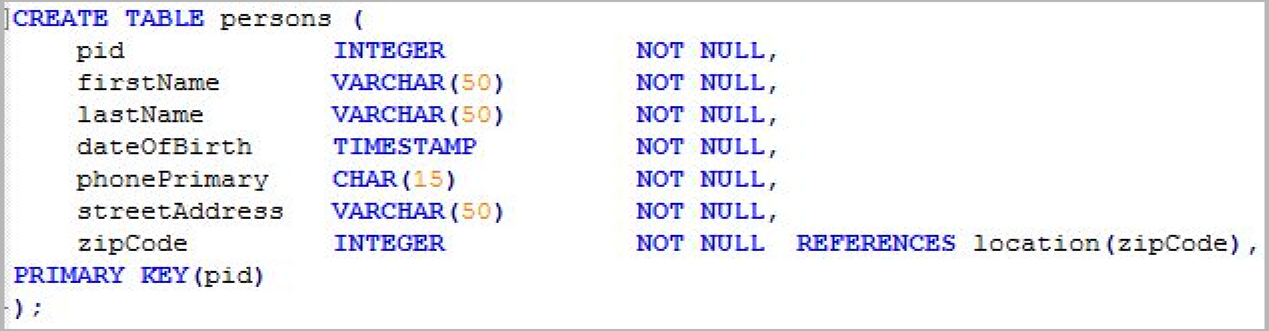


	zipcode [PK] integer	city character varying(50)	state character varying(2)
1	9093	Eugene	OR
2	11533	Soddy Daisy	TX
3	12366	Smyra	CA
4	12433	Campbell	NC
5	12601	Poughkeepsie	NY
6	31021	Dublin	GA
7	34234	Jacksonville	FL
8	34343	Buffalo	NY
9	37379	Soddy Daisy	TN
10	45431	Uniondale	NY
11	99959	Garden City	NY

Function Dependencies

zipCode → city, state

Persons Table -Due to the fact that staff members may also be guests in the hotel, there is a separate table titled persons, used to store information basic personal information regarding the individual.

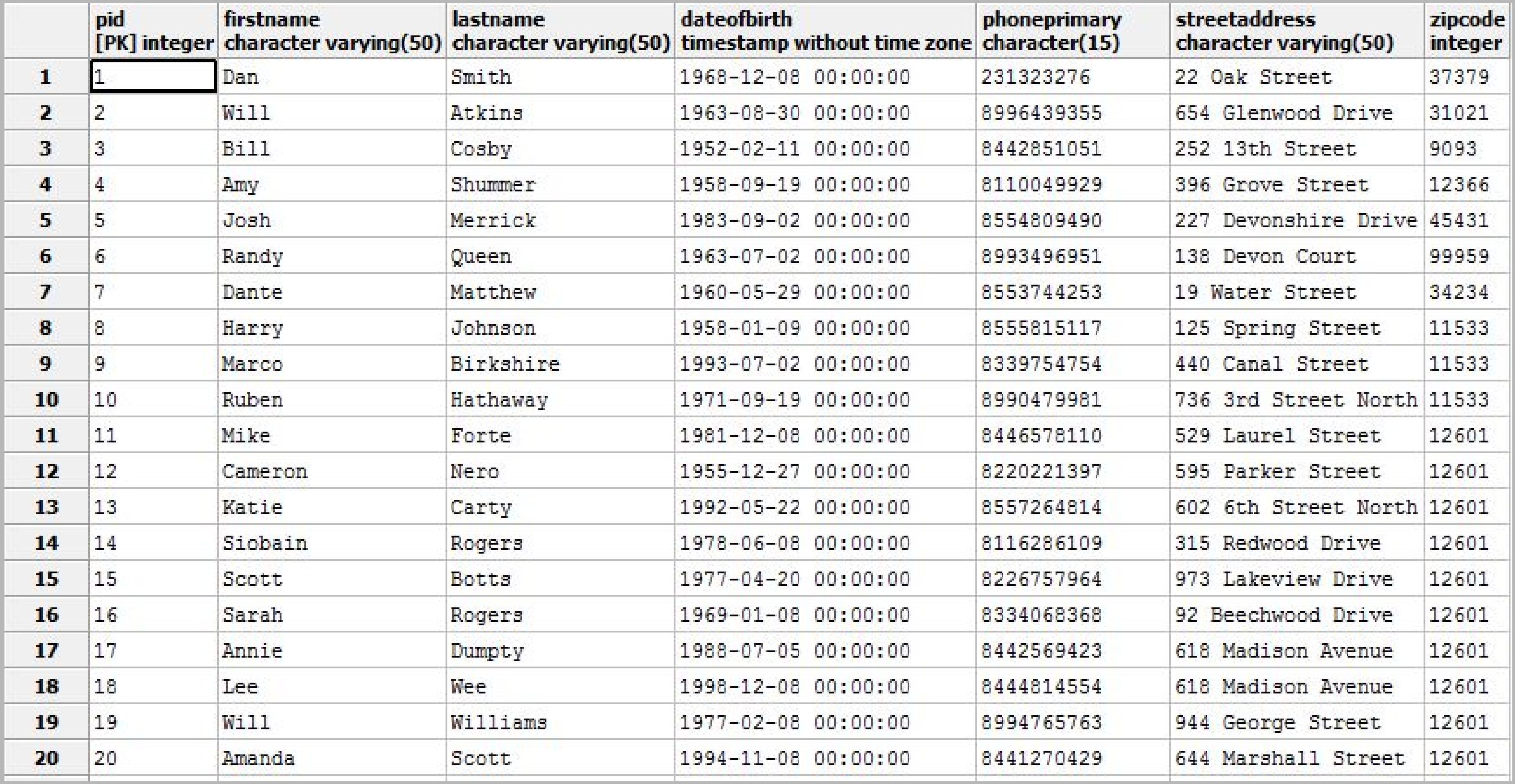


```
CREATE TABLE persons (
    pid             INTEGER            NOT NULL,
    firstName       VARCHAR(50)        NOT NULL,
    lastName        VARCHAR(50)        NOT NULL,
    dateOfBirth     TIMESTAMP          NOT NULL,
    phonePrimary    CHAR(15)           NOT NULL,
    streetAddress   VARCHAR(50)        NOT NULL,
    zipCode         INTEGER            NOT NULL  REFERENCES location(zipCode),
PRIMARY KEY(pid)
);
```

Functional Dependencies

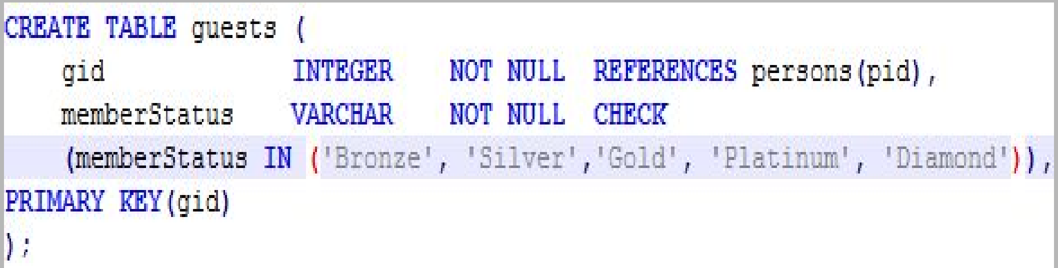
Pid → firstName, lastName, dateOfBirth, primaryPhone, streetAddress, zipCode

