M.Sc. (Five Year Integrated) in Computer Science (Artificial Intelligence & Data Science)

Second Semester

Laboratory Record

21-805-0307: DATABASE SYSTEMS LAB

Submitted in partial fulfillment
of the requirements for the award of degree in
Master of Science (Five Year Integrated)
in Computer Science (Artificial Intelligence & Data Science) of
Cochin University of Science and Technology (CUSAT)
Kochi

Submitted by

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DEPARTMENT OF COMPUTER SCIENCE

COCHIN UNIVERSITY OF SCIENCE AND TECHNOLOGY (CUSAT)

KOCHI, KERALA-682022

This is to certify that the software laboratory record for ***21-805-0307: Database Systems Lab*** *is a record of work carried out by* ***ATHIRA MOHANDAS(80521007)****, in partial fulfillment of the requirements for the award of degree in* ***Master of Science (Five Year Integrated)*** *in* ***Computer Science (Artificial Intelligence & Data Science)*** *of Cochin University of Science and Technology (CUSAT), Kochi. The lab record has been approved as it satisfies the academic requirements in respect of the second semester laboratory prescribed for the Master of Science (Five Year Integrated) in Computer Science degree.*

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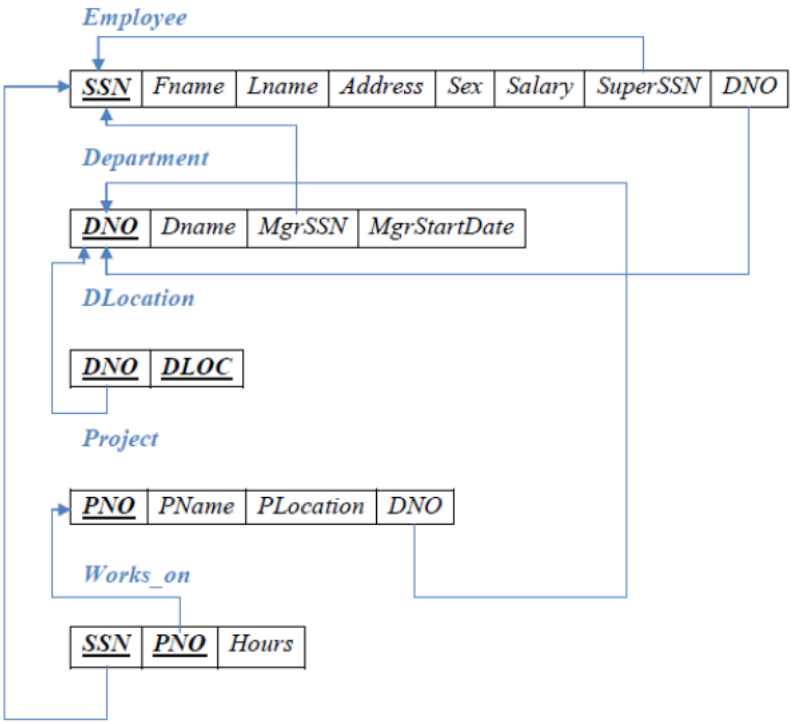
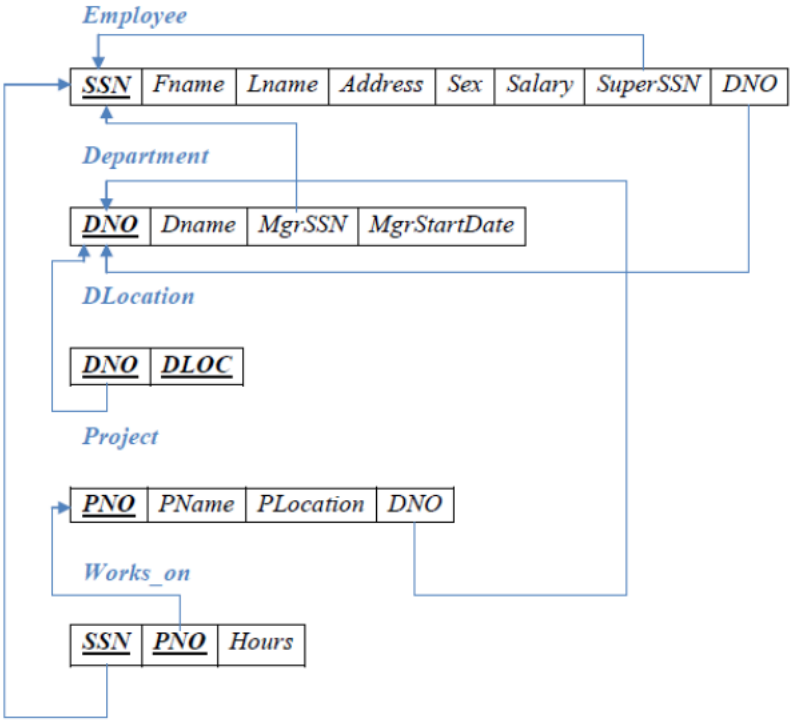
SCHEMA DIAGRAM



