King Saud University College of Computer and Information Sciences Computer Science Department	
CSC380 Fundamentals Of Database Systems	Fall 2022

CSC 380 Project

Hotel Management System

Team#1
Section#41208

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Glossary of terms

Database (DB)	*A collection of related data. [1,p4]A database is designed, built, and populated with data for a specific purpose.* *It has an intended group of users and some preconceived application in which these users interested [1,p5]*
Database management system (DBMS)	*A computerized system that enables users to create and maintain a database[1,p6]*
Supervisee	*One who is supervised, who works under a supervisor.[2]*

Description

Our hotel management system is a simple and attractive system that will make customers comfortable to use. The hotel manager has access to entire hotel management system and can perform any operation, such as adding or removing employees, also managing a guest's booking. The employee is capable of performing various operations on the bookings and rooms and guests, he can view and edit the information of any guest. Also, can keep track of the available rooms in the system. When a guest wants to book a room, he can by request it from an employee and choose either single or double room. Lastly, after generating the bail he has several ways of pay.

Requirement:

The hotel **GUEST** are described by their Identification Number ,name(First name , Last name) , contact information like Phone Number , Address and e-mail to pay the BILL , all are stored in the System.Each GUEST should have at least one booking in the Hotel and at least one Room reservation either it is single or double done by The Reception, and the GUEST will receive a generated BILL if his payment was successful , if it canceled by him or The Reception it will be deleted from the system .every GUEST must have a BILL and it is issued by an EMPLOYEE.

An **EMPLOYEE** is a worker who is Responsible for all the guest registration details and activities like Check-in, room assignment, etc. That serves the guests need. The EMPLOYEE is identified by a unique id known as the Employee id and other attributes as well such as name (First name, Last name), phone number, address, and salary, and Role the can specify his job. Each EMPLOYEE must be supervised by one supervisor and each supervisor must supervise one or many Employees.

RECEPTION is an entity that represents the hotel front office where all the reservation processes are held, it can be identified by the reception number. Each reception can be managed by one or more employees whose roles are identified as receptionists. The RECEPTION can view all the details of the rooms and has the authority to change the room availability based on the hotel's need, in addition to providing the guest with their room numbers on their arrival. He is also responsible for taking care of all customer needs and their comfort by providing them the facility to book one or more rooms for each guest.

BOOKING is identified by the booking number which is uniquely generated for a specific reservation. It contains the number of adults that are associated with a particular room at a particular time. Each guest can book one or many rooms and each room can

be booked by only one guest. Where checking the availability of the room will be considered the receptionist's responsibility.

The hotel **ROOM** is identified by Room number and it has other attributes room type and status. Guests request a ROOM; each Guest can request one or many rooms and each ROOM can be requested by one Guest. Booking includes ROOM, each booking includes one or more ROOM and each ROOM included in one booking.
A **BILL** is an entity identified by a unique id named Bill Id; it is generated for each customer with a confirmed reservation.A bill has a payment type attribute that allows the customer to choose whether to pay with a credit card or cash. It has other attributes, such as the expected payment date, bill Status, and amount (Total price, Tax) .The amount of the account Is the total price of all the reservations that the individual guest conducts. The bill's status would change to a paid position if the payment went through successfully. And canceled if the Employee who is role as manager cancels the bill due to the user request. Each EMPLOYEE with a receptionist role issues one or many BILL, and each BILL issued by one EMPLOYEE. Each BILL must have at least one BOOKING, And for each, there must be only one BILL.

Entity Relation Diagram:

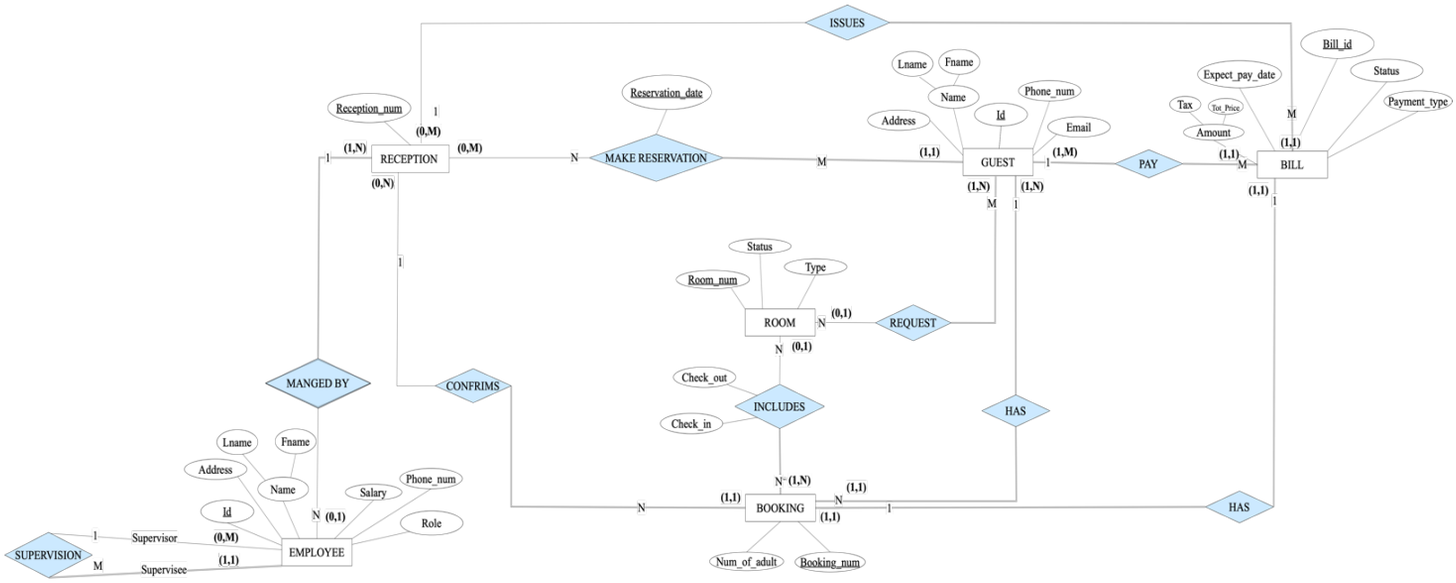


Figure 1: made by draw.io [3]

Relational Schema:

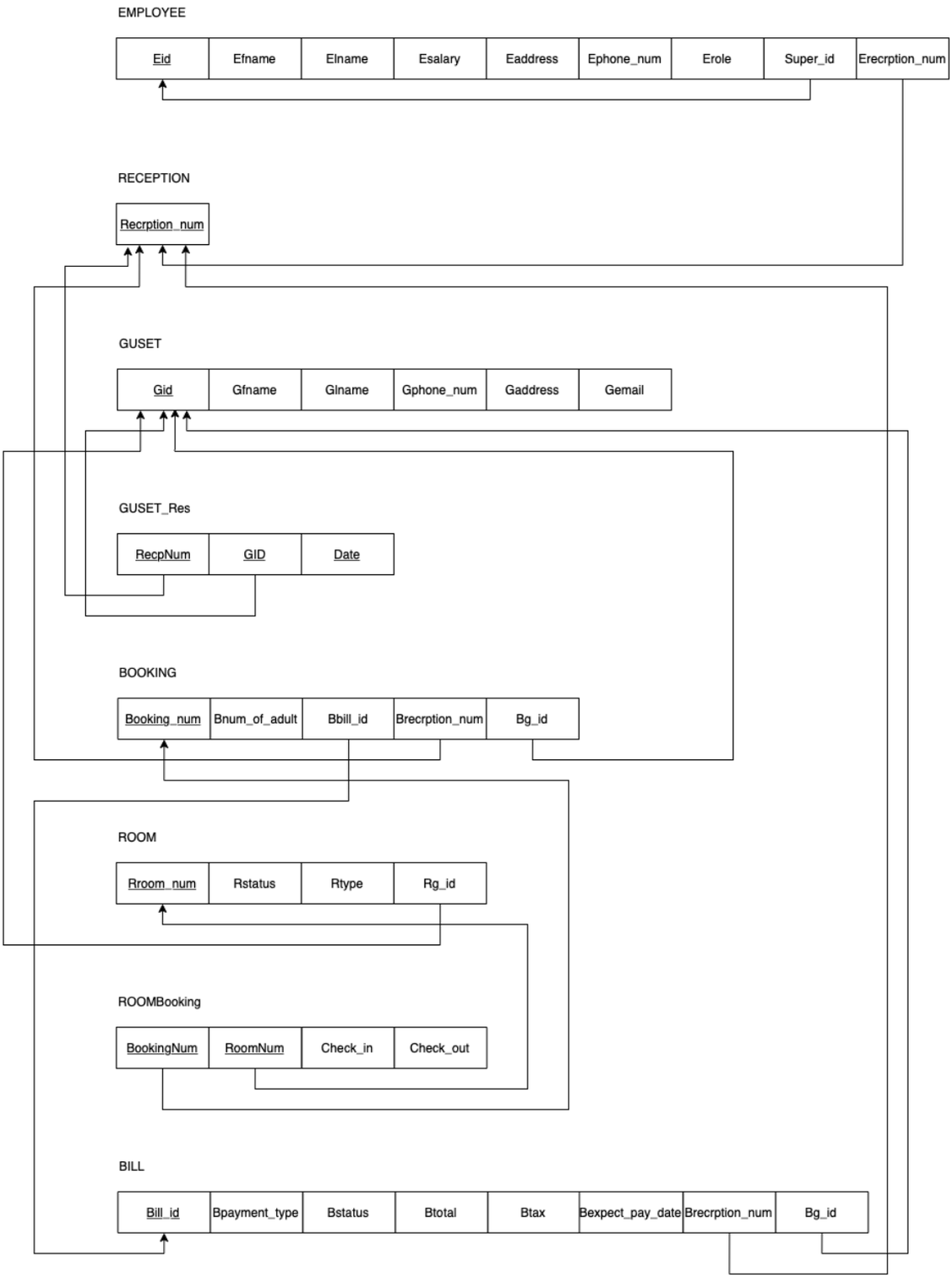


Figure 2: made by draw.io [3]

User Group: Manager

This user group is responsible for overseeing all business and administrative aspects of the Hotel. Hiring, training, and terminate the employees. Manager *can also promote employees and grant them database access*. In addition to managing personnel, a manager handles the business side of the operation. Marketing and setting business goal and also Checks paid bills are important responsibilities of this position. Special offers and initiatives to retain customers are a creative responsibility of the manager. The manager, in a nutshell, has complete control over the database system.

Manager View

Bill_id	Bpayment_typ	Bstatus	Btotal	Btax	Bexpect_pay_date	Booking_num	Bnum_of_adult
Eid	Efname	Elname	Esalary	Eaddress	Ephone_num	Erole	Super_id
Check_out	Gid	Gfname	Glname	Gphone_num	Gaddress	Gemail	gDate
	Reception_num	Room_num	Rstatus	Rtype	BookingNum	RoomNum	Check_in

Manager's Possible Operations

INSERT:

```
INSERT INTO EMPLOYEE
VALUES('1118765435', 'Lama', 'Alzakri', 2000, 'Alyasmeen', '0550907654', 'Receptionist', NULL , '679' );

INSERT INTO EMPLOYEE
VALUES('119230754', 'Waad', 'Alahmed', 1000, 'Altawan', '055902014', 'Receptionist', '1118765435', '543');

INSERT INTO EMPLOYEE
VALUES('1115678326', 'Nouf', 'Alhabeb', 500, 'ALtawan', '055674567', 'Receptionist', '119230754', '777' );

INSERT INTO EMPLOYEE
VALUES('1135678326', 'Aljohara', 'Aljubair', 4000, 'Aldiryah', '05576745', 'Receptionist', '1118765435', '444' );
```

Eid	Efname	Elname	Esalary	Eaddress	Ephone_num	Erole	Super_id	Erecrption_num
119230754	Waad	Alahmed	1000.00	Altawan	055902014	Receptionist	1118765435	543
1115678326	Nouf	Alhabeb	500.00	ALtawan	055674567	Receptionist	119230754	777
1118765435	Lama	Alzakr	2000.00	Alyasmeen	0550907654	Receptionist	NULL	679
1135678326	Aljohara	Aljubair	4000.00	Aldiryah	05576745	Receptionist	1118765435	444
NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL

```
INSERT INTO RECEPTION VALUES('543');
INSERT INTO RECEPTION VALUES('444');
INSERT INTO RECEPTION VALUES('898');
INSERT INTO RECEPTION VALUES('777');
INSERT INTO RECEPTION VALUES('679');
```

Reception_num
444
543
679
777
898
NULL

RETRIEVE FROM ONE TABLE:

```
SELECT Efname, Elname
FROM EMPLOYEE
WHERE Esalary > 1000;
```

Efname	Elname
Lama	Alzakr
Aljohara	Aljubair

```sql
SELECT E.Efname AS employee_F_name, E.Elname AS employee_L_name, S.Efname AS Super_F_name, S.Elname AS Super_L_name
FROM EMPLOYEE AS E, EMPLOYEE AS S
WHERE E.Super_id= S.Eid;
```

employee_F_name	employee_L_name	Super_F_name	Super_L_name
Nouf	Alhabeb	Waad	Alahmed
Aljohara	Aljubair	Lama	Alzakr
Waad	Alahmed	Lama	Alzakr

RETRIEVE FROM MORE THAN TWO TABLE(JOIN):

```sql
SELECT  Gfname AS GUSET_FirstName,
Glname AS GUSET_LastName,
Gphone_num AS GUSET_phone_num,
Efname AS EMPLOYEE_FirstName,
Elname AS EMPLOYEE_LastName,
Ephone_num AS EMPLOYEE_phone_num
FROM (  ( (guset JOIN bill ON Gid=Bg_id)   JOIN reception ON Breception_num= Reception_num)  LEFT JOIN employee ON Reception_num= Ereception_num)
WHERE Btotal > 8500;
```

GUSET_FirstName	GUSET_LastName	GUSET_phone_num	EMPLOYEE_FirstName	EMPLOYEE_LastName	EMPLOYEE_phone_num
Raneem	Khaled	055656786	NULL	NULL	NULL
Rawan	Mohammed	055676767	NULL	NULL	NULL
Amal	Zeyad	055678987	Waad	Alahmed	055902014

```sql
SELECT  Efname AS EMPLOYEE_FirstName, Elname AS EMPLOYEE_LastName, Eid AS EMPLOYEE_ID
FROM ( ( (room_booking JOIN room ON RoomNum= Room_num) JOIN booking ON Booking_num= Booking_num)  JOIN employee ON Breception_num= Ereception_num)
WHERE RoomNum=4443;
```

EMPLOYEE_FirstName	EMPLOYEE_LastName	EMPLOYEE_ID
Waad	Alahmed	119230754

UPDATE:

```sql
UPDATE employee
SET Ephone_num = '052221345'
WHERE Eid = '1115678326';
```

Eid	Efname	Elname	Esalary	Eaddress	Ephone_num	Erole	Super_id	Ereception_num
1115678326	Nouf	Alhabeb	500.00	ALtawan	052221345	Receptionist	119230754	777
1118765435	Lama	Alzakr	2000.00	Alyasmeen	0550907654	Receptionist	NULL	679
119230754	Waad	Alahmed	1000.00	Altawan	055902014	Receptionist	1118765435	543
NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL

```
1    UPDATE employee
2    SET Esalary= Esalary*2
3    WHERE Eid = '1118765435' ;
4
```

Eid	Efname	Elname	Esalary	Eaddress	Ephone_num	Erole	Super_id	Ereception_num
1115678326	Nouf	Alhabeb	500.00	ALtawan	052221345	Receptionist	119230754	777
1118765435	Lama	Alzakr	4000.00	Alyasmeen	0550907654	Receptionist	NULL	679
119230754	Waad	Alahmed	1000.00	Altawan	055902014	Receptionist	1118765435	543
NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL

DELETE:

```
1    DELETE FROM employee
2    WHERE Eid = '1135678326';
3
```

Eid	Efname	Elname	Esalary	Eaddress	Ephone_num	Erole	Super_id	Ereception_num
1115678326	Nouf	Alhabeb	500.00	ALtawan	055674567	Receptionist	119230754	777
1118765435	Lama	Alzakr	2000.00	Alyasmeen	0550907654	Receptionist	NULL	679
119230754	Waad	Alahmed	1000.00	Altawan	055902014	Receptionist	1118765435	543
NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL

```
1    DELETE FROM room
2    WHERE Room_num = '3465';
3
```

Room_num	Rstatus	Rtype	Rg_id
1168	Available	Single	NULL
1254	Not Available	Single	1114567876
4443	Available	Single	NULL
5699	Not Available	Double	1113456542
NULL	NULL	NULL	NULL

User Group: Employee

This user is responsible for serving the hotel guests, making bookings and checking the availability of the rooms and They are familiar with the specific details and features of each room. assign the room based on the needs of the possible guest. One of their responsibilities is to supervise the entire bill-paying procedure and for the guests and adding it to the database.