Table is on the following page

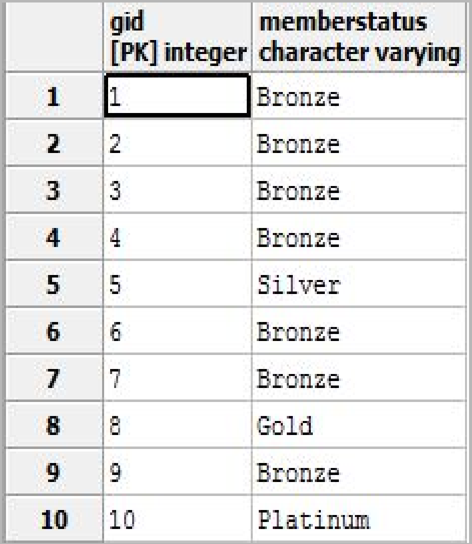


	pid [PK] integer	firstname character varying(50)	lastname character varying(50)	dateofbirth timestamp without time zone	phoneprimary character(15)	streetaddress character varying(50)	zipcode integer
1	1	Dan	Smith	1968-12-08 00:00:00	231323276	22 Oak Street	37379
2	2	Will	Atkins	1963-08-30 00:00:00	8996439355	654 Glenwood Drive	31021
3	3	Bill	Cosby	1952-02-11 00:00:00	8442851051	252 13th Street	9093
4	4	Amy	Shummer	1958-09-19 00:00:00	8110049929	396 Grove Street	12366
5	5	Josh	Merrick	1983-09-02 00:00:00	8554809490	227 Devonshire Drive	45431
6	6	Randy	Queen	1963-07-02 00:00:00	8993496951	138 Devon Court	99959
7	7	Dante	Matthew	1960-05-29 00:00:00	8553744253	19 Water Street	34234
8	8	Harry	Johnson	1958-01-09 00:00:00	8555815117	125 Spring Street	11533
9	9	Marco	Birkshire	1993-07-02 00:00:00	8339754754	440 Canal Street	11533
10	10	Ruben	Hathaway	1971-09-19 00:00:00	8990479981	736 3rd Street North	11533
11	11	Mike	Forte	1981-12-08 00:00:00	8446578110	529 Laurel Street	12601
12	12	Cameron	Nero	1955-12-27 00:00:00	8220221397	595 Parker Street	12601
13	13	Katie	Carty	1992-05-22 00:00:00	8557264814	602 6th Street North	12601
14	14	Siobain	Rogers	1978-06-08 00:00:00	8116286109	315 Redwood Drive	12601
15	15	Scott	Botts	1977-04-20 00:00:00	8226757964	973 Lakeview Drive	12601
16	16	Sarah	Rogers	1969-01-08 00:00:00	8334068368	92 Beechwood Drive	12601
17	17	Annie	Dumpty	1988-07-05 00:00:00	8442569423	618 Madison Avenue	12601
18	18	Lee	Wee	1998-12-08 00:00:00	8444814554	618 Madison Avenue	12601
19	19	Will	Williams	1977-02-08 00:00:00	8994765763	944 George Street	12601
20	20	Amanda	Scott	1994-11-08 00:00:00	8441270429	644 Marshall Street	12601

Guests -The purpose of the guests table is to identify each guest based on their gid/pid and specify their member status.



```
CREATE TABLE guests (
    gid             INTEGER    NOT NULL  REFERENCES persons(pid),
    memberStatus    VARCHAR    NOT NULL  CHECK
    (memberStatus IN ('Bronze', 'Silver','Gold', 'Platinum', 'Diamond')),
PRIMARY KEY(gid)
);
```



	gid [PK] integer	memberstatus character varying
1	1	Bronze
2	2	Bronze
3	3	Bronze
4	4	Bronze
5	5	Silver
6	6	Bronze
7	7	Bronze
8	8	Gold
9	9	Bronze
10	10	Platinum

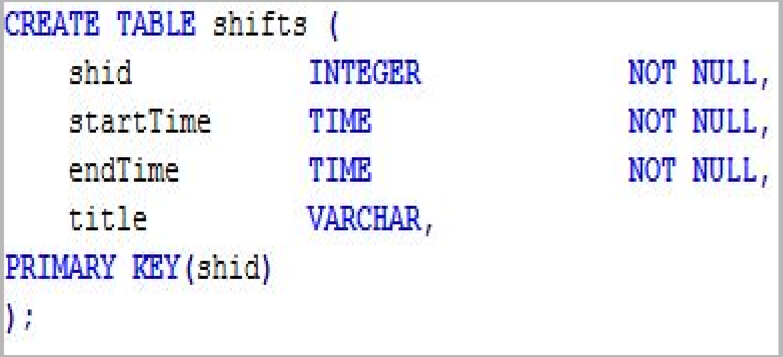
Function Dependencies

gid → memberStatus

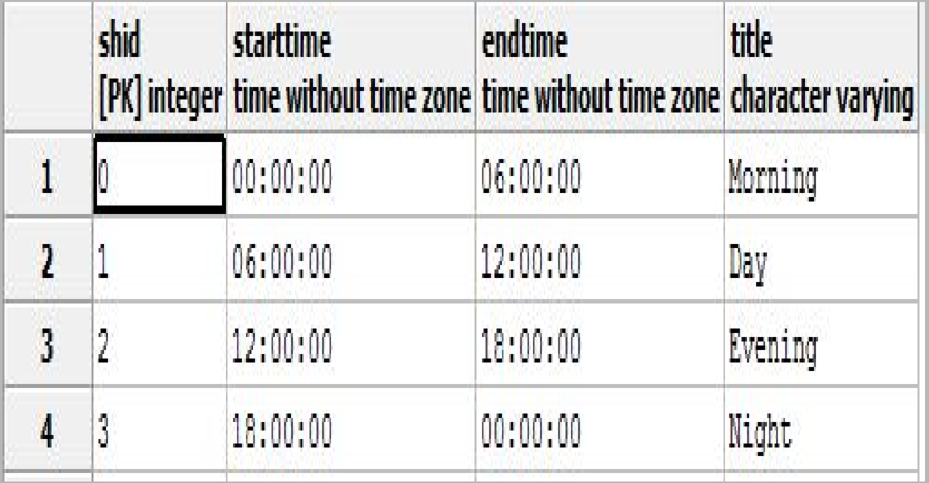
Future Enhancement

Although the memberStatus of each guest may look arbitrary, its primary goal to show the potential for future enhancements. Guests will ultimately be able to earn point the more they use the hotels services. Through points they will be able to upgrade their member status and redeem their points for potential discounts.

Shifts -This table gives some rudimentary shift hours that the staff could possible work.



```
CREATE TABLE shifts (
    shid            INTEGER                 NOT NULL,
    startTime       TIME                    NOT NULL,
    endTime         TIME                    NOT NULL,
    title           VARCHAR,
PRIMARY KEY(shid)
);
```

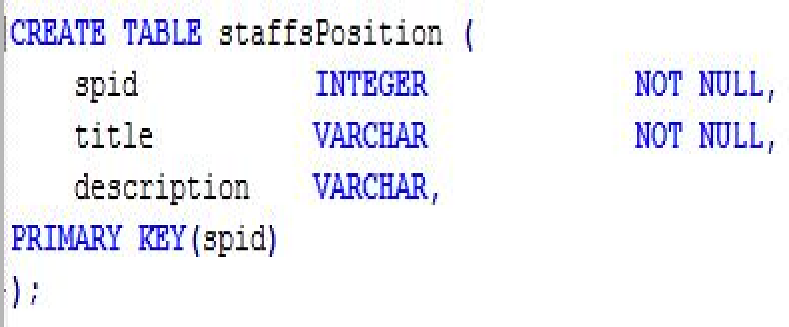


	shid	starttime	endtime	title
	[PK] integer	time without time zone	time without time zone	character varying
1	0	00:00:00	06:00:00	Morning
2	1	06:00:00	12:00:00	Day
3	2	12:00:00	18:00:00	Evening
4	3	18:00:00	00:00:00	Night