ER DIAGRAM



DDL COMMANDS

AIM

Develop SQL Queries to execute and verify the Data Definition Language commands and also implement Data Constraints.

Questions : 1

Create five tables using constraints like primary key, not null, check, default, null, unique, foreign key as per the above schema

QUERY

```
mysql> use COMPANY;
Database changed

mysql> create table Employee(SSN varchar(20) primary key not null,Fname varchar(20),
Lname varchar(20) null,Address varchar(20),Sex varchar(20) default 'Male',
Salary int(20) check(Salary>5000),SuperSSN varchar(20) unique,DNO varchar(20));

Query OK, 0 rows affected, 1 warning (0.05 sec)

mysql> create table Department(DNO varchar(20) primary key,Dname varchar(20),
MgrSSN varchar(20),MgrStartDate date not null);

Query OK, 0 rows affected (0.03 sec)

mysql> create table DLocation(DNO varchar(20) primary key,DLOC varchar(20));

Query OK, 0 rows affected (0.02 sec)

mysql> create table Project(PNO varchar(20) primary key,Pname varchar(20),
Plocation varchar(20),DNO varchar(20),constraint dno_project foreign key(DNO)
references Department(DNO));

Query OK, 0 rows affected (0.04 sec)

mysql> create table WORKS_ON(SSN varchar(20) primary key,PNO varchar(20),Hours int(20));

Query OK, 0 rows affected, 1 warning (0.02 sec)
```

DATABASE TABLES

```
mysql> desc Employee;
+----------+-------------+------+-----+---------+-------+
| Field    | Type        | Null | Key | Default | Extra |
+----------+-------------+------+-----+---------+-------+
| SSN      | varchar(20) | NO   | PRI | NULL    |       |
| Fname    | varchar(20) | YES  |     | NULL    |       |
| Lname    | varchar(20) | YES  |     | NULL    |       |
| Address  | varchar(20) | YES  |     | NULL    |       |
| Sex      | varchar(20) | YES  |     | Male    |       |
| Salary   | int         | YES  |     | NULL    |       |
| SuperSSN | varchar(20) | YES  | UNI | NULL    |       |
| DNO      | varchar(20) | YES  |     | NULL    |       |
+----------+-------------+------+-----+---------+-------+
mysql> desc Department;
+--------------+-------------+------+-----+---------+-------+
| Field        | Type        | Null | Key | Default | Extra |
+--------------+-------------+------+-----+---------+-------+
| DNO          | varchar(20) | NO   | PRI | NULL    |       |
| Dname        | varchar(20) | YES  |     | NULL    |       |
| MgrSSN       | varchar(20) | YES  |     | NULL    |       |
| MgrStartDate | date        | NO   |     | NULL    |       |
+--------------+-------------+------+-----+---------+-------+
mysql> desc DLocation;
+-------+-------------+------+-----+---------+-------+
| Field | Type        | Null | Key | Default | Extra |
+-------+-------------+------+-----+---------+-------+
| DNO   | varchar(20) | NO   | PRI | NULL    |       |
| DLOC  | varchar(20) | YES  |     | NULL    |       |
+-------+-------------+------+-----+---------+-------+
mysql> desc Project;
+-----------+-------------+------+-----+---------+-------+
| Field     | Type        | Null | Key | Default | Extra |
+-----------+-------------+------+-----+---------+-------+
| PNO       | varchar(20) | NO   | PRI | NULL    |       |
| Pname     | varchar(20) | YES  |     | NULL    |       |
| Plocation | varchar(20) | YES  |     | NULL    |       |
| DNO       | varchar(20) | YES  | MUL | NULL    |       |
+-----------+-------------+------+-----+---------+-------+
mysql> desc WORKS_ON;
+-------+-------------+------+-----+---------+-------+
| Field | Type        | Null | Key | Default | Extra |
+-------+-------------+------+-----+---------+-------+
| SSN   | varchar(20) | NO   | PRI | NULL    |       |
| PNO   | varchar(20) | YES  |     | NULL    |       |
| Hours | int         | YES  |     | NULL    |       |
+-------+-------------+------+-----+---------+-------+
```