Employee View

Bill_id	Bpayment_typ	Bstatus	Btotal	Btax	Bexpect_pay_date
Booking_num	Bnum_of_adult	Gid	Gfname	Glname	Gphone_num
Gaddress	Gemail	gDate	Reception_num	Room_num	Rstatus
Rtype	BookingNum	Check_in	Check_out		

Employee's Possible Operations

INSERT:

```
INSERT INTO GUSET
VALUES('1114567876', 'Rawan', 'Mohammed', '055676767', 'Jeddah', 'Rawan@gmail.com');

INSERT INTO GUSET
VALUES('1113456787', 'Raneem', 'Khaled', '055656786', 'Jeddah', 'Raneem@gmail.com');

INSERT INTO GUSET
VALUES('1113456542', 'Amal', 'Zeyad', '055678987', 'Riyadh', 'Amal@gmail.com');
```

Gid	Gfname	Glname	Gphone_num	Gaddress	Gemail
1113456542	Amal	Zeyad	055678987	Riyadh	Amal@gmail.com
1113456787	Raneem	Khaled	055656786	Jeddah	Raneem@gmail.com
1114567876	Rawan	Mohammed	055676767	Jeddah	Rawan@gmail.com
NULL	NULL	NULL	NULL	NULL	NULL

```
INSERT INTO BILL VALUES ('12456', 'Cash', 'Paid', '8400', '1260', '2022-12-01', '898', '1113456542');
INSERT INTO BILL VALUES ('42956', 'Credit', 'Not Paid', '10000', '1500', '2022-03-24', '543', '1113456542');
INSERT INTO BILL VALUES ('12996', 'Cash', 'Paid', '9000', '1350', '2022-04-21', '898', '1113456787');
INSERT INTO BILL VALUES ('13576', 'Credit', 'Paid', '9000', '1350', '2022-12-11', '898', '1114567876');
```

Bill_id	Bpayment_typ	Bstatus	Btotal	Btax	Bexpect_pay_date	Brecrption_num	Bg_id
12456	Cash	Paid	8400	1260	2022-12-01	898	1113456542
42956	Credit	Not Paid	10000	1500	2022-03-24	543	1113456542
12996	Cash	Paid	9000	1350	2022-04-21	898	1113456787
13576	Credit	Paid	9000	1350	2022-12-11	898	1114567876
NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL

DELETE:

```
DELETE FROM room_booking
WHERE BookingNum = '33678';
```

BookingNum	RoomNum	Check_in	Check_out
23876	4443	2021-09-19	2021-10-01
43876	5699	2022-12-01	2022-12-04
44558	3465	2022-12-11	2022-12-22
NULL	NULL	NULL	NULL

```
1    DELETE FROM guset
2    WHERE Gid = 1113456787;
```

Gid	Gfname	Glname	Gphone_num	Gaddress	Gemail
1113456542	Amal	Zeyad	055678987	Riyadh	Amal@gmail.com
1114567876	Rawan	Mohamed	055676767	Jeddah	Rawan@gmail.com
1118436881	Alaa	Mohamed	054601135	Riyadh	Alaa@gmail.com
NULL	NULL	NULL	NULL	NULL	NULL

```
1    DELETE FROM guset WHERE Gid = '1118436881';
```

Gid	Gfname	Glname	Gphone_num	Gaddress	Gemail
1113456542	Amal	Zeyad	055678987	Riyadh	Amal@gmail.com
1114567876	Rawan	Mohamed	055676767	Jeddah	Rawan@gmail.com
NULL	NULL	NULL	NULL	NULL	NULL

UPDATE:

```
1    UPDATE room SET Rstatus = 'Available'  WHERE Rg_id IS NULL;
```

Room_num	Rstatus	Rtype	Rg_id
1168	Available	Single	NULL
1254	Not Available	Single	1114567876
3465	Available	Double	NULL
4443	Not Available	Single	1118436881
5699	Not Available	Double	1113456542
NULL	NULL		NULL

```
1    UPDATE bill SET Bstatus = 'Paid'  WHERE Bill_id = '42956';
2
```

Bill_id	Bpayment_typ	Bstatus	Btotal	Btax	Bexpect_pay_date	Breception_num	Bg_id
13576	Credit	Paid	9000	1350	2022-12-11	898	1114567876
42956	Credit	Paid	10000	1500	2022-03-24	543	1113456542
NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL

RETRIEVE FROM ONE TABLE:

```
1 •  SELECT check_in, check_out
2    FROM room_booking
3    WHERE BookingNum= '43876'AND RoomNum='5699';
4
```

	check_in	check_out
▶	2022-12-01	2022-12-04

```
1 •  SELECT Bg_id AS Guset_not_paid FROM bill
2    WHERE Bstatus='Not Paid' ;
3
```

	Guset_not_paid
▶	1113456542

RETRIEVE FROM MORE THAN TWO TABLE(JOIN):

```
1   SELECT Room_num, Rtype, Gfname AS GUSET_FirstName, Glname AS GUSET_LastName, Check_in, Check_out
2   FROM ( ( (room_booking JOIN room ON RoomNum= Room_num) JOIN guset ON Rg_id= Gid) LEFT JOIN booking ON Gid= Bg_id)
3   WHERE Rstatus= 'Not Available';
```

	Room_num	Rtype	GUSET_FirstName	GUSET_LastName	Check_in	Check_out
▶	1254	Single	Rawan	Mohammed	2021-03-24	2021-04-04
	3465	Double	Raneem	Khaled	2022-12-11	2022-12-22
	4443	Single	Alaa	Mohammed	2021-09-19	2021-10-01
	5699	Double	Amal	Zeyad	2022-12-01	2022-12-04

```
1   SELECT DISTINCT  Gfname AS GUSET_FirstName, Glname AS GISET_LastName,Gphone_num AS GUSET_phone, Bstatus AS BILL_status , Bill_id AS BILL_id
2   FROM ( ( ( (room_booking JOIN room ON RoomNum= Room_num)
3   JOIN booking ON Booking_num= Booking_num)
4   JOIN bill ON Bbill_id= Bill_id )
5   JOIN guset ON Gid= bill.Bg_id)
6   WHERE Bstatus='Not Paid';
7
```

	GUSET_FirstName	GISET_LastName	GUSET_phone	BILL_status	BILL_id
▶	Amal	Zeyad	055678987	Not Paid	42956

The tools and programs used to run this project

1.Implementing the database using DBMS (MySQL)

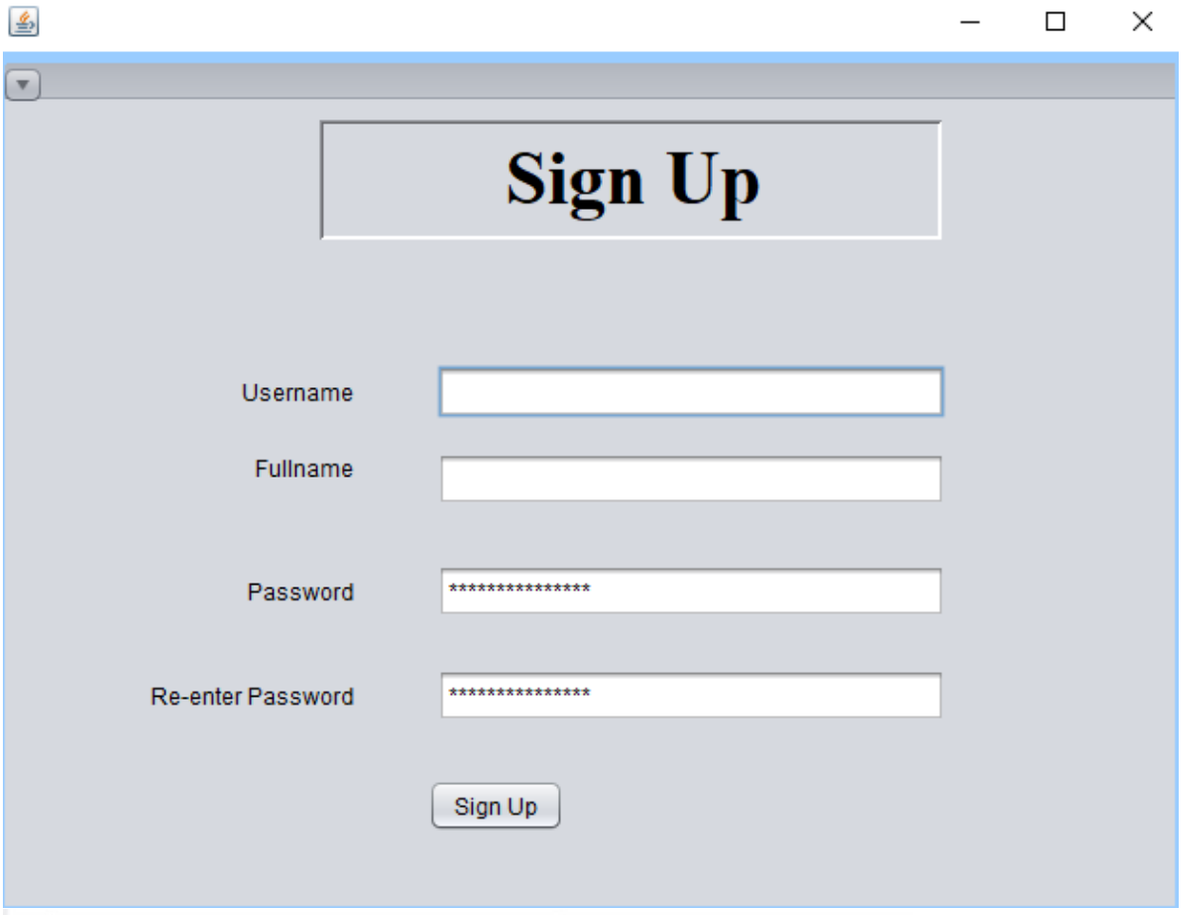
2.The build of user view by GUI (Graphical User Interface) in Java programing language.

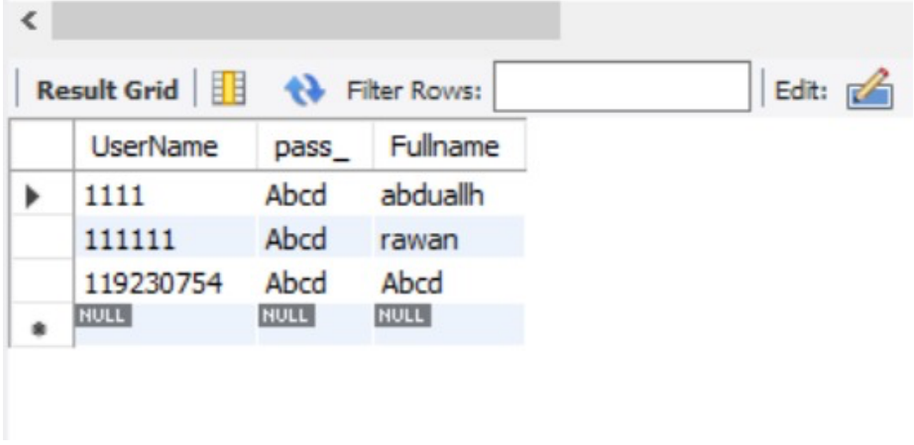
Connection Part

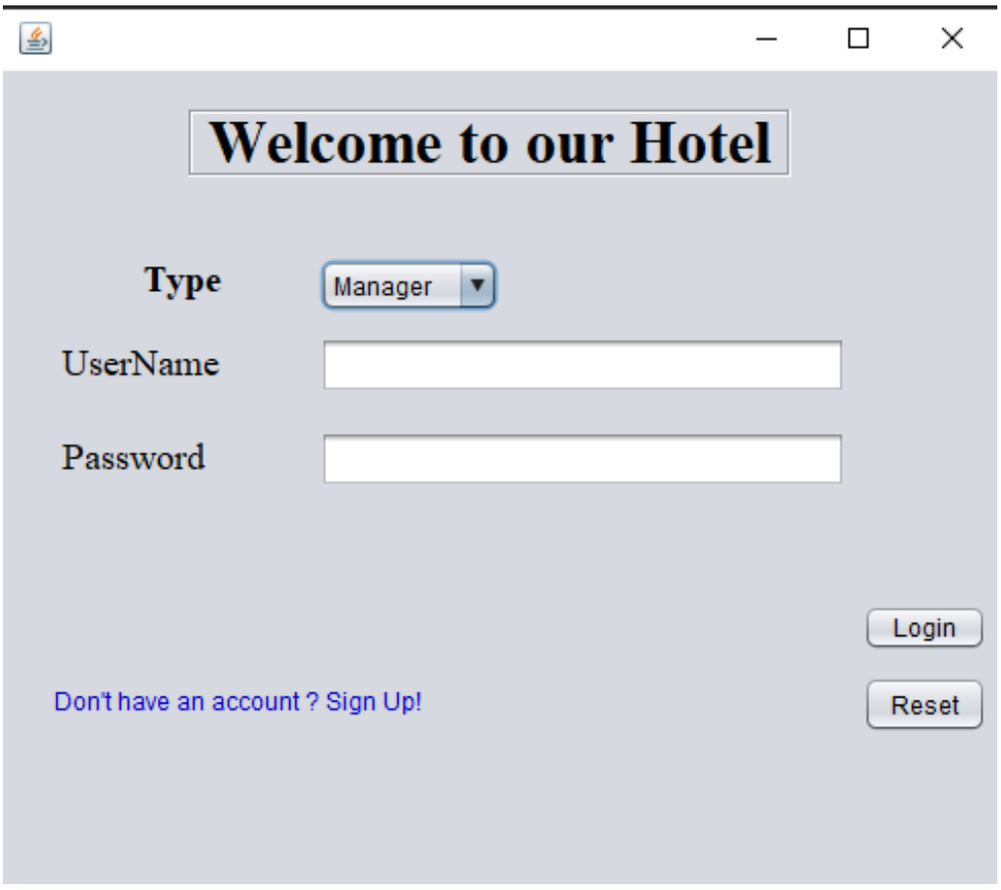
```java
import java.sql.Connection;
import java.sql.DriverManager;
import java.sql.*;

public class MyConnection {
  //spring.datasource.driver-class-name=com.mysql.cj.jdbc.Driver

    public static Connection getConnection(){
       Connection con = null;

        try{
            Class.forName("com.mysql.cj.jdbc.Driver"
                    //+ "com.mysql.jdbc.Driver"
                    );
            con
=DriverManager.getConnection("jdbc:mysql://localhost:3306/newhotel","root","Abcd2002"
);
        }
        catch(ClassNotFoundException | SQLException e){
            System.out.println(e.getMessage());
        }
        return con;
    }

}
```