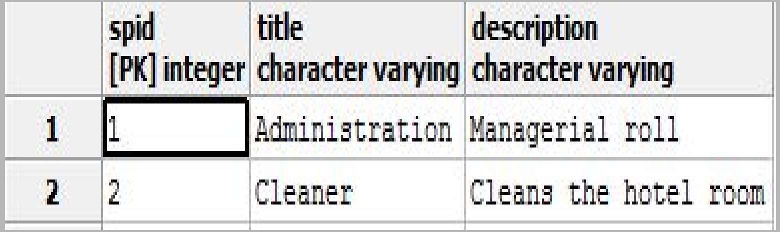
Function Dependencies

shid → startTime, endTime, title

Staff’s Position -Breaks down the staffs’ positions into main categories.



```
CREATE TABLE staffsPosition (
    spid            INTEGER             NOT NULL,
    title           VARCHAR             NOT NULL,
    description     VARCHAR,
PRIMARY KEY(spid)
);
```

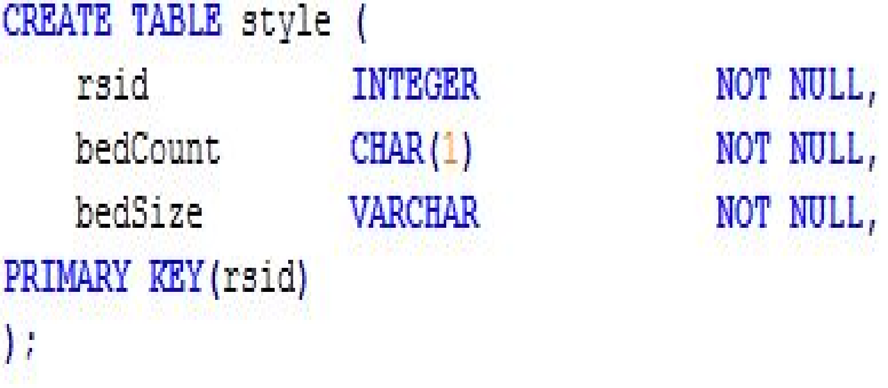


	spid [PK] integer	title character varying	description character varying
1	1	Administration	Managerial roll
2	2	Cleaner	Cleans the hotel room

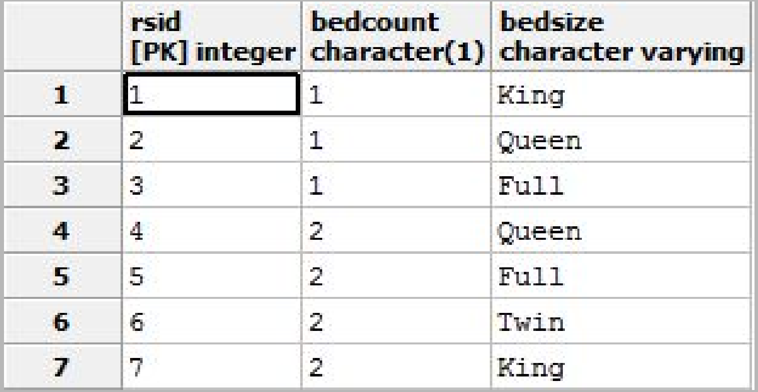
Function Dependencies

spid → title, description

Style -This table represents the style of each individual room in regard to bed count and the sizes of the bed(s).



```
CREATE TABLE style (
    rsid          INTEGER            NOT NULL,
    bedCount      CHAR(1)            NOT NULL,
    bedSize       VARCHAR            NOT NULL,
PRIMARY KEY(rsid)
);
```

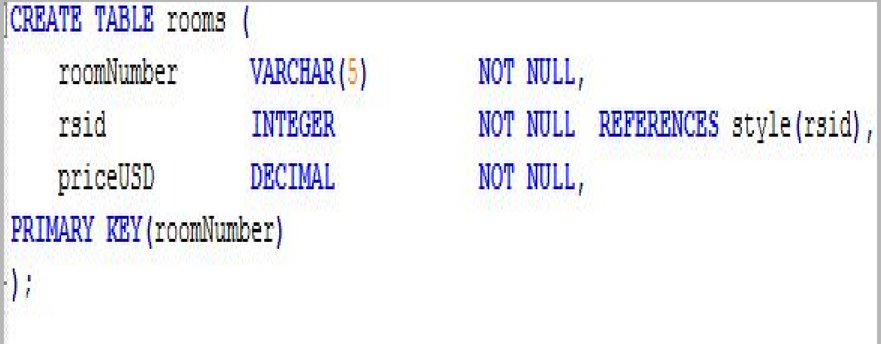


	rsid [PK] integer	bedcount character(1)	bedsize character varying
1	1	1	King
2	2	1	Queen
3	3	1	Full
4	4	2	Queen
5	5	2	Full
6	6	2	Twin
7	7	2	King

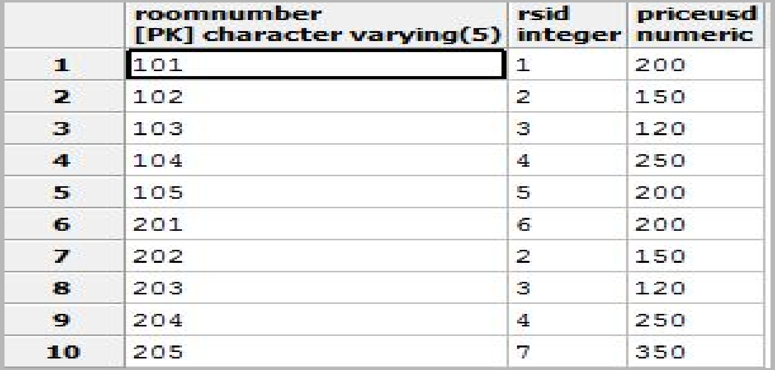
Function Dependencies

rsid → bedCount, bedSize

Rooms Gives the details of each room located within the hotel.



```
CREATE TABLE rooms (
    roomNumber      VARCHAR(5)          NOT NULL,
    rsid            INTEGER             NOT NULL  REFERENCES style(rsid),
    priceUSD        DECIMAL             NOT NULL,
PRIMARY KEY(roomNumber)
);
```

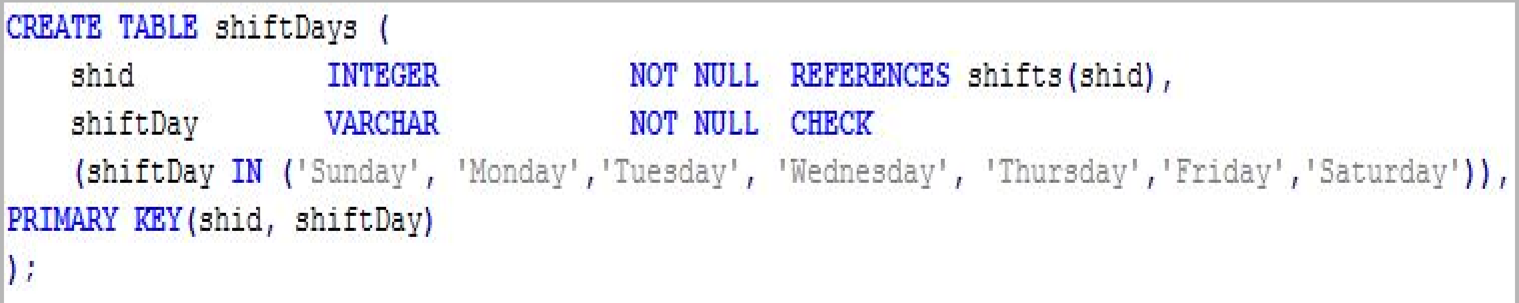


	roomnumber	rsid	priceusd
	[PK] character varying(5)	integer	numeric
1	101	1	200
2	102	2	150
3	103	3	120
4	104	4	250
5	105	5	200
6	201	6	200
7	202	2	150
8	203	3	120
9	204	4	250
10	205	7	350

Function Dependencies

roomNumber→ rsid, priceUSD

Shift Days -Specifies what shifts are available on each specific day of the week.