Questions : 2

Add another column Age with datatype integer in employee table

QUERY

```
mysql> alter table Employee add(Age integer);

Query OK, 0 rows affected (0.02 sec)
Records: 0  Duplicates: 0  Warnings: 0
```

DATABASE TABLES

```
mysql> desc Employee;
+----------+-------------+------+-----+---------+-------+
| Field    | Type        | Null | Key | Default | Extra |
+----------+-------------+------+-----+---------+-------+
| SSN      | varchar(20) | NO   | PRI | NULL    |       |
| Fname    | varchar(20) | YES  |     | NULL    |       |
| Lname    | varchar(20) | YES  |     | NULL    |       |
| Address  | varchar(20) | YES  |     | NULL    |       |
| Sex      | varchar(20) | YES  |     | Male    |       |
| Salary   | int         | YES  |     | NULL    |       |
| SuperSSN | varchar(20) | YES  | UNI | NULL    |       |
| DNO      | varchar(20) | YES  |     | NULL    |       |
| Age      | int         | YES  |     | NULL    |       |
+----------+-------------+------+-----+---------+-------+
```

Questions : 3

Drop a table named Project

QUERY

```
mysql> drop table Project;

Query OK, 0 rows affected (0.02 sec)
```

DATABASE TABLES

```
mysql> desc Project;
ERROR 1146 (42S02): Table 'company.project' doesn't exist
```

Questions : 4

Truncate a table named WORKS_ON

QUERY

```
mysql> Truncate table WORKS_ON;

Query OK, 0 rows affected (0.03 sec)
```

DATABASE TABLES

```
mysql> desc WORKS_ON;
+-------+-------------+------+-----+---------+-------+
| Field | Type        | Null | Key | Default | Extra |
+-------+-------------+------+-----+---------+-------+
| SSN   | varchar(20) | NO   | PRI | NULL    |       |
| PNO   | varchar(20) | YES  |     | NULL    |       |
| Hours | int         | YES  |     | NULL    |       |
+-------+-------------+------+-----+---------+-------+
3 rows in set (0.00 sec)

mysql> select * from WORKS_ON;
Empty set (0.01 sec)
```

Questions : 5

View the structure of the table Department

QUERY

```
mysql> desc Department;
```

DATABASE TABLES

```
+--------------+-------------+------+-----+---------+-------+
| Field        | Type        | Null | Key | Default | Extra |
+--------------+-------------+------+-----+---------+-------+
| DNO          | varchar(20) | NO   | PRI | NULL    |       |
| Dname        | varchar(20) | YES  |     | NULL    |       |
| MgrSSN       | varchar(20) | YES  |     | NULL    |       |
| MgrStartDate | date        | NO   |     | NULL    |       |
+--------------+-------------+------+-----+---------+-------+
4 rows in set (0.00 sec)
```

DML COMMANDS

AIM

Develop SQL Queries to execute and verify the Data Manipulation Language commands.