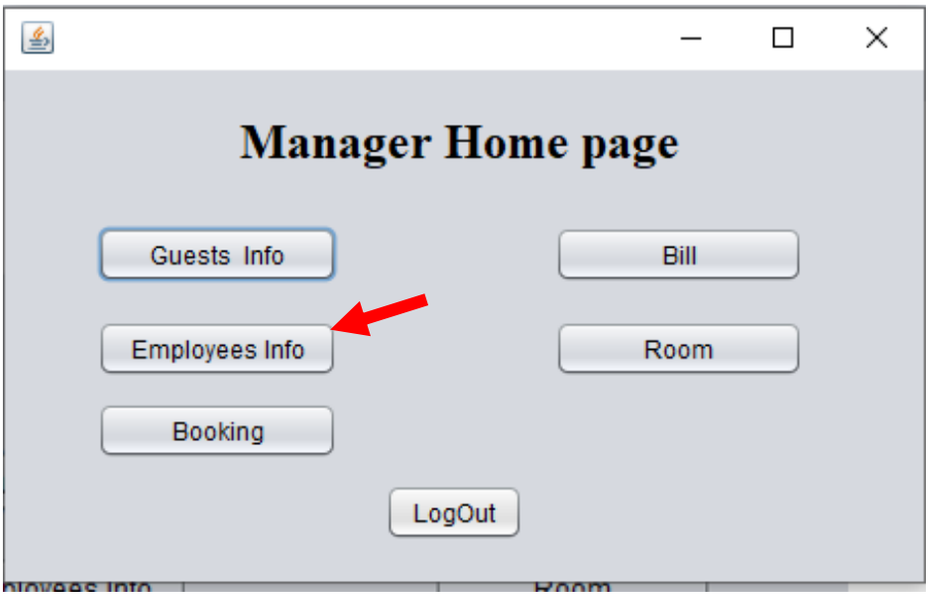
Print Screen of Program Interface

Manager View





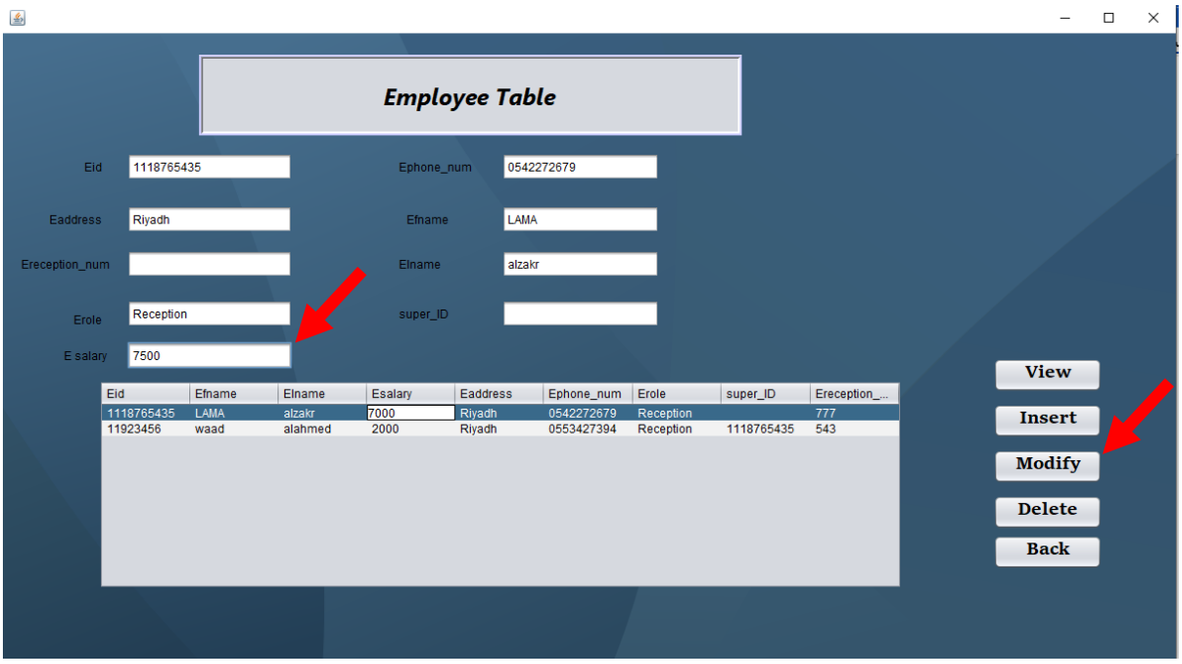

Welcome to our Hotel
Type
Manager
UserName
Password
Login
Don't have an account ? Sign Up!
Reset

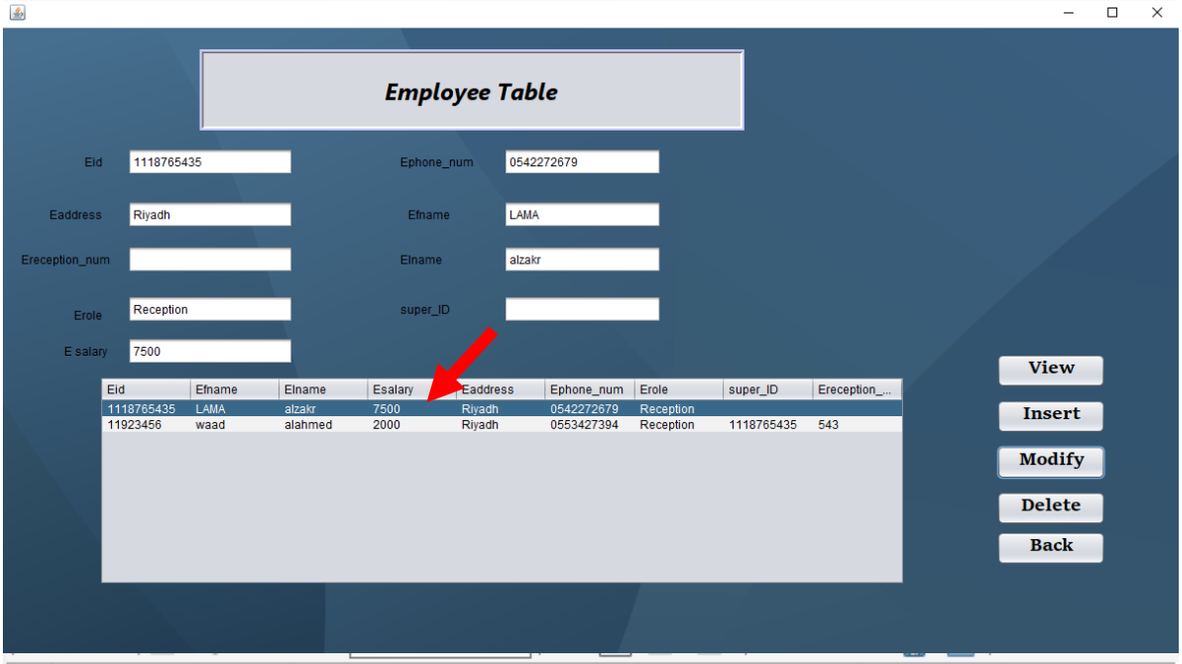

Manager Home page
Guests Info
Bill
Employees Info
Room
Booking
LogOut

VIEW:

	Eid	Efname	Elname	Esalary	Eaddress	Ephone_num	Erole	Super_id	Ereception_num
▶	1118765435	LAMA	alzakr	7000	Riyadh	0542272679	Reception	NULL	777
	11923456	waad	alahmed	2000	Riyadh	0553427394	Reception	1118765435	543
*	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL

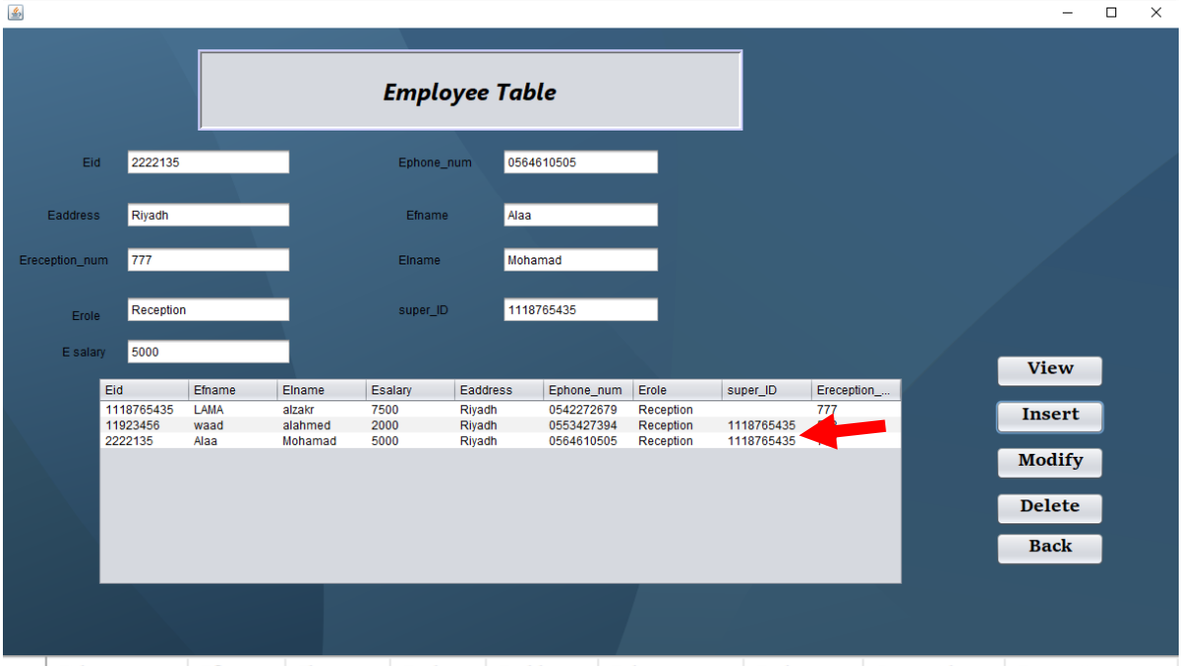
MODIFY:





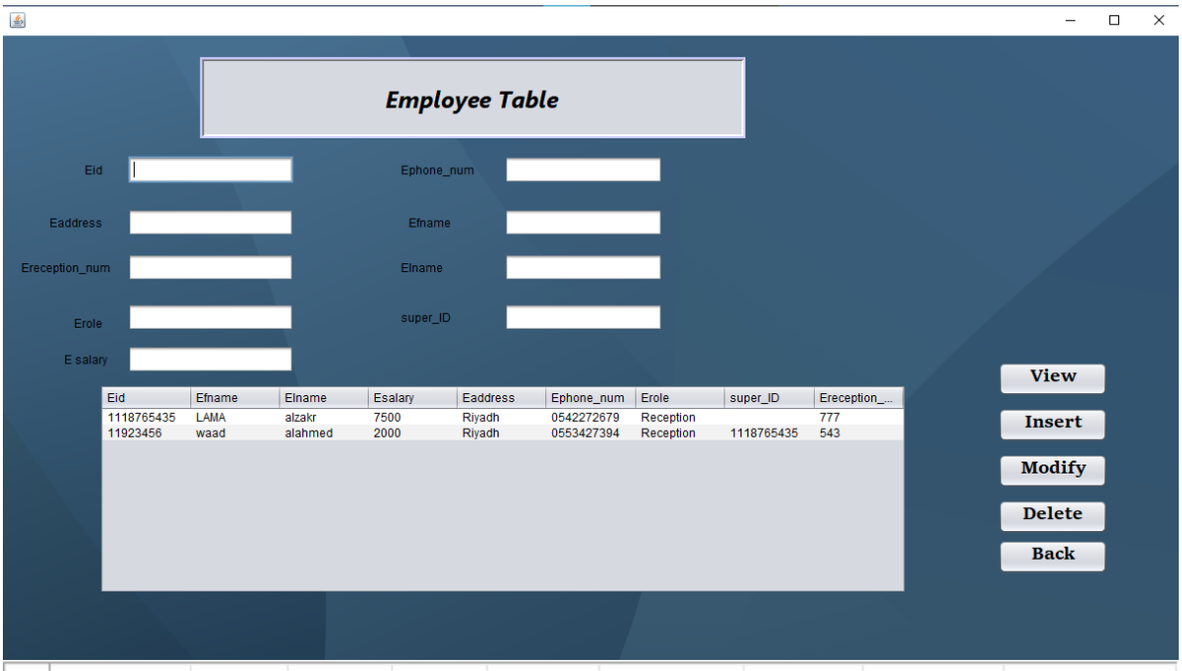
Eid	Efname	Elname	Esalary	Eaddress	Ephone_num	Erole	Super_id	Ereception_num
1118765435	LAMA	alzakr	7500	Riyadh	0542272679	Reception	NULL	777
11923456	waad	alahmed	2000	Riyadh	0553427394	Reception	1118765435	543
NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL

INSERT:



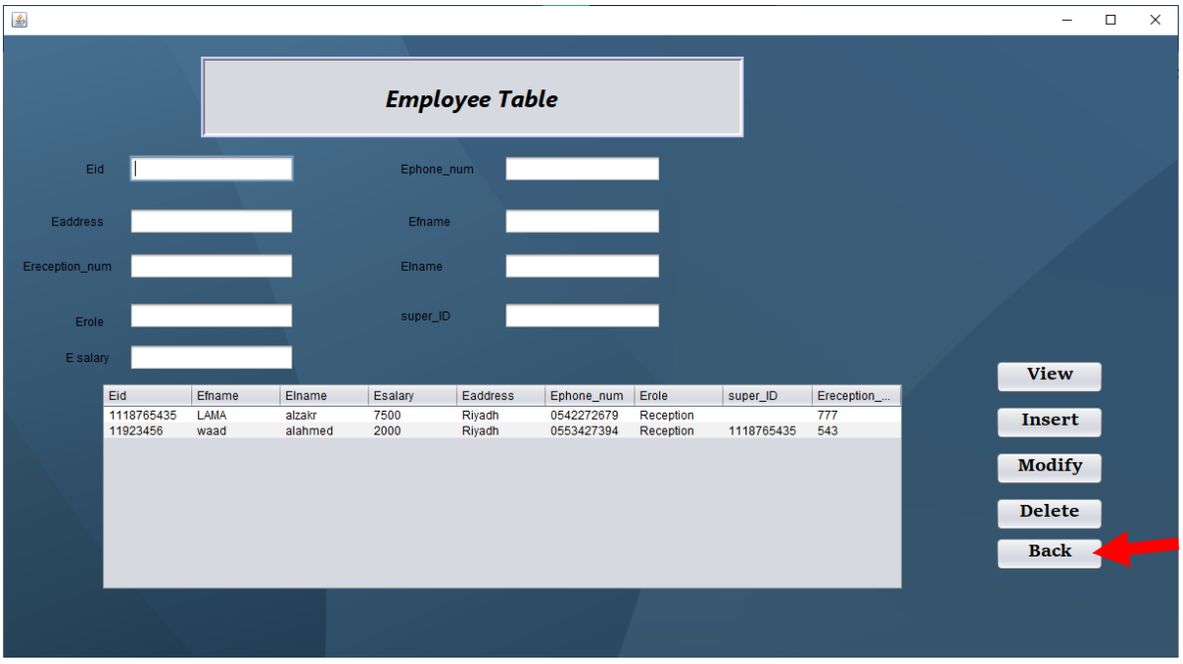
Eid	Efname	Elname	Esalary	Eaddress	Ephone_num	Erole	Super_id	Ereception_num
1118765435	LAMA	alzakr	7500	Riyadh	0542272679	Reception	NULL	777
11923456	waad	alahmed	2000	Riyadh	0553427394	Reception	1118765435	543
2222145	Alaa	Mohamad	5000	Riyadh	0564610505	Reception	1118765435	777
NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL

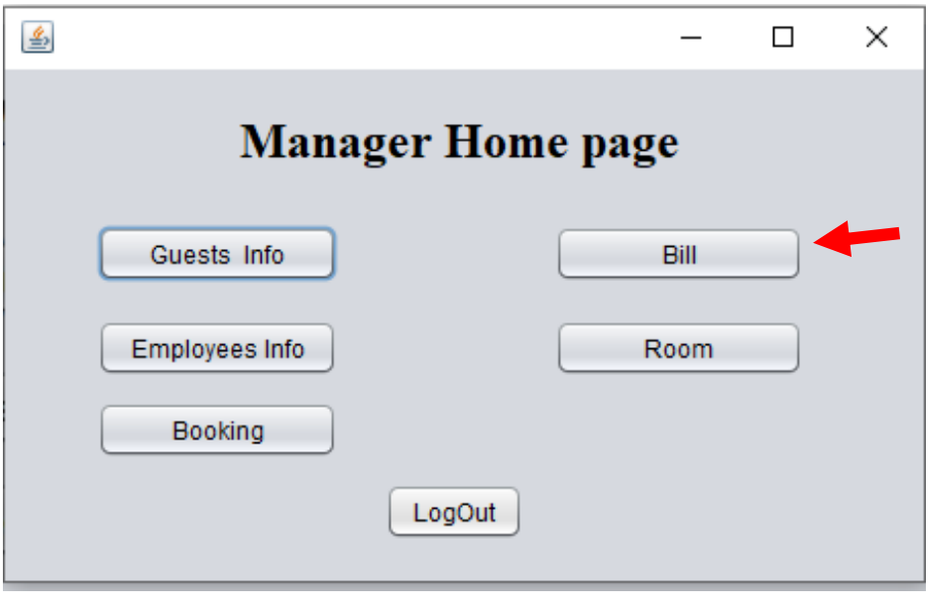
DELETE:



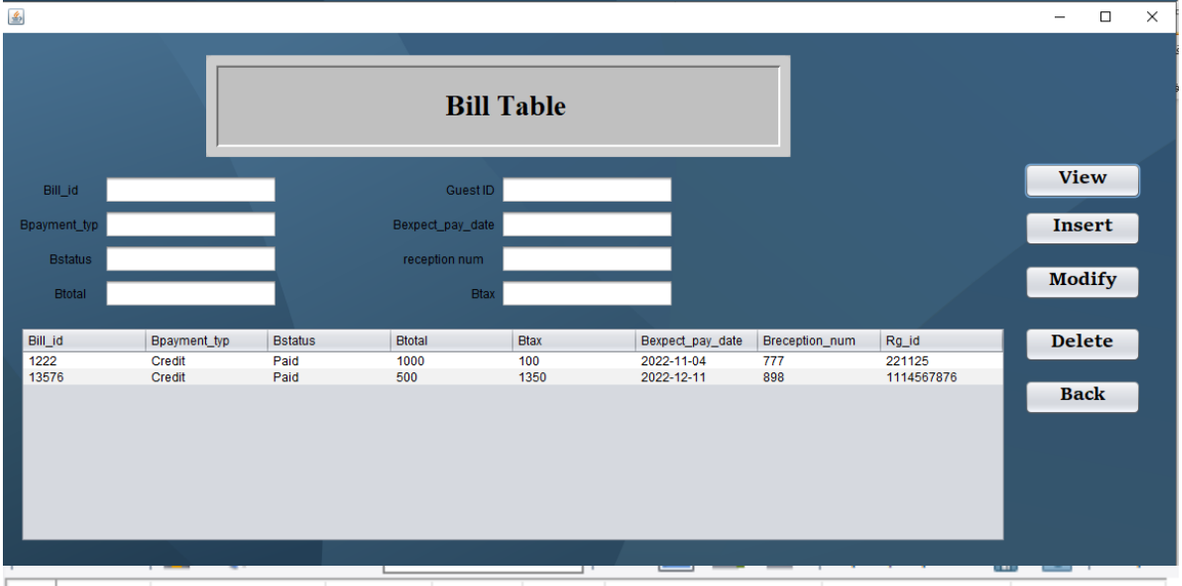
Eid	Efname	Elname	Esalary	Eaddress	Ephone_num	Erole	Super_id	Ereception_num
1118765435	LAMA	alzakr	7500	Riyadh	0542272679	Reception	NULL	777
11923456	waad	alahmed	2000	Riyadh	0553427394	Reception	1118765435	543
NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL

BACK:


Employee Table
Eid
Ephone_num
Eaddress
Efname
Ereception_num
Elname
Erole
super_ID
E salary
Eid Efname Elname Esalary Eaddress Ephone_num Erole super_ID Ereception_...
1118765435 LAMA alzakr 7500 Riyadh 0542272679 Reception 777
11923456 waad alahmed 2000 Riyadh 0553427394 Reception 1118765435 543
View
Insert
Modify
Delete
Back


Manager Home page
Guests Info
Bill
Employees Info
Room
Booking
LogOut

VIEW:



Bill_id	Bpayment_typ	Bstatus	Btotal	Btax	Bexpect_pay_date	Breception_num	Bg_id
1222	Credit	Paid	1000	100	2022-11-04	777	221125
13576	Credit	Paid	500	1350	2022-12-11	898	1114567876
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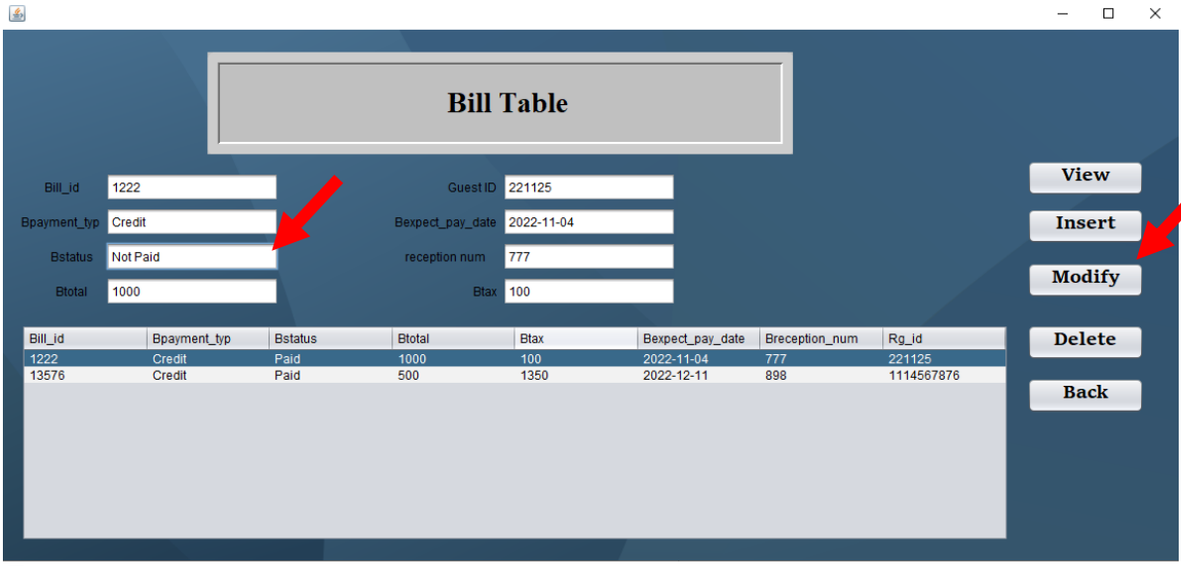
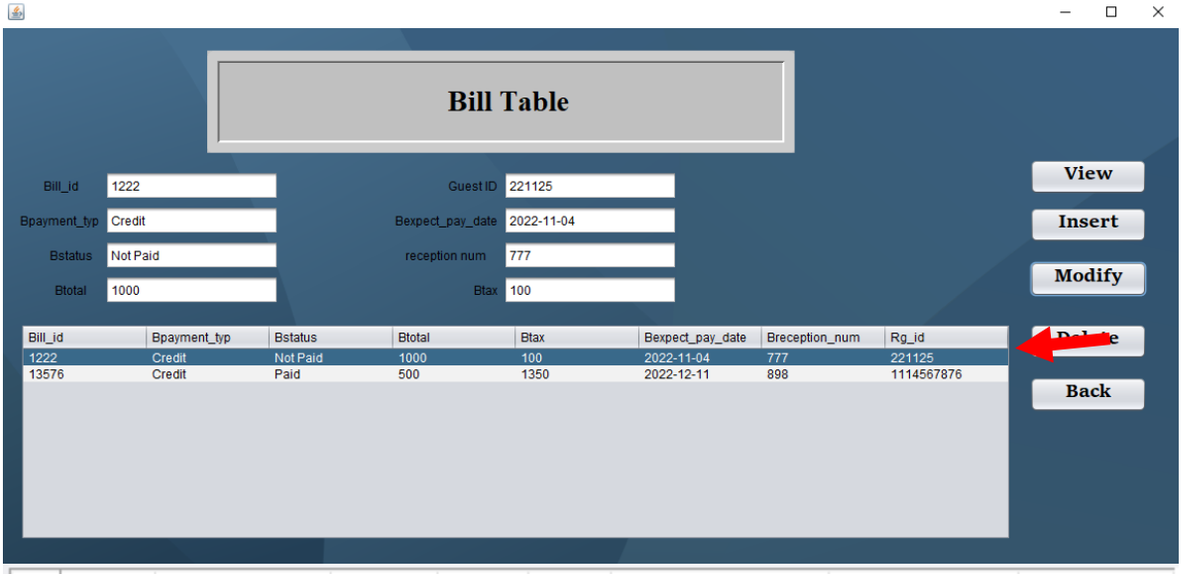
MODIFY:





Bill_id	Bpayment_typ	Bstatus	Btotal	Btax	Bexpect_pay_date	Breception_num	Bg_id
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13576	Credit	Paid	500	1350	2022-12-11	898	1114567876
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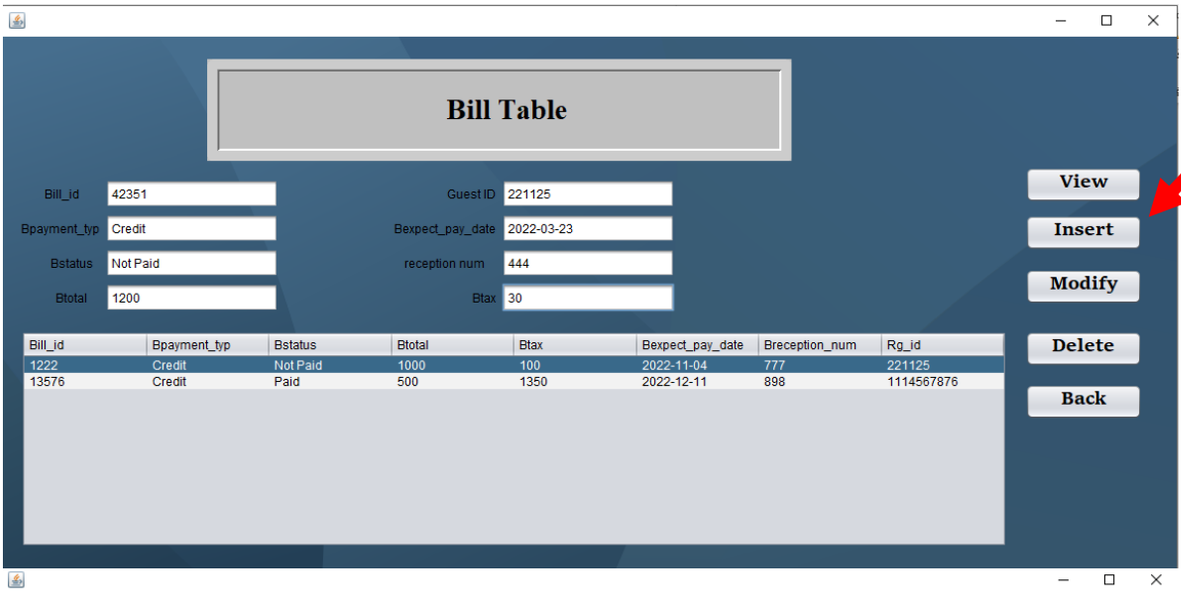