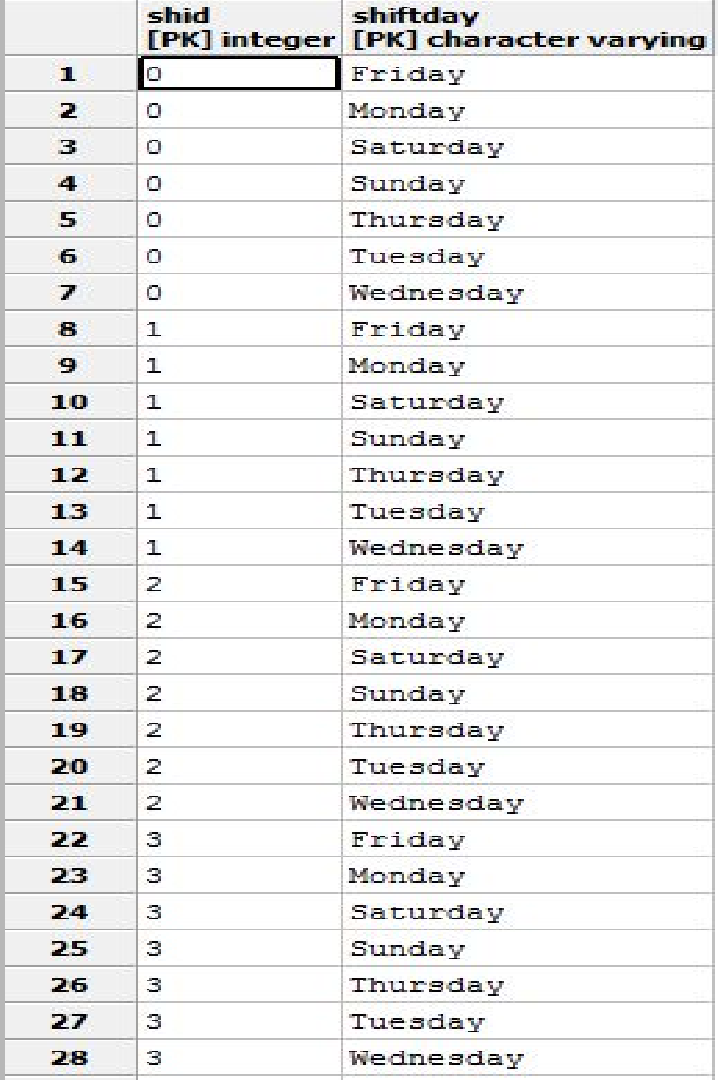
```
CREATE TABLE shiftDays (
    shid            INTEGER           NOT NULL  REFERENCES shifts(shid),
    shiftDay        VARCHAR           NOT NULL  CHECK
    (shiftDay IN ('Sunday', 'Monday','Tuesday', 'Wednesday', 'Thursday','Friday','Saturday')),
PRIMARY KEY(shid, shiftDay)
);
```

Function Dependencies

shid, shiftDay →

Table is located on the following page

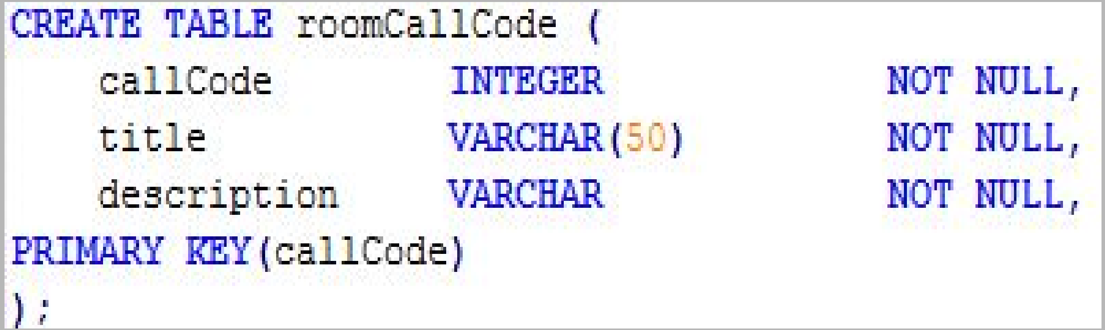
Shift Days Table



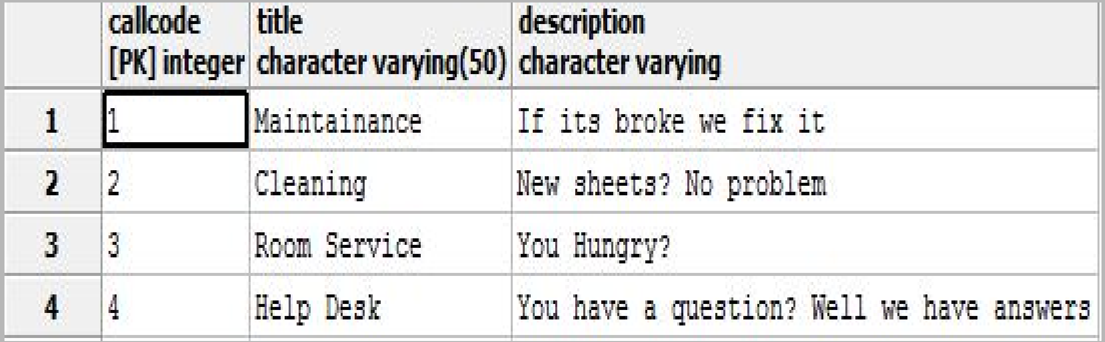
	shid [PK] integer	shiftday [PK] character varying
1	0	Friday
2	0	Monday
3	0	Saturday
4	0	Sunday
5	0	Thursday
6	0	Tuesday
7	0	Wednesday
8	1	Friday
9	1	Monday
10	1	Saturday
11	1	Sunday
12	1	Thursday
13	1	Tuesday
14	1	Wednesday
15	2	Friday
16	2	Monday
17	2	Saturday
18	2	Sunday
19	2	Thursday
20	2	Tuesday
21	2	Wednesday
22	3	Friday
23	3	Monday
24	3	Saturday
25	3	Sunday
26	3	Thursday
27	3	Tuesday
28	3	Wednesday

Room Call Codes

-This table is referenced back the roomCall table. It gives descriptions of what guest calls consist, ultimately placing them in 4 categories.



```
CREATE TABLE roomCallCode (
    callCode        INTEGER                 NOT NULL,
    title           VARCHAR(50)             NOT NULL,
    description     VARCHAR                 NOT NULL,
PRIMARY KEY(callCode)
);
```

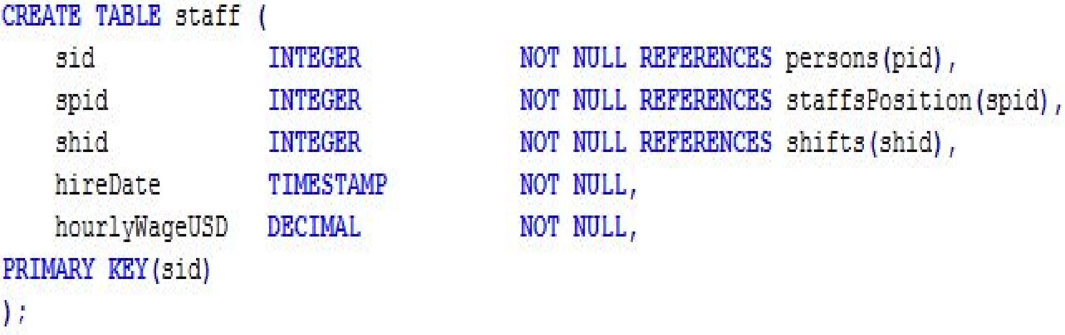


	callcode [PK] integer	title character varying(50)	description character varying
1	1	Maintainance	If its broke we fix it
2	2	Cleaning	New sheets? No problem
3	3	Room Service	You Hungry?
4	4	Help Desk	You have a question? Well we have answers