Questions : 1

Insert five records in the tables as per the above schema

QUERY

```
mysql> insert into Employee values('e001','Arun','Kumar','Kochi','Male',20000,'s1001',
'd01',25);
Query OK, 1 row affected (0.02 sec)

mysql> insert into Employee values('e002','Ann','Susan','Chennai','Female',25000,'s1002',
'd02',23);
Query OK, 1 row affected (0.01 sec)

mysql> insert into Employee values('e003','Anu','Priya','Chennai','Female',18000,'s1003',
'd03',23);
Query OK, 1 row affected (0.01 sec)

mysql> insert into Employee values('e004','Sidharth','Shukla','Pune','Male',17000,
's1004','d04',22);
Query OK, 1 row affected (0.01 sec)

mysql> insert into Employee values('e005','Ali','Khan','Mumbai','Male',30000,'s1005',
'd04',22);
Query OK, 1 row affected (0.01 sec)

mysql> insert into Department values("d01","Sales","m1001","2020-12-03");
Query OK, 1 row affected (0.01 sec)

mysql> insert into Department values("d02","Finance","m1002","2022-10-13");
Query OK, 1 row affected (0.01 sec)

mysql> insert into Department values("d03","Marketing","m1003","2021-11-04");
Query OK, 1 row affected (0.01 sec)

mysql> insert into Department values("d04","HR","m1004","2021-01-02");
Query OK, 1 row affected (0.01 sec)
```

```
mysql> insert into Department values("d05","Designing","m1005","2022-02-12");
Query OK, 1 row affected (0.01 sec)

mysql> insert into DLocation values("d01","Chennai");
Query OK, 1 row affected (0.01 sec)

mysql> insert into DLocation values("d02","Pune");
Query OK, 1 row affected (0.01 sec)

mysql> insert into DLocation values("d03","Banglore");
Query OK, 1 row affected (0.01 sec)

mysql> insert into DLocation values("d04","Pune");
Query OK, 1 row affected (0.00 sec)

mysql> insert into DLocation values("d05","Chennai");
Query OK, 1 row affected (0.01 sec)

mysql> insert into Project values("p1001","Project Zen","Chennai","d01");
Query OK, 1 row affected (0.01 sec)

mysql> insert into Project values("p1002","Project Breeze","Mumbai","d02");
Query OK, 1 row affected (0.00 sec)

mysql> insert into Project values("p1003","Project Mecha","Mumbai","d03");
Query OK, 1 row affected (0.01 sec)

mysql> insert into Project values("p1004","Project Program","Banglore","d04");
Query OK, 1 row affected (0.01 sec)

mysql> insert into Project values("p1005","Project Dynamite","Chennai","d05");
Query OK, 1 row affected (0.01 sec)

mysql> insert into WORKS_ON values("e1001","p1001",4);
Query OK, 1 row affected (0.02 sec)

mysql> insert into WORKS_ON values("e1002","p1002",5);
Query OK, 1 row affected (0.01 sec)

mysql> insert into WORKS_ON values("e1003","p1003",3);
```

```
Query OK, 1 row affected (0.01 sec)

mysql> insert into WORKS_ON values("e1004","p1004",5);
Query OK, 1 row affected (0.01 sec)

mysql> insert into WORKS_ON values("e1005","p1005",6);
Query OK, 1 row affected (0.01 sec)
```

Questions : 2

Display the entire content of the tables as per the above schema

QUERY

```
mysql> select * from Employee;
mysql> select * from Department;
mysql> select * from DLocation;
mysql> select * from Project;
mysql> select * from WORKS_ON;
```