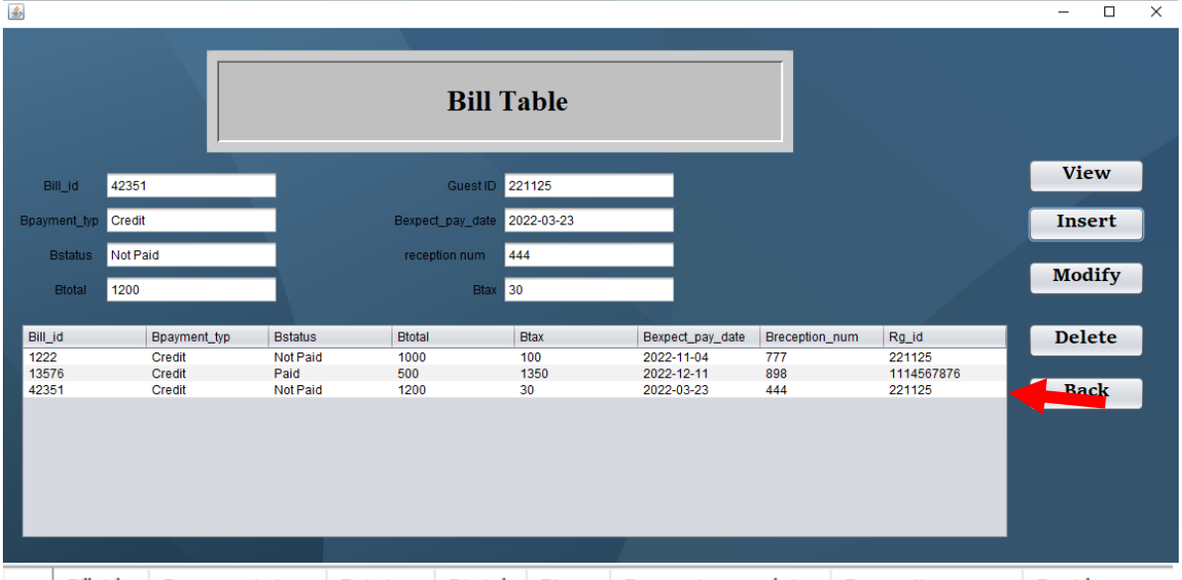

Bill_id	Bpayment_typ	Bstatus	Btotal	Btax	Bexpect_pay_date	Breception_num	Bg_id
1222	Credit	Not Paid	1000	100	2022-11-04	777	221125
13576	Credit	Paid	500	1350	2022-12-11	898	1114567876
42351	Credit	Not Paid	1200	30	2022-03-23	444	221125
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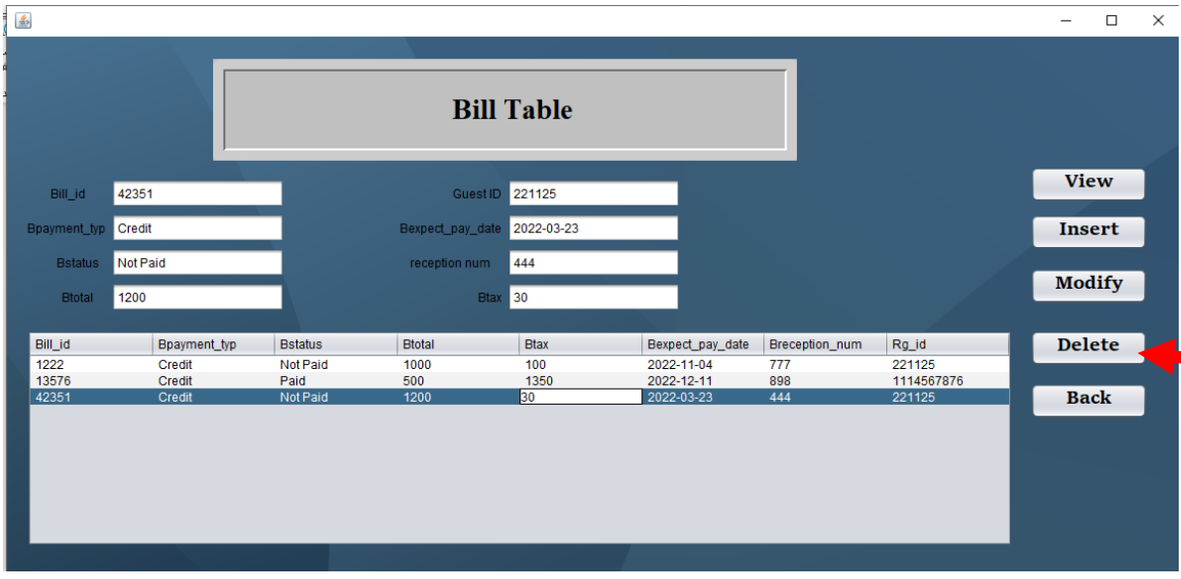
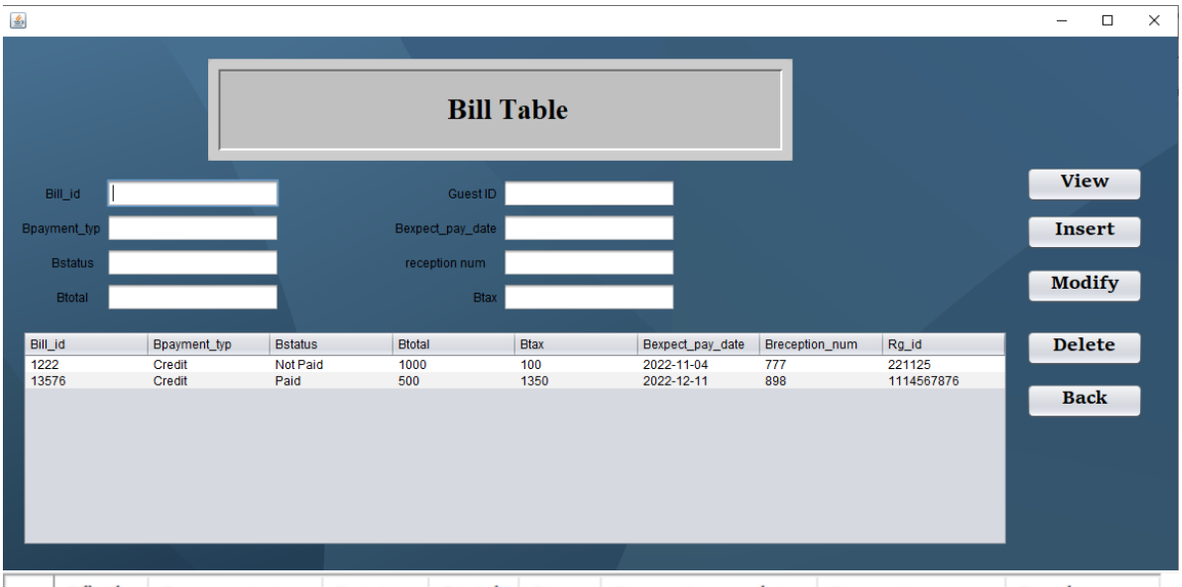
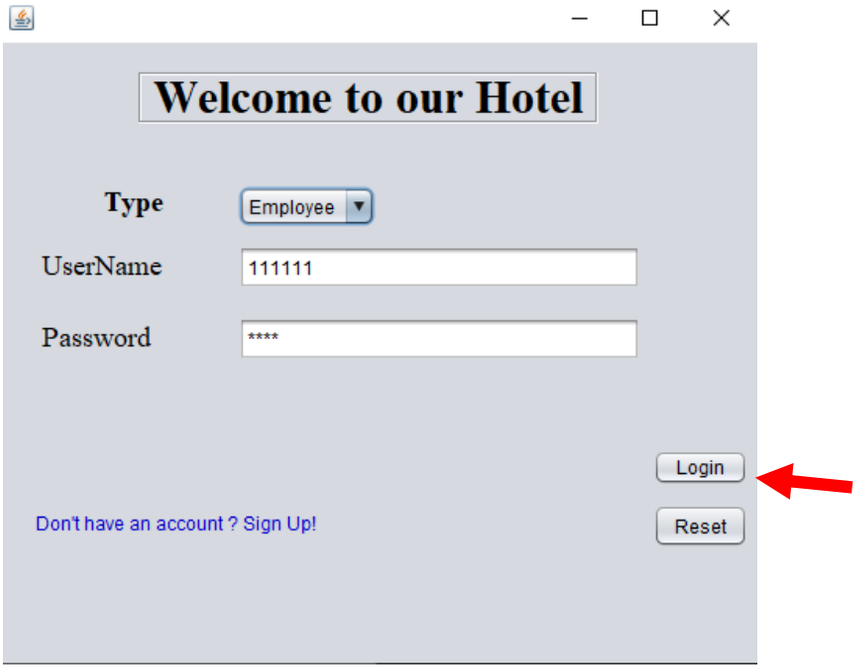
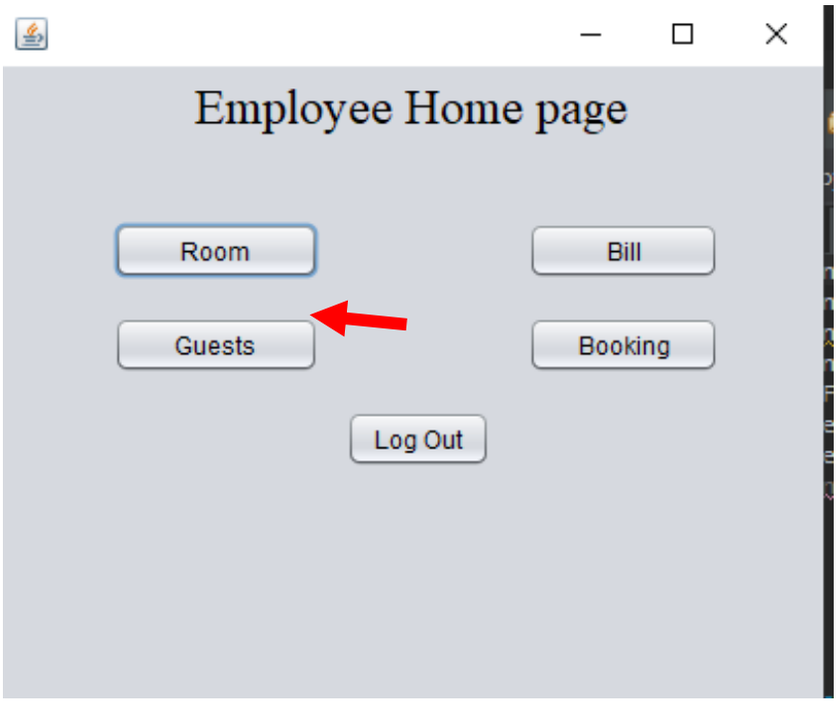




Bill_id	Bpayment_typ	Bstatus	Btotal	Btax	Bexpect_pay_date	Breception_num	Bg_id
1222	Credit	Not Paid	1000	100	2022-11-04	777	221125
13576	Credit	Paid	500	1350	2022-12-11	898	1114567876
NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL