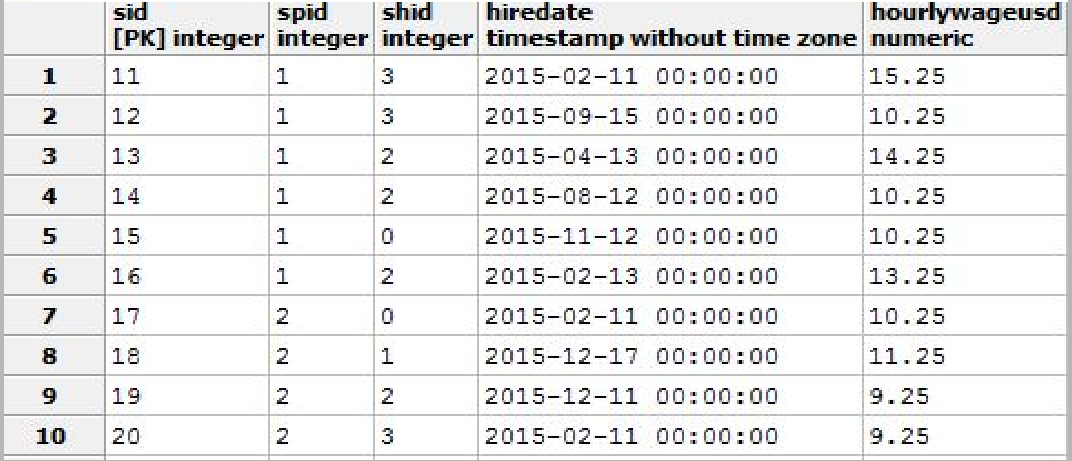
Function Dependencies

callCode → title, description

Staff -This table provides us with the basic information needed in regard to the hotels employees and their job entailment.



```
CREATE TABLE staff (
    sid             INTEGER           NOT NULL REFERENCES persons(pid),
    spid            INTEGER           NOT NULL REFERENCES staffsPosition(spid),
    shid            INTEGER           NOT NULL REFERENCES shifts(shid),
    hireDate        TIMESTAMP         NOT NULL,
    hourlyWageUSD   DECIMAL           NOT NULL,
PRIMARY KEY(sid)
);
```

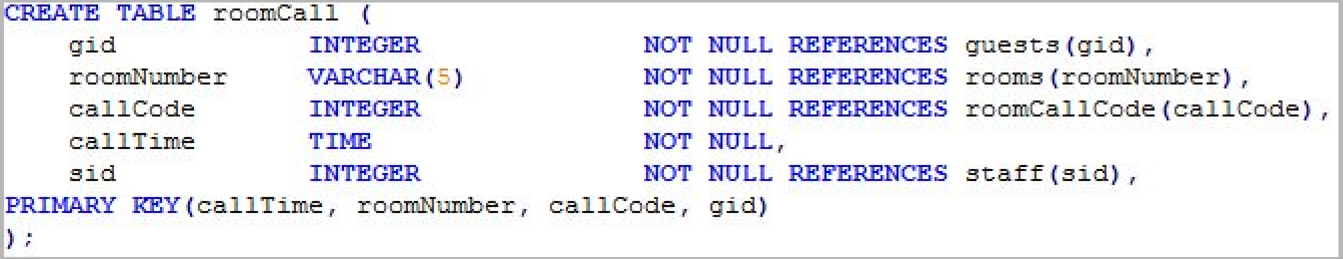


	sid [PK] integer	spid integer	shid integer	hiredate timestamp without time zone	hourlywageusd numeric
1	11	1	3	2015-02-11 00:00:00	15.25
2	12	1	3	2015-09-15 00:00:00	10.25
3	13	1	2	2015-04-13 00:00:00	14.25
4	14	1	2	2015-08-12 00:00:00	10.25
5	15	1	0	2015-11-12 00:00:00	10.25
6	16	1	2	2015-02-13 00:00:00	13.25
7	17	2	0	2015-02-11 00:00:00	10.25
8	18	2	1	2015-12-17 00:00:00	11.25
9	19	2	2	2015-12-11 00:00:00	9.25
10	20	2	3	2015-02-11 00:00:00	9.25

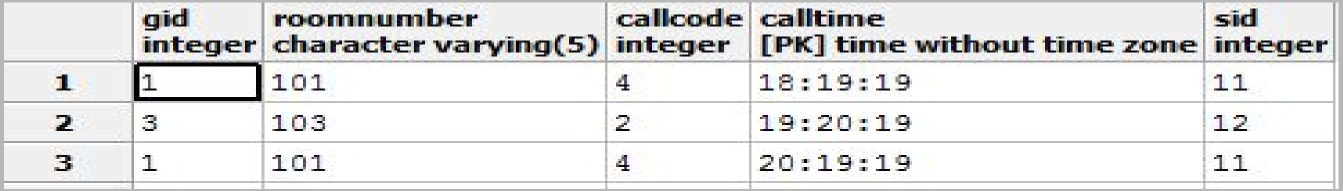
Function Dependencies

sid → spid, shid, hireDate, hourlyWage

Room Calls -The objective of this table is to track each guest's room calls.



```
CREATE TABLE roomCall (
    gid            INTEGER              NOT NULL REFERENCES guests(gid),
    roomNumber     VARCHAR(5)           NOT NULL REFERENCES rooms(roomNumber),
    callCode       INTEGER              NOT NULL REFERENCES roomCallCode(callCode),
    callTime       TIME                 NOT NULL,
    sid            INTEGER              NOT NULL REFERENCES staff(sid),
PRIMARY KEY(callTime, roomNumber, callCode, gid)
);
```

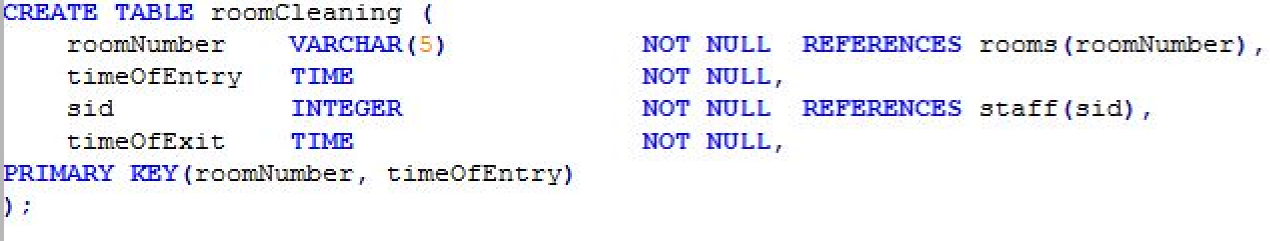


	gid integer	roomnumber character varying(5)	callcode integer	calltime [PK] time without time zone	sid integer
1	1	101	4	18:19:19	11
2	3	103	2	19:20:19	12
3	1	101	4	20:19:19	11