DATABASE TABLES

```
mysql> select * from Employee;
+------+----------+--------+---------+--------+--------+----------+------+------+
| SSN  | Fname    | Lname  | Address | Sex    | Salary | SuperSSN | DNO  | Age  |
+------+----------+--------+---------+--------+--------+----------+------+------+
| e001 | Arun     | Kumar  | Kochi   | Male   |  20000 | s1001    | d01  |   25 |
| e002 | Ann      | Susan  | Chennai | Female |  25000 | s1002    | d02  |   23 |
| e003 | Anu      | Priya  | Chennai | Female |  18000 | s1003    | d03  |   23 |
| e004 | Sidharth | Shukla | Pune    | Male   |  17000 | s1004    | d04  |   22 |
| e005 | Ali      | Khan   | Mumbai  | Male   |  30000 | s1005    | d04  |   22 |
+------+----------+--------+---------+--------+--------+----------+------+------+
5 rows in set (0.00 sec)

mysql> select * from Department;
+-----+-----------+--------+--------------+
| DNO | Dname     | MgrSSN | MgrStartDate |
+-----+-----------+--------+--------------+
| d01 | Sales     | m1001  | 2020-12-03   |
| d02 | Finance   | m1002  | 2022-10-13   |
| d03 | Marketing | m1003  | 2021-11-04   |
| d04 | HR        | m1004  | 2021-01-02   |
| d05 | Designing | m1005  | 2022-02-12   |
+-----+-----------+--------+--------------+
5 rows in set (0.00 sec)
```

```
mysql> select * from DLocation;
+-----+----------+
| DNO | DLOC     |
+-----+----------+
| d01 | Chennai  |
| d02 | Pune     |
| d03 | Banglore |
| d04 | Pune     |
| d05 | Chennai  |
+-----+----------+
5 rows in set (0.00 sec)

mysql>  select * from Project;
+-------+------------------+-----------+------+
| PNO   | Pname            | Plocation | DNO  |
+-------+------------------+-----------+------+
| p1001 | Project Zen      | Chennai   | d01  |
| p1002 | Project Breeze   | Mumbai    | d02  |
| p1003 | Project Mecha    | Mumbai    | d03  |
| p1004 | Project Program  | Banglore  | d04  |
| p1005 | Project Dynamite | Chennai   | d05  |
+-------+------------------+-----------+------+
5 rows in set (0.00 sec)

mysql> select * from WORKS_ON;
+-------+-------+-------+
| SSN   | PNO   | Hours |
+-------+-------+-------+
| e1001 | p1001 |     4 |
| e1002 | p1002 |     5 |
| e1003 | p1003 |     3 |
| e1004 | p1004 |     5 |
| e1005 | p1005 |     6 |
+-------+-------+-------+
5 rows in set (0.00 sec)
```

Questions : 3

Modify the salary of the employee as 25000 whose SSN is e001

QUERY

```
mysql> update Employee set Salary=25000 where SSN = 'e001';
Query OK, 1 row affected (0.02 sec)
Rows matched: 1  Changed: 1  Warnings: 0
```

DATABASE TABLES

```
mysql> select * from Employee;
+------+----------+--------+---------+--------+--------+----------+------+------+
| SSN  | Fname    | Lname  | Address | Sex    | Salary | SuperSSN | DNO  | Age  |
+------+----------+--------+---------+--------+--------+----------+------+------+
| e001 | Arun     | Kumar  | Kochi   | Male   |  25000 | s1001    | d01  |   25 |
| e002 | Ann      | Susan  | Chennai | Female |  25000 | s1002    | d02  |   23 |
| e003 | Anu      | Priya  | Chennai | Female |  18000 | s1003    | d03  |   23 |
| e004 | Sidharth | Shukla | Pune    | Male   |  17000 | s1004    | d04  |   22 |
| e005 | Ali      | Khan   | Mumbai  | Male   |  30000 | s1005    | d04  |   22 |
+------+----------+--------+---------+--------+--------+----------+------+------+
5 rows in set (0.00 sec)
```

Questions : 4

Delete the details of the employee whose SSN is "e002"

QUERY

```
mysql> delete from Employee where SSN="e002";
Query OK, 1 row affected (0.01 sec)
```

DATABASE TABLES

```
mysql> select * from Employee;
+------+----------+--------+---------+--------+--------+----------+------+------+
| SSN  | Fname    | Lname  | Address | Sex    | Salary | SuperSSN | DNO  | Age  |
+------+----------+--------+---------+--------+--------+----------+------+------+
| e001 | Arun     | Kumar  | Kochi   | Male   |  25000 | s1001    | d01  |   25 |
| e003 | Anu      | Priya  | Chennai | Female |  18000 | s1003    | d03  |   23 |
| e004 | Sidharth | Shukla | Pune    | Male   |  17000 | s1004    | d04  |   22 |
| e005 | Ali      | Khan   | Mumbai  | Male   |  30000 | s1005    | d04  |   22 |
+------+----------+--------+---------+--------+--------+----------+------+------+
4 rows in set (0.00 sec)
```