Employee View





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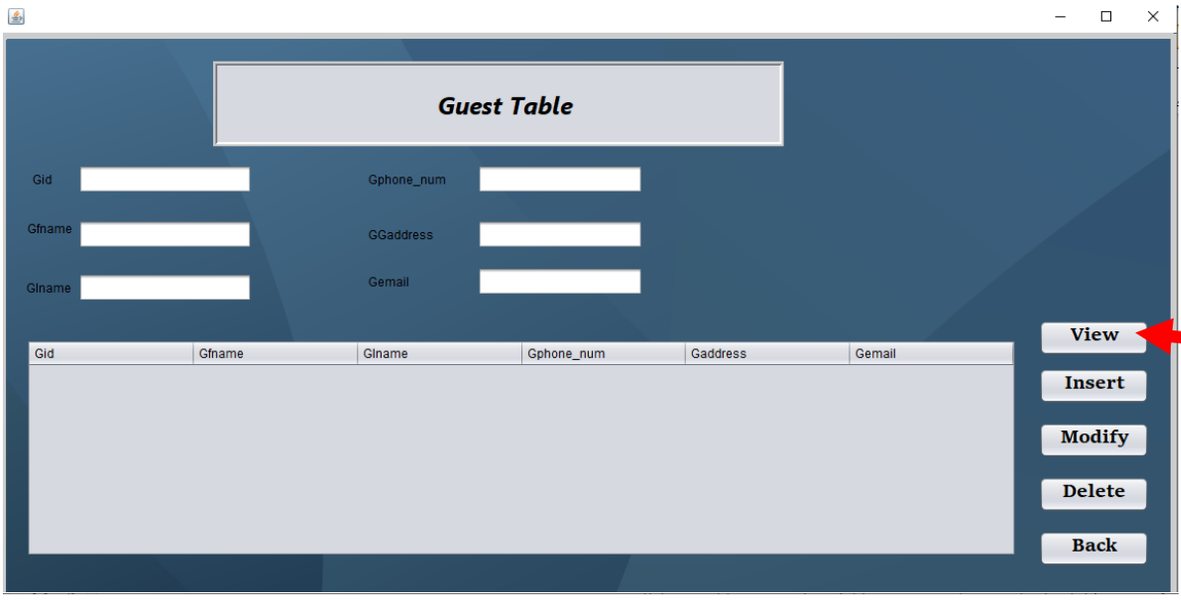
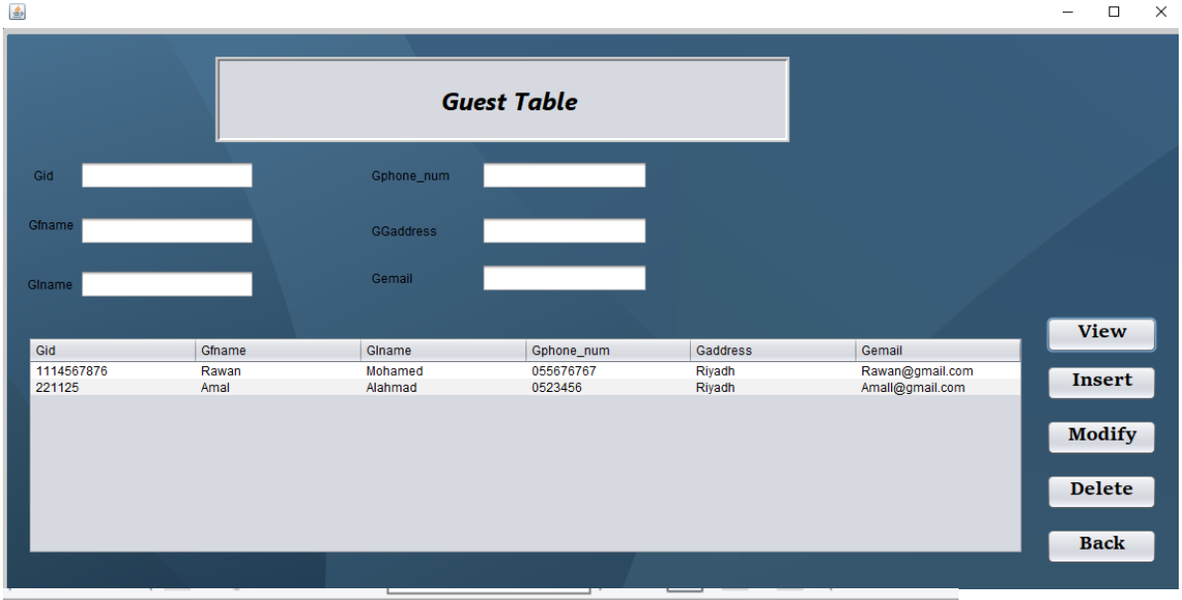
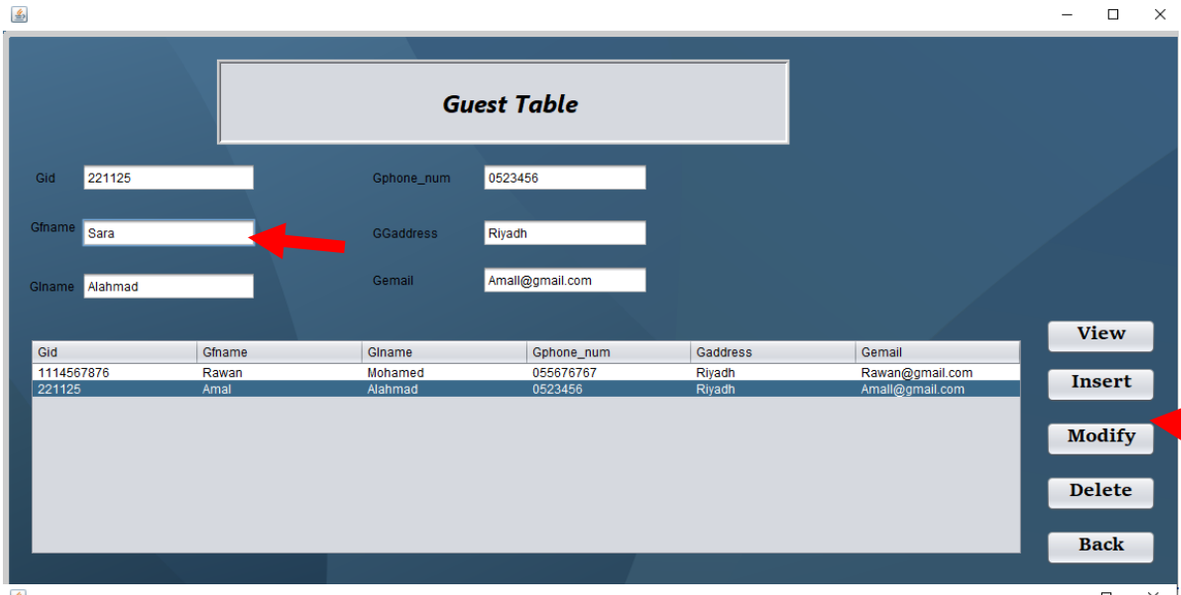
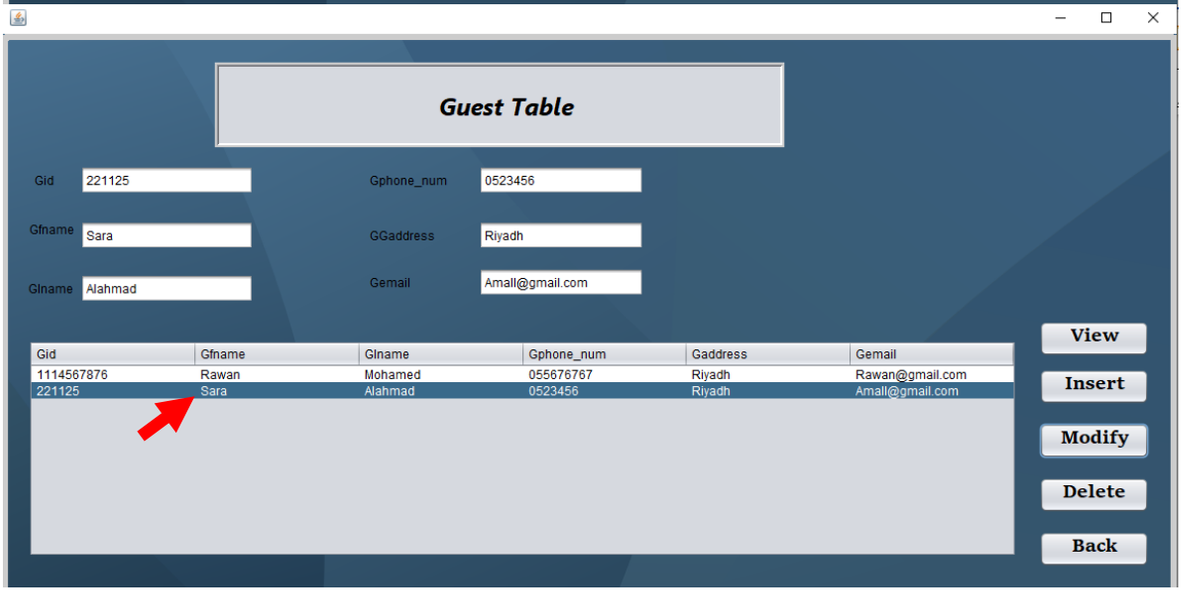




	Gid	Gfname	Glname	Gphone_num	Gaddress	Gemail
▶	1114567876	Rawan	Mohamed	055676767	Riyadh	Rawan@gmail.com
	221125	Amal	Alahmad	0523456	Riyadh	Amall@gmail.com
*	NULL	NULL	NULL	NULL	NULL	NULL

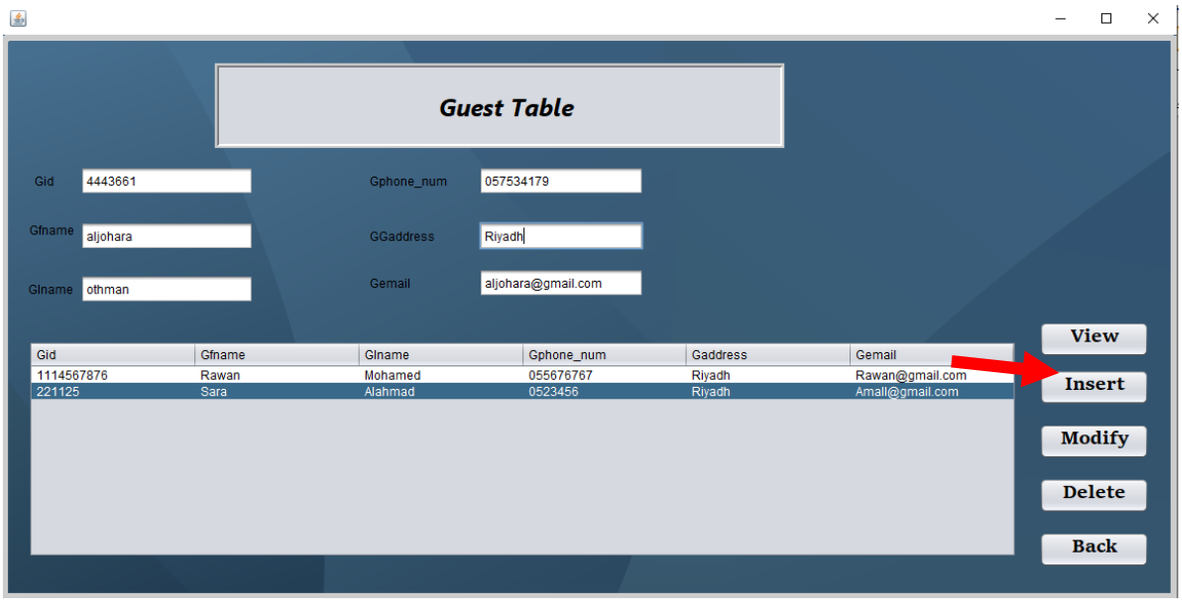
MODIFY:

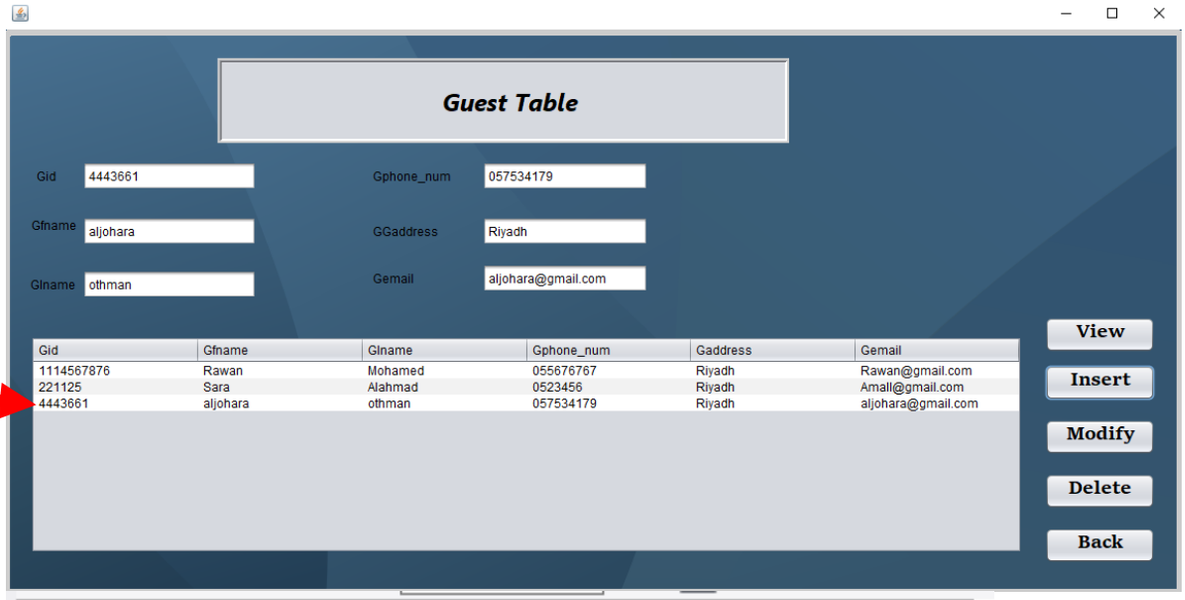




Gid	Gfname	Glname	Gphone_num	Gaddress	Gemail
1114567876	Rawan	Mohamed	055676767	Riyadh	Rawan@gmail.com
221125	Sara	Alahmad	0523456	Riyadh	Amall@gmail.com
NULL	NULL	NULL	NULL	NULL	NULL

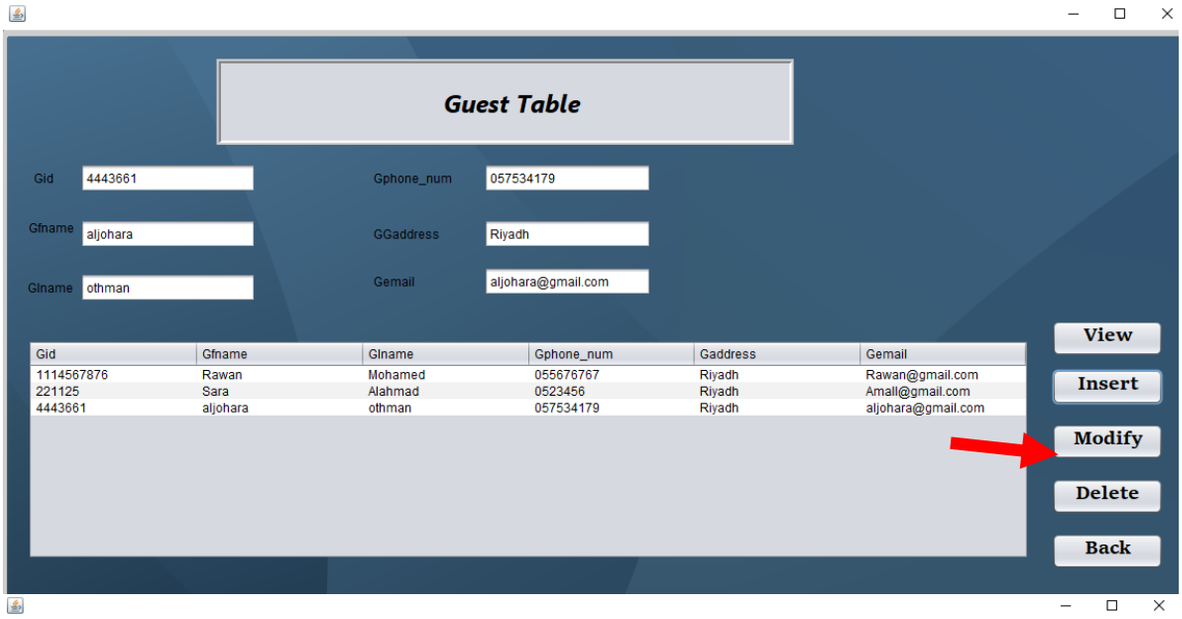
INSERT:

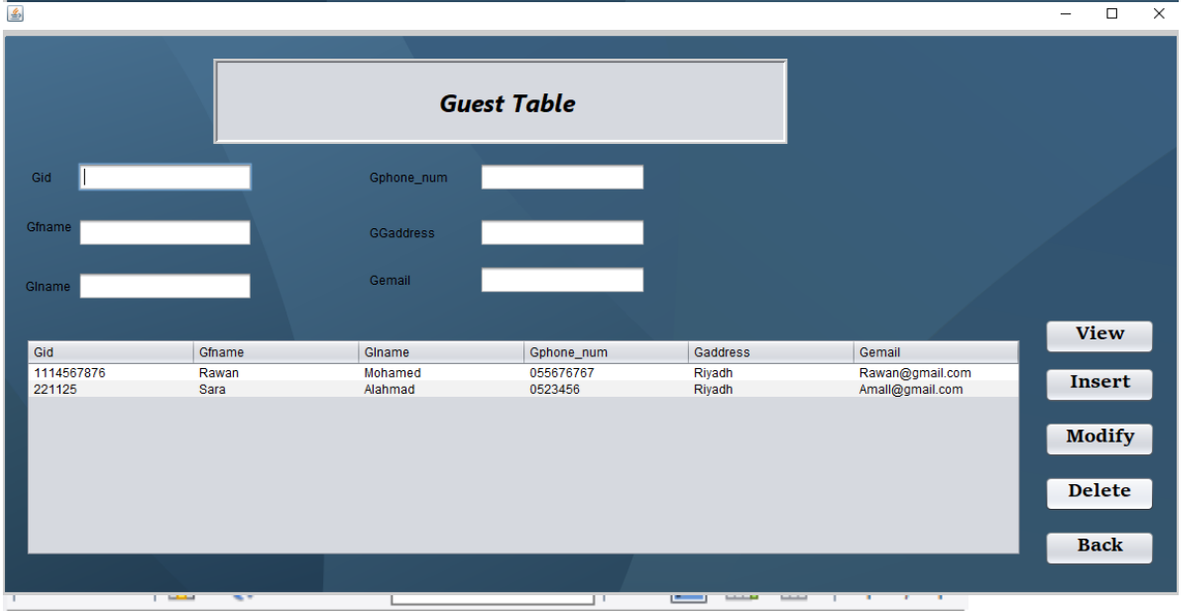


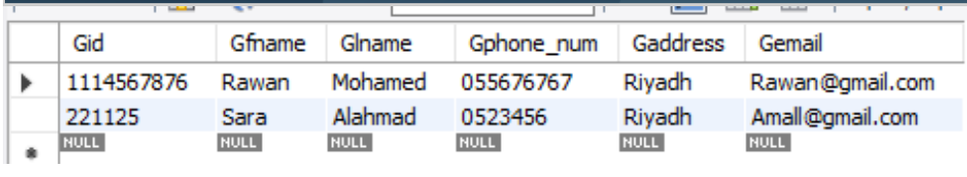


Gid	Gfname	Glname	Gphone_num	Gaddress	Gemail
1114567876	Rawan	Mohamed	055676767	Riyadh	Rawan@gmail.com
221125	Sara	Alahmad	0523456	Riyadh	Amall@gmail.com
4443661	aljohara	othman	057534179	Riyadh	aljohara@gmail.com
NULL	NULL	NULL	NULL	NULL	NULL

DELETE:

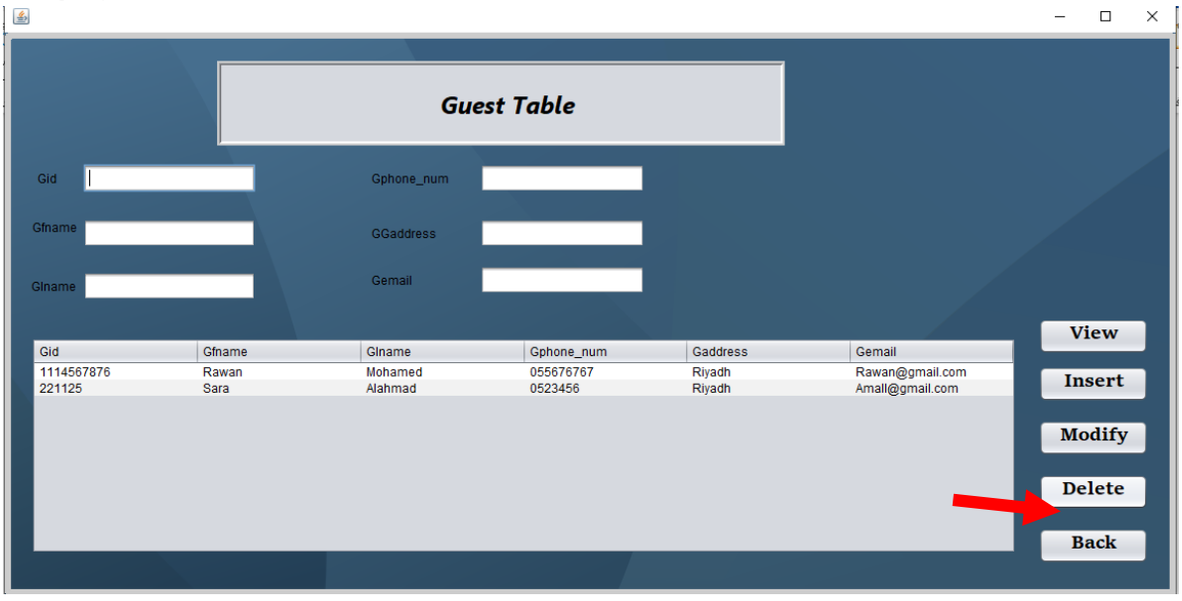


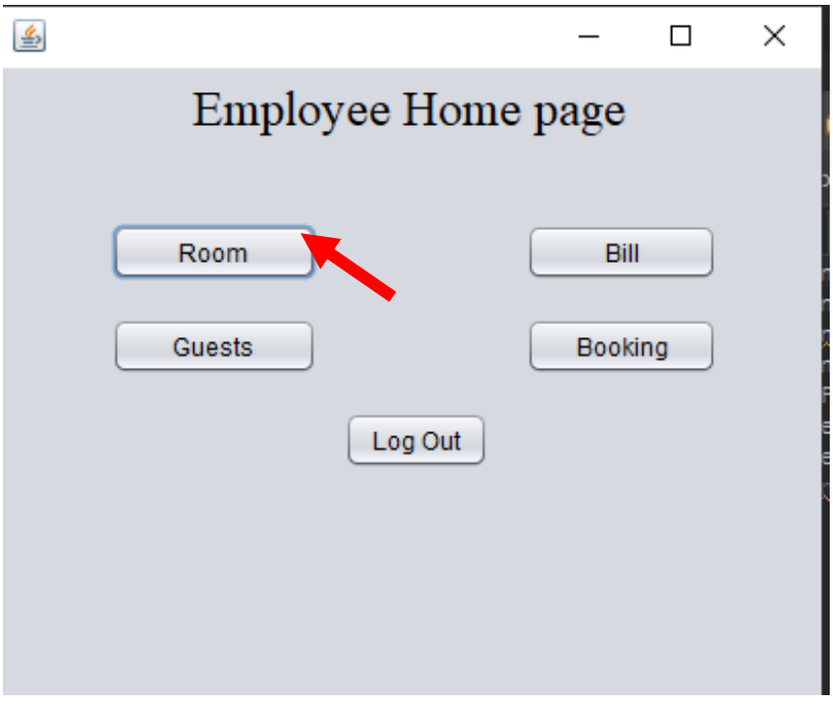




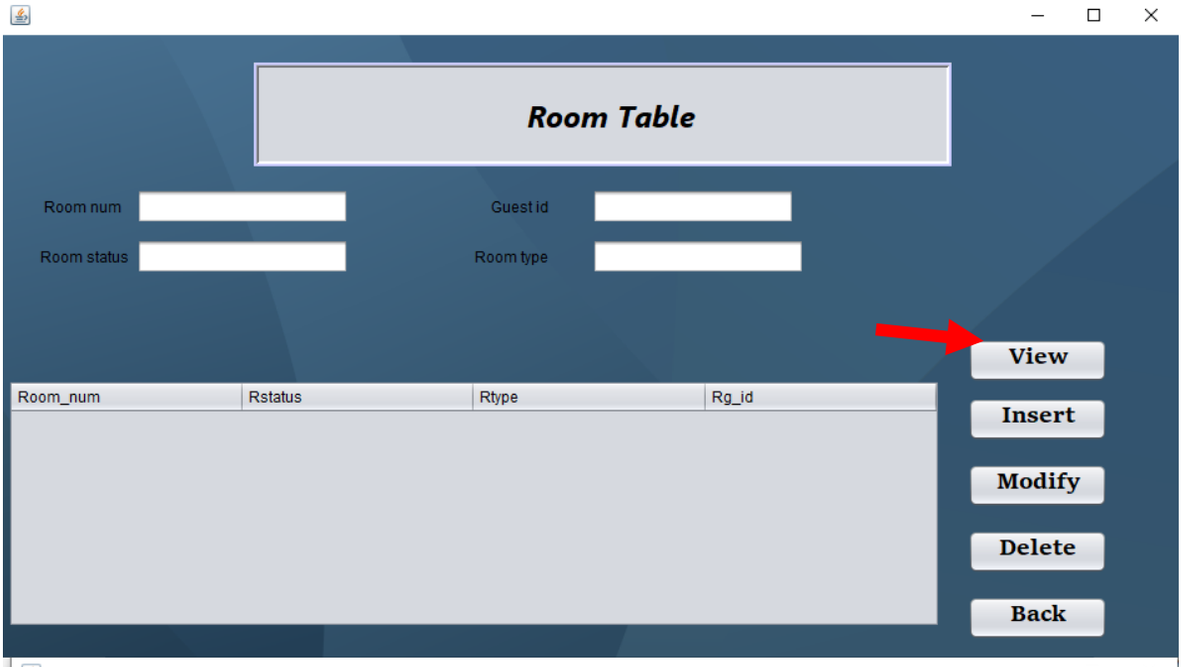
Gid	Gfname	Glname	Gphone_num	Gaddress	Gemail
1114567876	Rawan	Mohamed	055676767	Riyadh	Rawan@gmail.com
221125	Sara	Alahmad	0523456	Riyadh	Amall@gmail.com
NULL	NULL	NULL	NULL	NULL	NULL

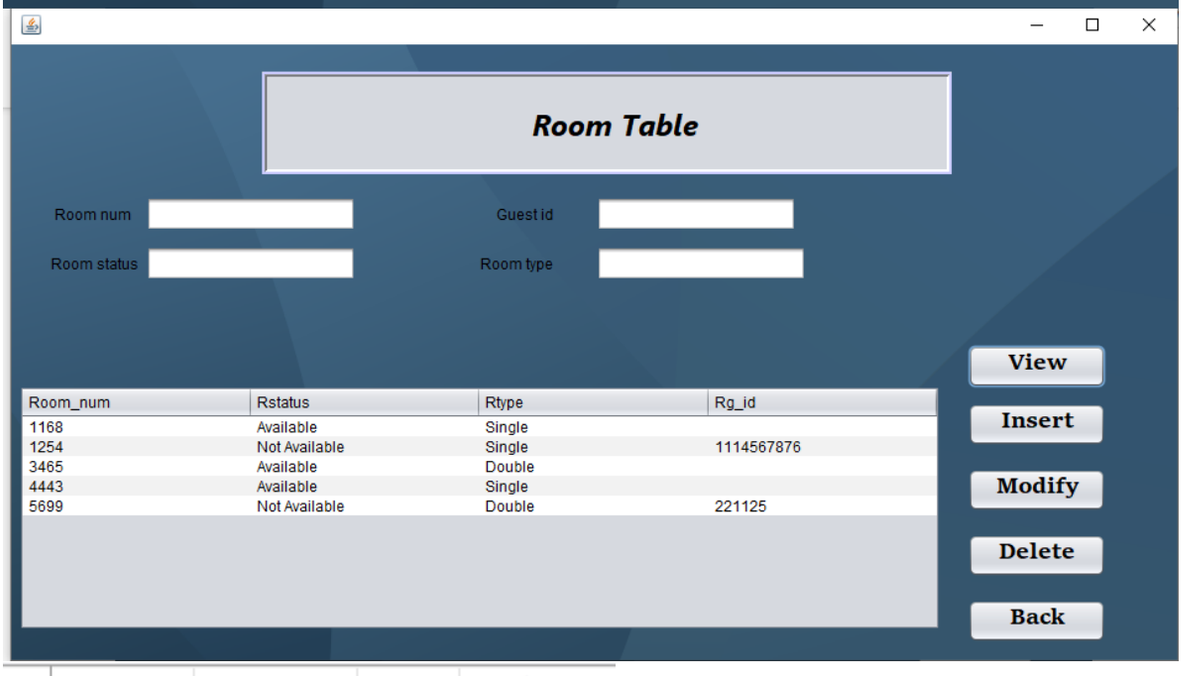
BACK:


Guest Table
Gid
Gfname
Glname
Gphone_num
GGaddress
Gemail
Gid Gfname Glname Gphone_num Gaddress Gemail
1114567876 Rawan Mohamed 055676767 Riyadh Rawan@gmail.com
221125 Sara Alahmad 0523456 Riyadh Amall@gmail.com
View
Insert
Modify
Delete
Back


Employee Home page
Room
Bill
Guests
Booking
Log Out

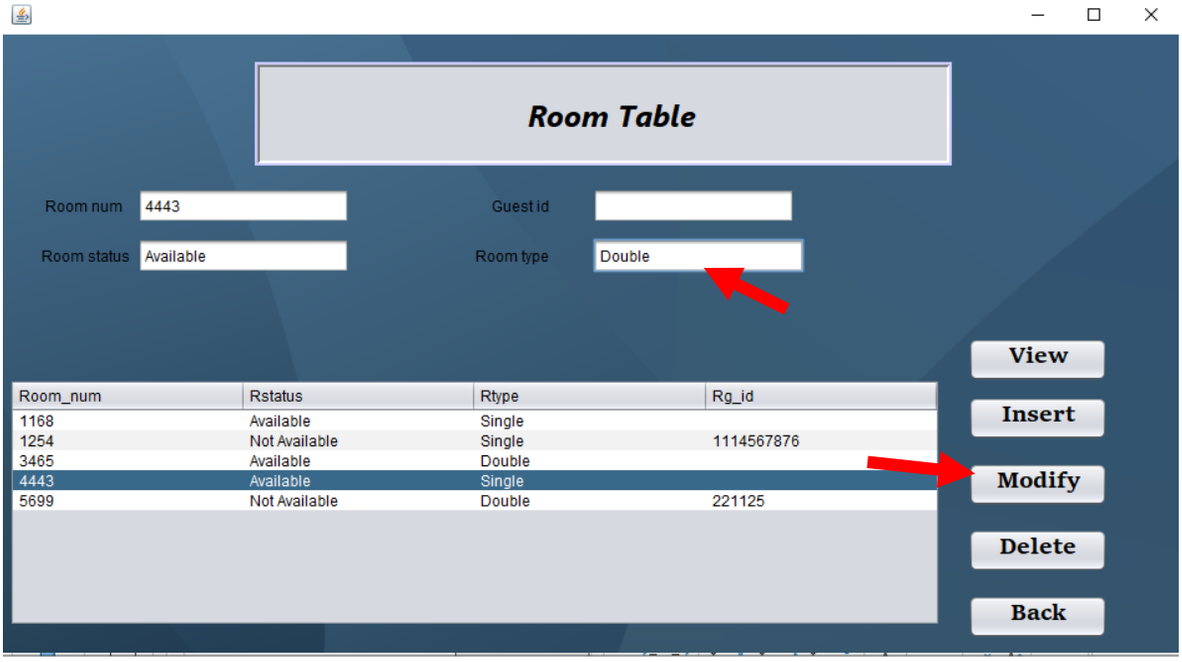
VIEW:

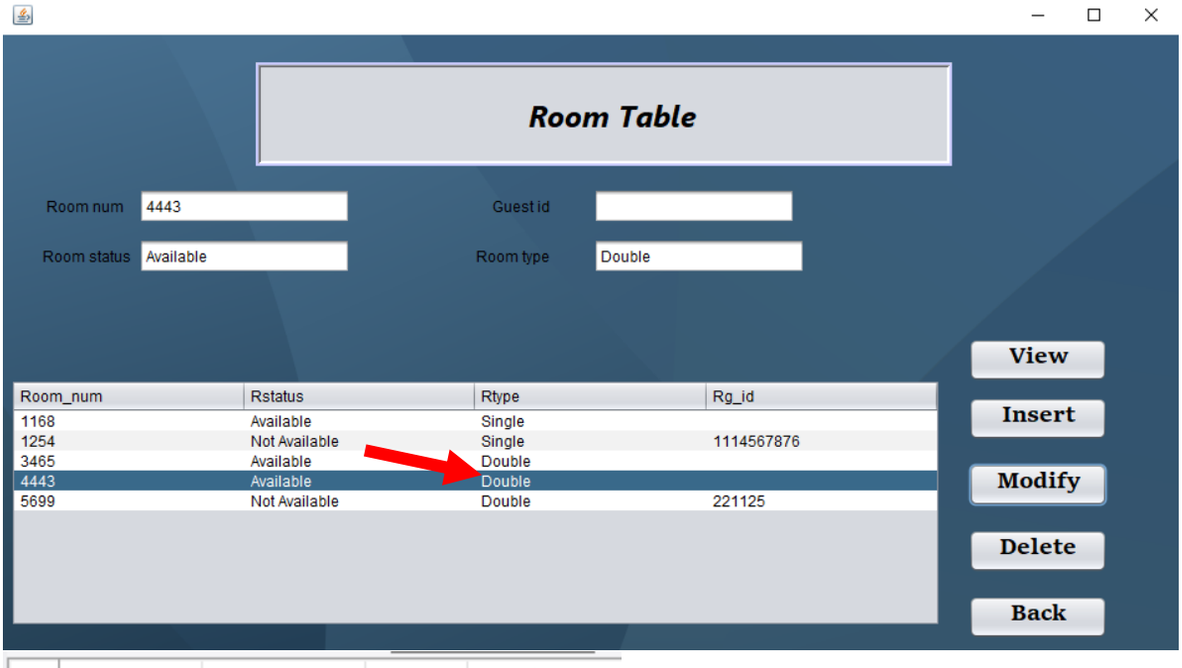




Room_num	Rstatus	Rtype	Rg_id
1168	Available	Single	NULL
1254	Not Available	Single	1114567876
3465	Available	Double	NULL
4443	Available	Single	NULL
5699	Not Available	Double	221125
NULL	NULL	NULL	NULL

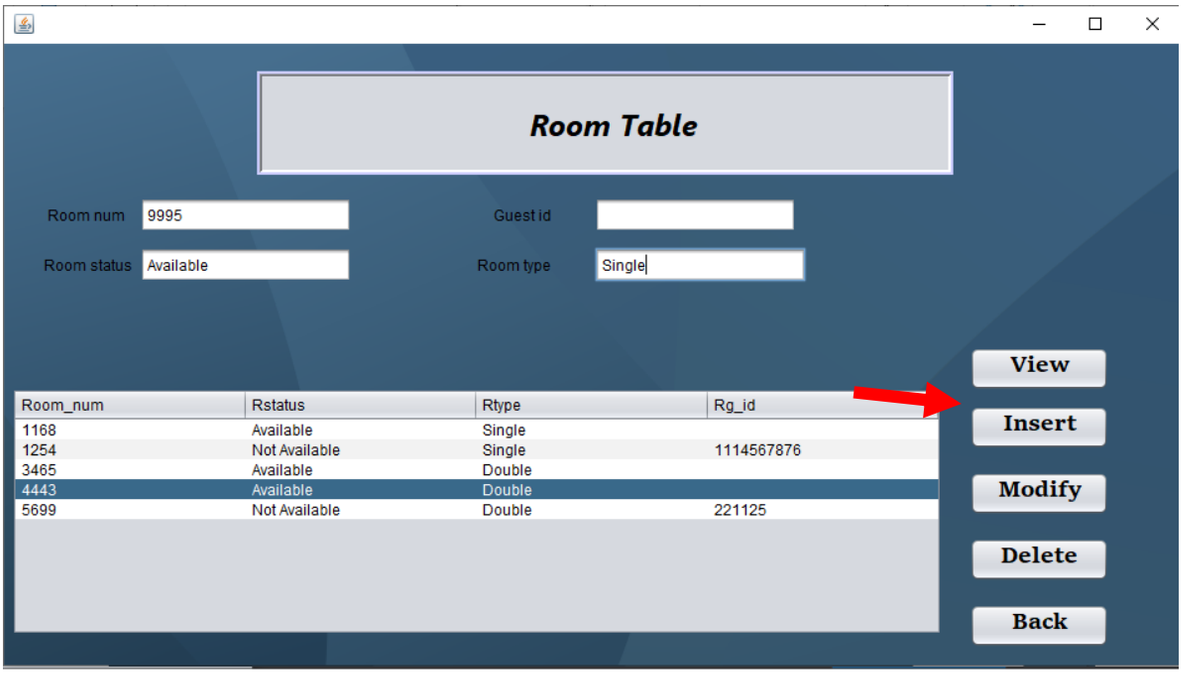
MODIFY:

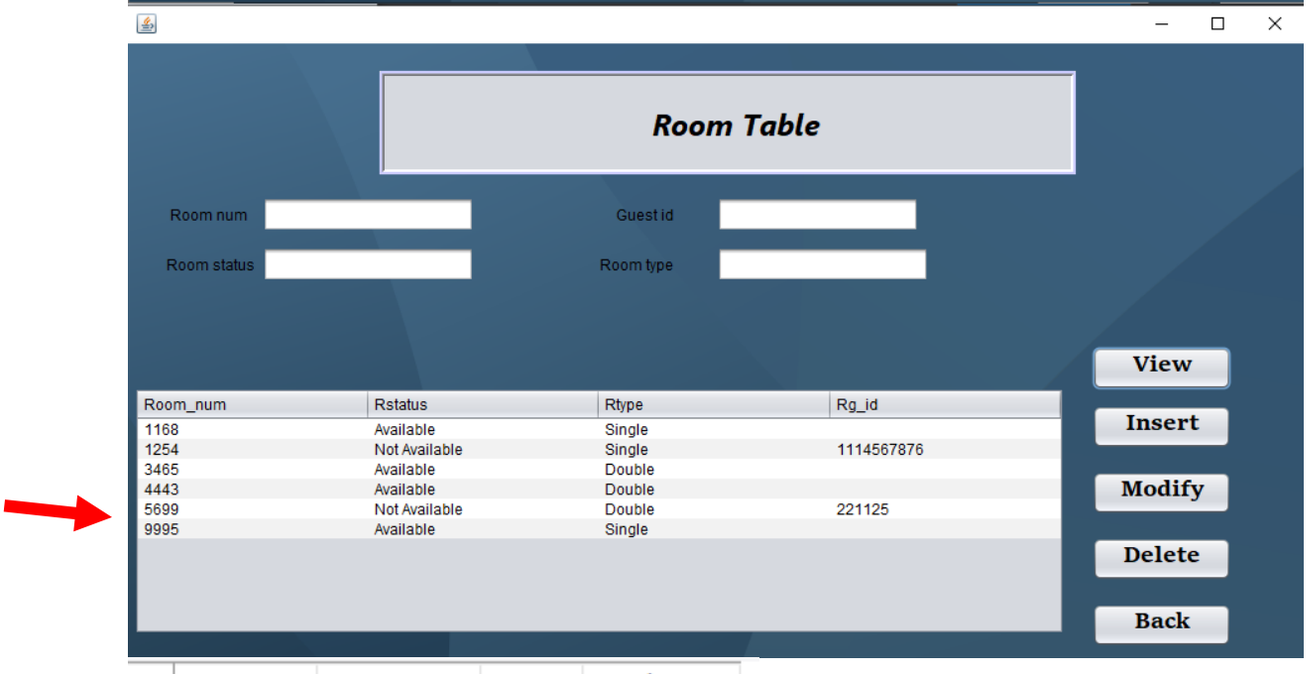




Room_num	Rstatus	Rtype	Rg_id
1168	Available	Single	NULL
1254	Not Available	Single	1114567876
3465	Available	Double	NULL
4443	Available	Double	NULL
5699	Not Available	Double	221125
NULL	NULL	NULL	NULL

INSERT:





Room_num	Rstatus	Rtype	Rg_id
1168	Available	Single	NULL
1254	Not Available	Single	1114567876
3465	Available	Double	NULL
4443	Available	Double	NULL
5699	Not Available	Double	221125
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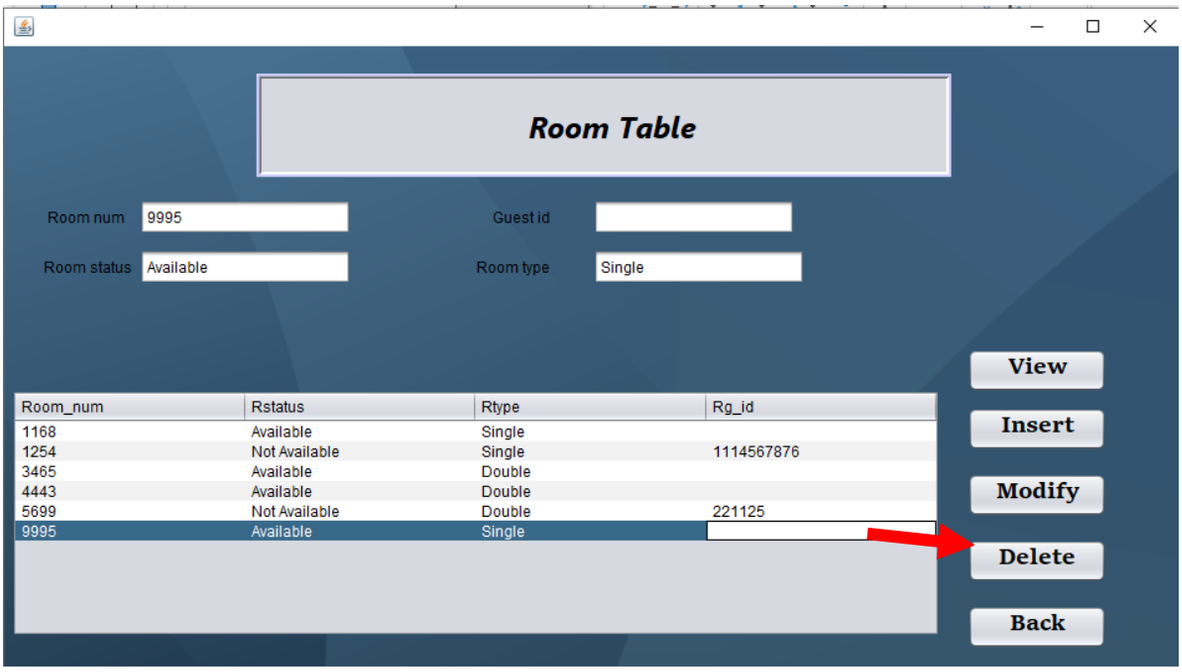
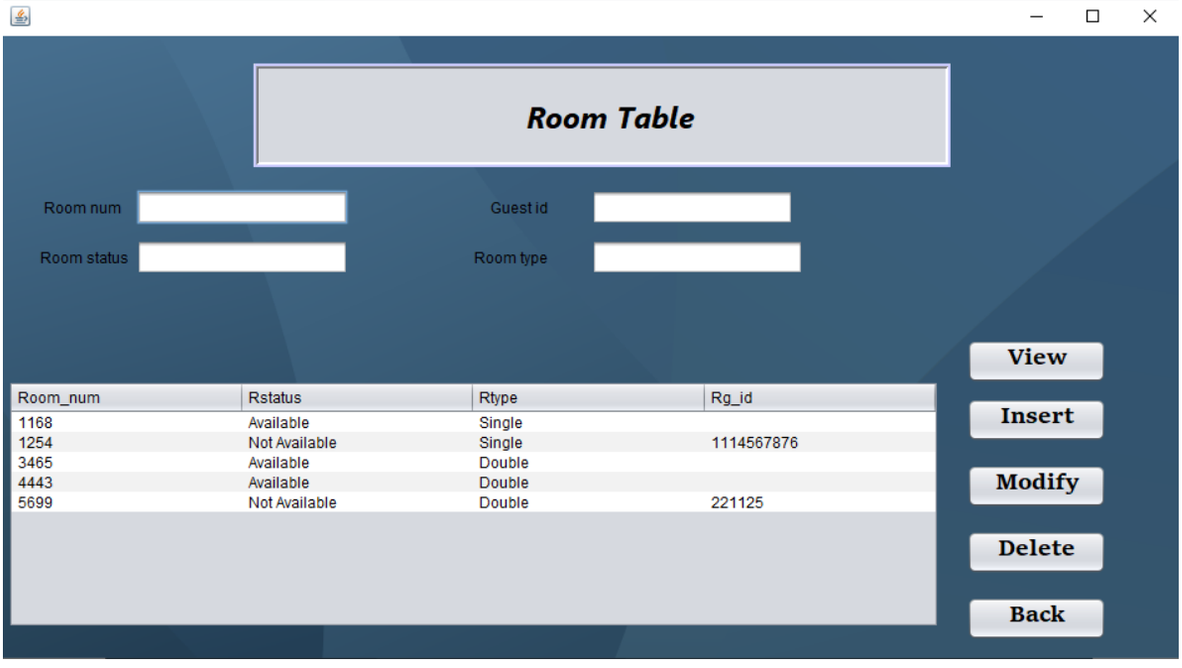

Room Table
Room num
9995
Guest id
Room status
Available
Room type
Single
View
Insert
Modify
Delete
Back
Room_num
Rstatus
Rtype
Rg_id
1168
Available
Single
1254
Not Available
Single
1114567876
3465
Available
Double
4443
Available
Double
5699
Not Available
Double
221125
9995
Available
Single


Room Table
Room num
Guest id
Room status
Room type
View
Insert
Modify
Delete
Back
Room_num
Rstatus
Rtype
Rg_id
1168
Available
Single
1254
Not Available
Single
1114567876
3465
Available
Double
4443
Available
Double
5699
Not Available
Double
221125

Difficulties

- *In phase #4 in connecting the DBMS(MySQL) to java*
- *Implementing GUI*

References

[1] Ramez Elmasri, H. B. N. (2015). Fundamentals of Database Systems Pearson. Pearson. https://iran-lms.com/images/images/Books/PDF/Fundamentals-of-Database- Systems-Pearson-2015-Ramez-Elmasri-Shamkant-B.-Navathe.pdf

[2] Supervisee. (n.d.). Wiktionary.Org. Retrieved May 21, 2022, from https://en.wiktionary.org/wiki/supervisee

[3] https://drawio-app.com/