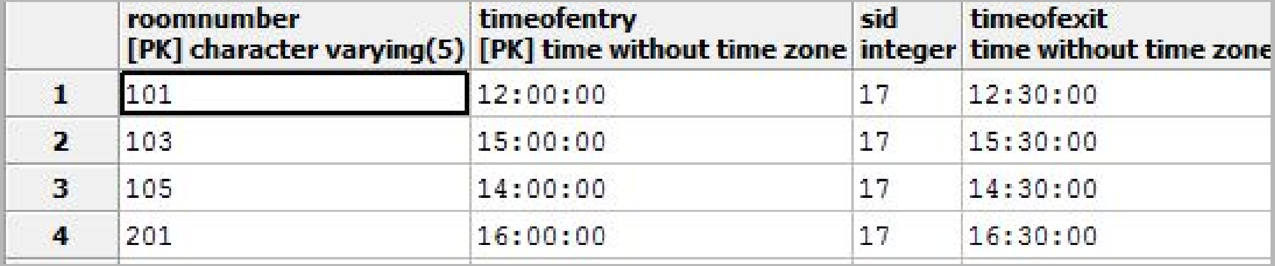
Function Dependencies

gid, roomNumber, callCode, callTime → sid

Room Cleaning -Specifies when each hotel room was last cleaned and which staff member cleaned it.



```
CREATE TABLE roomCleaning (
    roomNumber    VARCHAR(5)             NOT NULL  REFERENCES rooms(roomNumber),
    timeOfEntry   TIME                   NOT NULL,
    sid           INTEGER                NOT NULL  REFERENCES staff(sid),
    timeOfExit    TIME                   NOT NULL,
PRIMARY KEY(roomNumber, timeOfEntry)
);
```

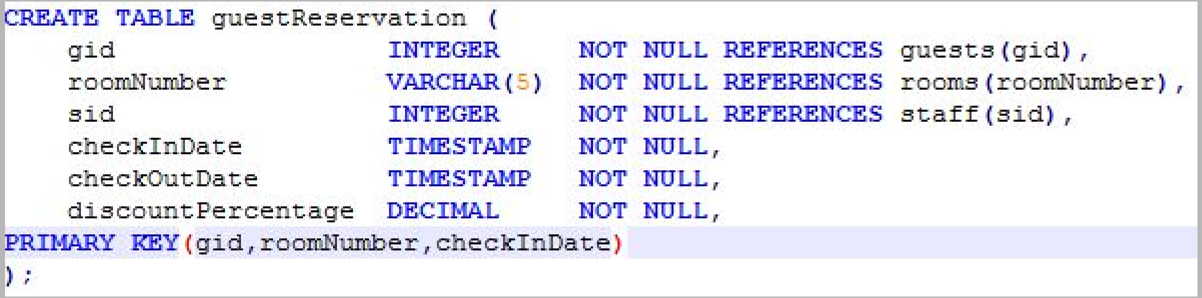


	roomnumber [PK] character varying(5)	timeofentry [PK] time without time zone	sid integer	timeofexit time without time zone
1	101	12:00:00	17	12:30:00
2	103	15:00:00	17	15:30:00
3	105	14:00:00	17	14:30:00
4	201	16:00:00	17	16:30:00

Function Dependencies

roomNumber, timeOfEntry → sid, timeOfExit

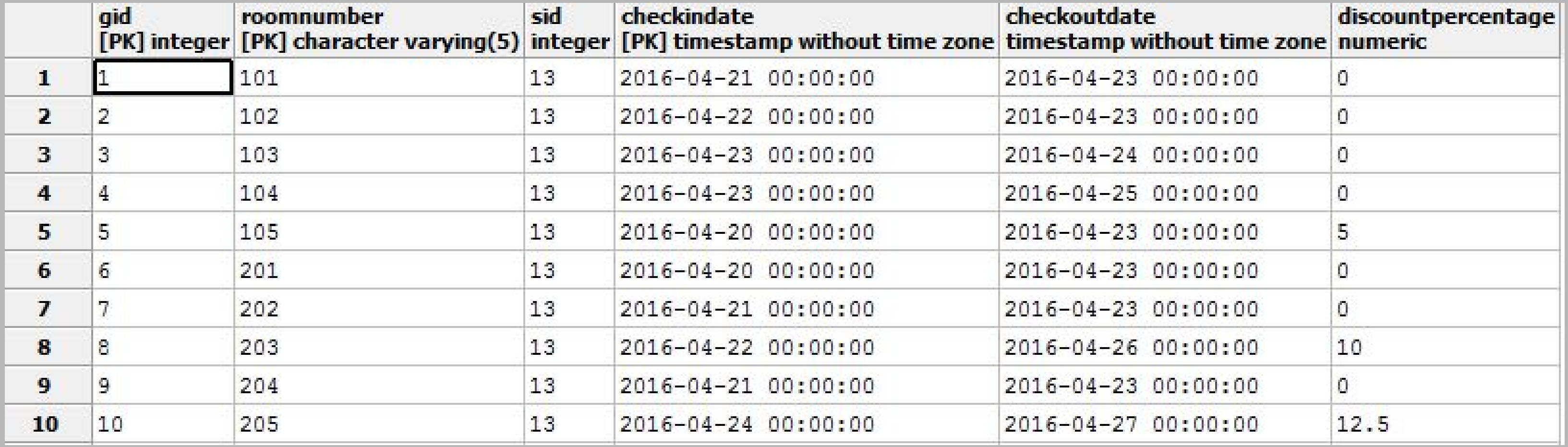
Guest Reservation -This tables tracks the basic information of each guest through the duration of their stay.



```
CREATE TABLE guestReservation (
    gid                 INTEGER      NOT NULL REFERENCES guests(gid),
    roomNumber          VARCHAR(5)   NOT NULL REFERENCES rooms(roomNumber),
    sid                 INTEGER      NOT NULL REFERENCES staff(sid),
    checkInDate         TIMESTAMP    NOT NULL,
    checkOutDate        TIMESTAMP    NOT NULL,
    discountPercentage  DECIMAL      NOT NULL,
PRIMARY KEY(gid,roomNumber,checkInDate)
);
```

Function Dependencies

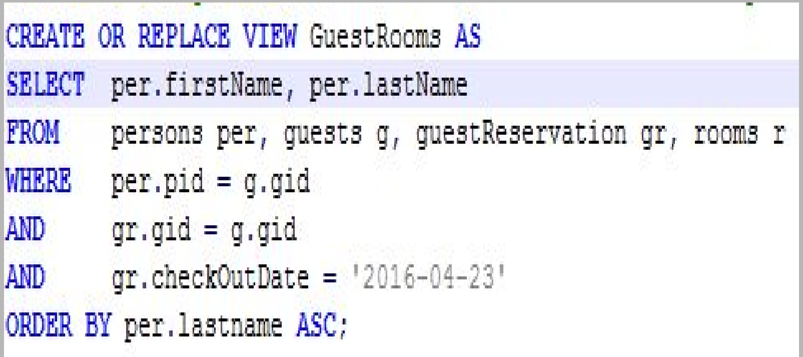
gid, roomNumber → sid,checkInDate, checkOutDate, discountPercentage



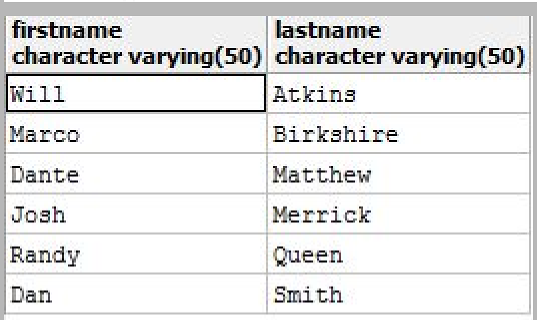
	gid [PK] integer	roomnumber [PK] character varying(5)	sid integer	checkindate [PK] timestamp without time zone	checkoutdate timestamp without time zone	discountpercentage numeric
1	1	101	13	2016-04-21 00:00:00	2016-04-23 00:00:00	0
2	2	102	13	2016-04-22 00:00:00	2016-04-23 00:00:00	0
3	3	103	13	2016-04-23 00:00:00	2016-04-24 00:00:00	0
4	4	104	13	2016-04-23 00:00:00	2016-04-25 00:00:00	0
5	5	105	13	2016-04-20 00:00:00	2016-04-23 00:00:00	5
6	6	201	13	2016-04-20 00:00:00	2016-04-23 00:00:00	0
7	7	202	13	2016-04-21 00:00:00	2016-04-23 00:00:00	0
8	8	203	13	2016-04-22 00:00:00	2016-04-26 00:00:00	10
9	9	204	13	2016-04-21 00:00:00	2016-04-23 00:00:00	0
10	10	205	13	2016-04-24 00:00:00	2016-04-27 00:00:00	12.5

Views

The objective of this view is track guests who checked out on a specific date. This view can be altered by chaning gr. checkOutDate to NULL. in doing so Administration will be able to see which guest are still in the hotel.