DCL COMMANDS

AIM

Develop SQL Queries to implement Data Control Language commands

Questions : 1

To grant a SELECT permission on employee table to user1

QUERY

```
mysql> create user 'user1'@'localhost' identified by 'password';
Query OK, 0 rows affected (0.01 sec)

mysql> grant select on COMPANY.EMPLOYEE to 'user1'@'localhost';
Query OK, 0 rows affected (0.01 sec)
```

DATABASE TABLES

```
mysql> show grants for 'user1'@'localhost';
+-----------------------------------------------------------+
| Grants for user1@localhost                                |
+-----------------------------------------------------------+
| GRANT USAGE ON *.* TO `user1`@`localhost`                  |
| GRANT SELECT ON `company`.`employee` TO `user1`@`localhost` |
+-----------------------------------------------------------+
2 rows in set (0.01 sec)
```

Questions : 2

Revoking a privilege to all users in a table

QUERY

```
mysql> grant all on COMPANY.EMPLOYEE to 'user1'@'localhost';
Query OK, 0 rows affected (0.01 sec)

mysql> Revoke all on EMPLOYEE from 'user1'@'localhost';
Query OK, 0 rows affected (0.00 sec)
```

DATABASE TABLES

```
mysql> show grants for 'user1'@'localhost';
+-----------------------------------------+
| Grants for user1@localhost              |
+-----------------------------------------+
| GRANT USAGE ON *.* TO `user1`@`localhost` |
+-----------------------------------------+
1 row in set (0.00 sec)
```

GROUP FUNCTION OR AGGREGATE FUNCTION

AIM

Develop SQL Queries to execute computation on table data with built-in functions

Questions : 1

List the fname of all the employee having 'a' as the second last character in their name.

QUERY

```
mysql> Select Fname from Employee where Fname like '%a_';
```

DATABASE TABLES

```
mysql> Select Fname from Employee where Fname like '%a_';
+-------+
| Fname |
+-------+
| Hanan |
+-------+
1 row in set (0.00 sec)
```

Questions : 2

Count the total number of male and female employees in the Employee table.

QUERY

```
mysql> select Sex,count(*) from Employee group by Sex;
```

DATABASE TABLES

```
mysql> Select Sex,count(*) from Employee group by Sex;
+--------+----------+
| Sex    | count(*) |
+--------+----------+
| Male   |        3 |
| Female |        1 |
+--------+----------+
2 rows in set (0.01 sec)
```

Questions : 3

Calculate the average salary of the female employees.

QUERY

```
mysql> select avg(Salary) from EMPLOYEE where Sex="Female";
```

DATABASE TABLES

```
mysql> Select avg(Salary) from Employee where Sex="Female";
+-------------+
| avg(Salary) |
+-------------+
|  18000.0000 |
+-------------+
1 row in set (0.01 sec)
```

Questions : 4

Calculate the sum of salaries of male employees.

QUERY

```
mysql> select sum(Salary) from Employee where Sex="Male";
```

DATABASE TABLES

```
mysql> select sum(Salary) from Employee where Sex="Male";
+-------------+
| sum(Salary) |
+-------------+
|       72000 |
+-------------+
1 row in set (0.00 sec)
```

Questions : 5

Display the maximum and minimum salaries of male employees.

QUERY

```
mysql> select max(Salary),min(Salary) from Employee where Sex="Male";
```

DATABASE TABLES

```
mysql> select max(Salary),min(Salary) from Employee where Sex="Male";
+-------------+-------------+
| max(Salary) | min(Salary) |
+-------------+-------------+
|       30000 |       17000 |
+-------------+-------------+
1 row in set (0.01 sec)
```

Questions : 6

Display the details of all employees whose salary between 25000 and 50000

QUERY

```
mysql> select * from Employee where Salary between 25000 and 50000;
```

DATABASE TABLES

```
mysql> select * from Employee where Salary between 25000 and 50000;
+------+-------+-------+---------+------+--------+----------+------+------+
| SSN  | Fname | Lname | Address | Sex  | Salary | SuperSSN | DNO  | Age  |
+------+-------+-------+---------+------+--------+----------+------+------+
| e001 | Arun  | Kumar | Kochi   | Male |  25000 | s1001    | d01  |   25 |
| e005 | Hanan | Khan  | Mumbai  | Male |  30000 | s1005    | d04  |   22 |
+------+-------+-------+---------+------+--------+----------+------+------+
2 rows in set (0.01 sec)
```

Questions : 7

Display the lname of the employees whose salaries are 30000 or 40000 or 50000.

QUERY

```
mysql> select Lname from Employee where Salary=30000 or Salary=40000
or Salary = 50000;
```

DATABASE TABLES

```
mysql> select Lname from Employee where Salary=30000 or Salary=40000 or Salary = 50000;
+-------+
| Lname |
+-------+
| Khan  |
+-------+
1 row in set (0.00 sec)
```

NESTED QUERIES

AIM

Develop SQL Queries to implement Nested Queries/ Sub Queries and Joins

Questions : 1

Update the salary by 0.25 times for all the employees whose Plocation is 'Chennai'.

QUERY

```
mysql> update employee set salary = salary + 0.25* salary where Address = 'Chennai';
Query OK, 1 row affected (0.02 sec)
Rows matched: 1  Changed: 1  Warnings: 0
```

DATABASE TABLES

```
mysql> select * from employee;
+------+----------+--------+---------+--------+--------+----------+------+------+
| SSN  | Fname    | Lname  | Address | Sex    | Salary | SuperSSN | DNO  | Age  |
+------+----------+--------+---------+--------+--------+----------+------+------+
| e001 | Arun     | Kumar  | Kochi   | Male   |  25000 | s1001    | d01  |   25 |
| e003 | Anu      | Priya  | Chennai | Female |  22500 | s1003    | d03  |   23 |
| e004 | Sidharth | Shukla | Pune    | Male   |  17000 | s1004    | d04  |   22 |
| e005 | Hanan    | Khan   | Mumbai  | Male   |  30000 | s1005    | d04  |   22 |
+------+----------+--------+---------+--------+--------+----------+------+------+
4 rows in set (0.00 sec)
```

Questions : 2

To display the name and project location of employees whose working hour is greater than 5

QUERY

```
mysql> select Employee.Fname,PROJECT.PLocation FROM Employee,WORKS_ON,Project
where WORKS_ON.Hours > 5 and Employee.SSN = WORKS_ON.SSN
and WORKS_ON.PNo=project.PNo;
```

DATABASE TABLES

```
+-------+-----------+
| Fname | PLocation |
+-------+-----------+
| Hanan | Chennai   |
+-------+-----------+
1 row in set (0.00 sec)
```

Questions : 3

Left join employee table and works_on table

QUERY

```
mysql> select * from EMPLOYEE left join WORKS_ON on EMPLOYEE.SSN = WORKS_ON.SSN;
```

DATABASE TABLES

```
mysql> select * from EMPLOYEE left join WORKS_ON on EMPLOYEE.SSN = WORKS_ON.SSN;
+------+----------+--------+---------+--------+--------+----------+------+------+------+-------+-------+
| SSN  | Fname    | Lname  | Address | Sex    | Salary | SuperSSN | DNO  | Age  | SSN  | PNO   | Hours |
+------+----------+--------+---------+--------+--------+----------+------+------+------+-------+-------+
| e001 | Arun     | Kumar  | Kochi   | Male   |  25000 | s1001    | d01  |   25 | e001 | p1001 |     4 |
| e003 | Anu      | Priya  | Chennai | Female |  22500 | s1003    | d03  |   23 | e003 | p1003 |     3 |
| e004 | Sidharth | Shukla | Pune    | Male   |  17000 | s1004    | d04  |   22 | e004 | p1004 |     5 |
| e005 | Hanan    | Khan   | Mumbai  | Male   |  30000 | s1005    | d04  |   22 | e005 | p1005 |     6 |
+------+----------+--------+---------+--------+--------+----------+------+------+------+-------+-------+
4 rows in set (0.01 sec)
```