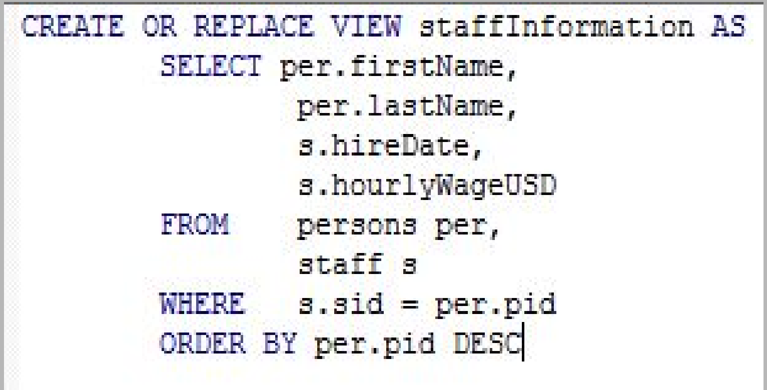


```
CREATE OR REPLACE VIEW GuestRooms AS
SELECT  per.firstName, per.lastName
FROM    persons per, guests g, guestReservation gr, rooms r
WHERE   per.pid = g.gid
AND     gr.gid = g.gid
AND     gr.checkOutDate = '2016-04-23'
ORDER BY per.lastname ASC;
```

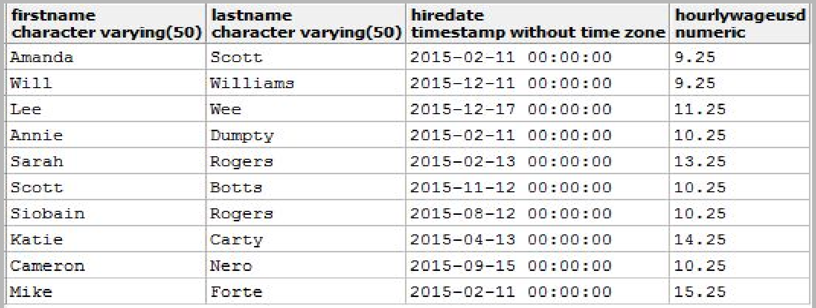


firstname character varying(50)	lastname character varying(50)
Will	Atkins
Marco	Birkshire
Dante	Matthew
Josh	Merrick
Randy	Queen
Dan	Smith

This view keeps a record of each employee throughout the hotel. It tracks their first name, last name,date of hire, and their hourly wage in USD.



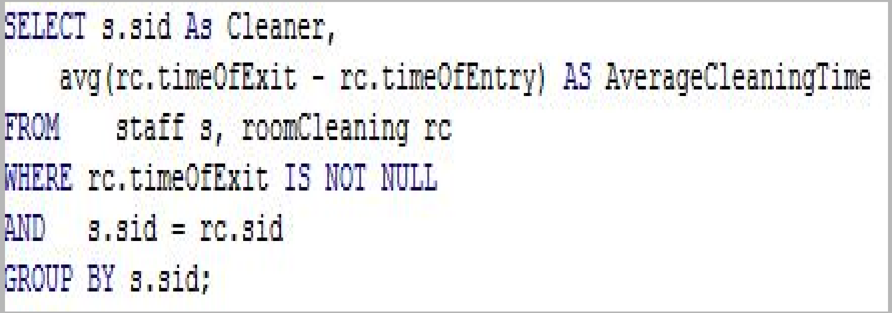
```
CREATE OR REPLACE VIEW staffInformation AS
        SELECT per.firstName,
               per.lastName,
               s.hireDate,
               s.hourlyWageUSD
        FROM   persons per,
               staff s
        WHERE  s.sid = per.pid
        ORDER BY per.pid DESC
```



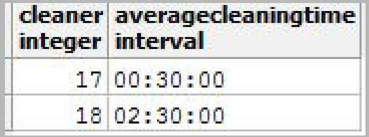
firstname character varying(50)	lastname character varying(50)	hiredate timestamp without time zone	hourlywageusd numeric
Amanda	Scott	2015-02-11 00:00:00	9.25
Will	Williams	2015-12-11 00:00:00	9.25
Lee	Wee	2015-12-17 00:00:00	11.25
Annie	Dumpty	2015-02-11 00:00:00	10.25
Sarah	Rogers	2015-02-13 00:00:00	13.25
Scott	Botts	2015-11-12 00:00:00	10.25
Siobain	Rogers	2015-08-12 00:00:00	10.25
Katie	Carty	2015-04-13 00:00:00	14.25
Cameron	Nero	2015-09-15 00:00:00	10.25
Mike	Forte	2015-02-11 00:00:00	15.25

Reports

The objective of this query is to track how long it takes for each employee to clean rooms.

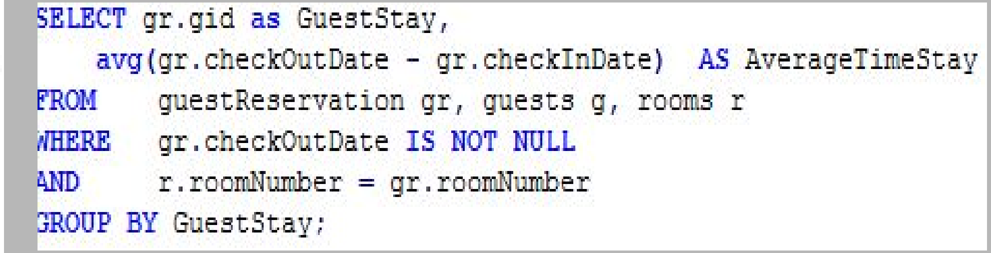


```
SELECT s.sid As Cleaner,
   avg(rc.timeOfExit - rc.timeOfEntry) AS AverageCleaningTime
FROM    staff s, roomCleaning rc
WHERE rc.timeOfExit IS NOT NULL
AND   s.sid = rc.sid
GROUP BY s.sid;
```

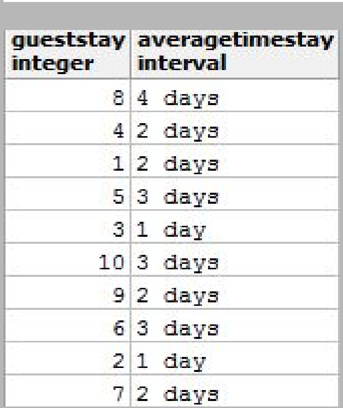


cleaner integer	averagecleaningtime interval
17	00:30:00
18	02:30:00

This query is meant to track the amount of time each quest has stayed at the hotel. It will be more useful once future implementation is taken account for.

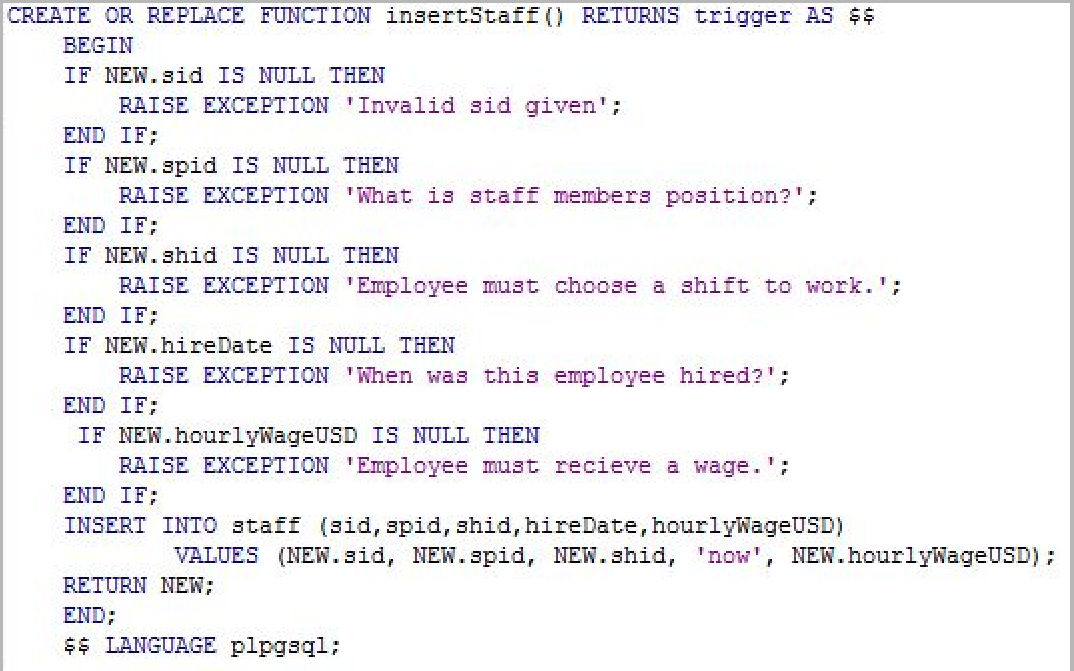


```
SELECT gr.gid as GuestStay,
   avg(gr.checkOutDate - gr.checkInDate)  AS AverageTimeStay
FROM     guestReservation gr, guests g, rooms r
WHERE    gr.checkOutDate IS NOT NULL
AND      r.roomNumber = gr.roomNumber
GROUP BY GuestStay;
```

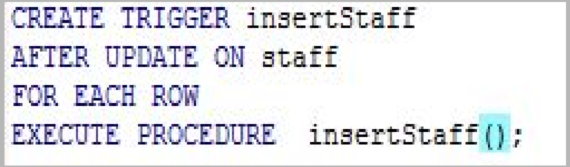


gueststay integer	averagetimestay interval
8	4 days
4	2 days
1	2 days
5	3 days
3	1 day
10	3 days
9	2 days
6	3 days
2	1 day
7	2 days

Stored Procedure & Trigger



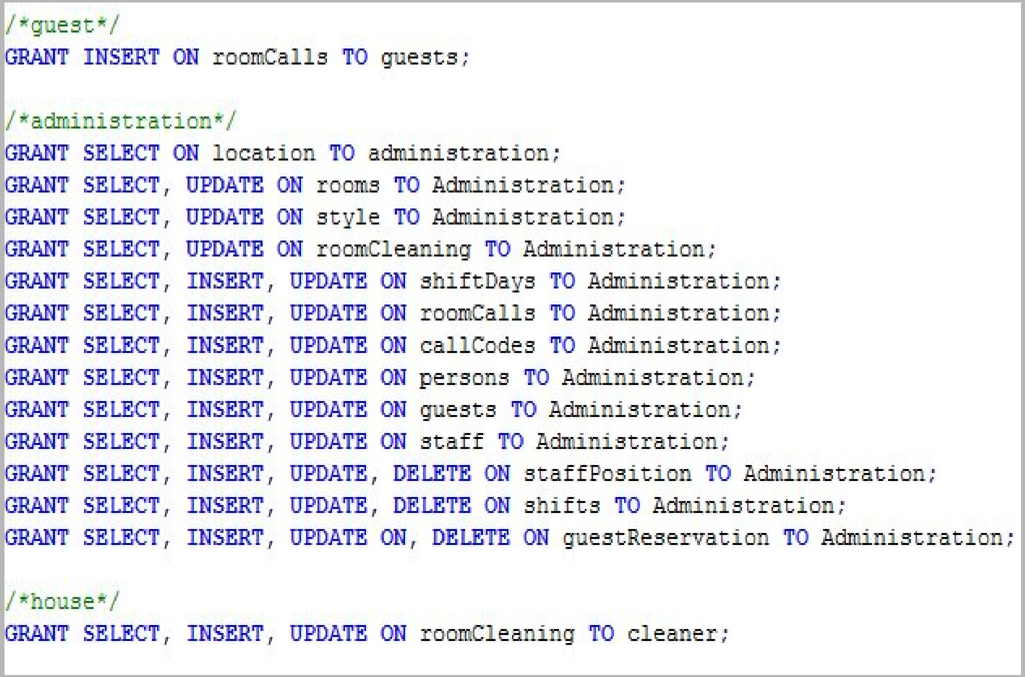
```
CREATE OR REPLACE FUNCTION insertStaff() RETURNS trigger AS $$
    BEGIN
    IF NEW.sid IS NULL THEN
        RAISE EXCEPTION 'Invalid sid given';
    END IF;
    IF NEW.spid IS NULL THEN
        RAISE EXCEPTION 'What is staff members position?';
    END IF;
    IF NEW.shid IS NULL THEN
        RAISE EXCEPTION 'Employee must choose a shift to work.';
    END IF;
    IF NEW.hireDate IS NULL THEN
        RAISE EXCEPTION 'When was this employee hired?';
    END IF;
     IF NEW.hourlyWageUSD IS NULL THEN
        RAISE EXCEPTION 'Employee must recieve a wage.';
    END IF;
    INSERT INTO staff (sid,spid,shid,hireDate,hourlyWageUSD)
            VALUES (NEW.sid, NEW.spid, NEW.shid, 'now', NEW.hourlyWageUSD);
    RETURN NEW;
    END;
    $$ LANGUAGE plpgsql;
```



```
CREATE TRIGGER insertStaff
AFTER UPDATE ON staff
FOR EACH ROW
EXECUTE PROCEDURE  insertStaff();
```

Security

There are two primary users and three classes within the hotel. For each role the specified user is allowed certain permissions.



```
/*guest*/
GRANT INSERT ON roomCalls TO guests;

/*administration*/
GRANT SELECT ON location TO administration;
GRANT SELECT, UPDATE ON rooms TO Administration;
GRANT SELECT, UPDATE ON style TO Administration;
GRANT SELECT, UPDATE ON roomCleaning TO Administration;
GRANT SELECT, INSERT, UPDATE ON shiftDays TO Administration;
GRANT SELECT, INSERT, UPDATE ON roomCalls TO Administration;
GRANT SELECT, INSERT, UPDATE ON callCodes TO Administration;
GRANT SELECT, INSERT, UPDATE ON persons TO Administration;
GRANT SELECT, INSERT, UPDATE ON guests TO Administration;
GRANT SELECT, INSERT, UPDATE ON staff TO Administration;
GRANT SELECT, INSERT, UPDATE, DELETE ON staffPosition TO Administration;
GRANT SELECT, INSERT, UPDATE, DELETE ON shifts TO Administration;
GRANT SELECT, INSERT, UPDATE ON, DELETE ON guestReservation TO Administration;

/*house*/
GRANT SELECT, INSERT, UPDATE ON roomCleaning TO cleaner;
```

Notes - Issues - Future Enhancements

- Some issues that may be problematic in regard to the design of the hotel’s database would be to the lack of diversification of the staff selection, ultimately, giving staff members more roles other than cleaner or administration. Since there are multiple administrators, it may make more sense to just one of them complete access over the database in regard to security. Also, there should be a lot more flexibility with the amount of shifts available. Perhaps if I implemented more test data, similar to that of a real hotel, I would have been able to create more advanced queries.

- For future enhancements I would ultimately like to link this database to a much larger database. For example, if any person booked a room, their data will be stored within a much larger database. Employees would be able to allocate to different if they decide to transfer. Also, there should be several more positions other than the administration and cleaning staff, but I decide to keep the database simple by assigning few staff positions.