Questions : 4

Right join works_on table and employee table

QUERY

```
mysql> select * from WORKS_ON RIGHT join EMPLOYEE on
EMPLOYEE.SSN = WORKS_ON.SSN;
```

DATABASE TABLES

```
mysql> select * from WORKS_ON RIGHT join EMPLOYEE on EMPLOYEE.SSN = WORKS_ON.SSN;
+------+-------+-------+------+----------+--------+---------+--------+--------+----------+------+------+
| SSN  | PNO   | Hours | SSN  | Fname    | Lname  | Address | Sex    | Salary | SuperSSN | DNO  | Age  |
+------+-------+-------+------+----------+--------+---------+--------+--------+----------+------+------+
| e001 | p1001 |     4 | e001 | Arun     | Kumar  | Kochi   | Male   |  25000 | s1001    | d01  |   25 |
| e003 | p1003 |     3 | e003 | Anu      | Priya  | Chennai | Female |  22500 | s1003    | d03  |   23 |
| e004 | p1004 |     5 | e004 | Sidharth | Shukla | Pune    | Male   |  17000 | s1004    | d04  |   22 |
| e005 | p1005 |     6 | e005 | Hanan    | Khan   | Mumbai  | Male   |  30000 | s1005    | d04  |   22 |
+------+-------+-------+------+----------+--------+---------+--------+--------+----------+------+------+
4 rows in set (0.00 sec)
```

Questions : 5

Full join works_on table and employee table

QUERY

```
mysql> select * from WORKS_ON full join EMPLOYEE ;
```

DATABASE TABLES

```
mysql> select * from WORKS_ON full join EMPLOYEE ;
+------+-------+-------+------+----------+--------+---------+--------+--------+----------+------+------+
| SSN  | PNO   | Hours | SSN  | Fname    | Lname  | Address | Sex    | Salary | SuperSSN | DNO  | Age  |
+------+-------+-------+------+----------+--------+---------+--------+--------+----------+------+------+
| e001 | p1001 |     4 | e005 | Hanan    | Khan   | Mumbai  | Male   |  30000 | s1005    | d04  |   22 |
| e001 | p1001 |     4 | e004 | Sidharth | Shukla | Pune    | Male   |  17000 | s1004    | d04  |   22 |
| e001 | p1001 |     4 | e003 | Anu      | Priya  | Chennai | Female |  22500 | s1003    | d03  |   23 |
| e001 | p1001 |     4 | e001 | Arun     | Kumar  | Kochi   | Male   |  25000 | s1001    | d01  |   25 |
| e002 | p1002 |     5 | e005 | Hanan    | Khan   | Mumbai  | Male   |  30000 | s1005    | d04  |   22 |
| e002 | p1002 |     5 | e004 | Sidharth | Shukla | Pune    | Male   |  17000 | s1004    | d04  |   22 |
| e002 | p1002 |     5 | e003 | Anu      | Priya  | Chennai | Female |  22500 | s1003    | d03  |   23 |
| e002 | p1002 |     5 | e001 | Arun     | Kumar  | Kochi   | Male   |  25000 | s1001    | d01  |   25 |
| e003 | p1003 |     3 | e005 | Hanan    | Khan   | Mumbai  | Male   |  30000 | s1005    | d04  |   22 |
| e003 | p1003 |     3 | e004 | Sidharth | Shukla | Pune    | Male   |  17000 | s1004    | d04  |   22 |
| e003 | p1003 |     3 | e003 | Anu      | Priya  | Chennai | Female |  22500 | s1003    | d03  |   23 |
| e003 | p1003 |     3 | e001 | Arun     | Kumar  | Kochi   | Male   |  25000 | s1001    | d01  |   25 |
| e004 | p1004 |     5 | e005 | Hanan    | Khan   | Mumbai  | Male   |  30000 | s1005    | d04  |   22 |
| e004 | p1004 |     5 | e004 | Sidharth | Shukla | Pune    | Male   |  17000 | s1004    | d04  |   22 |
| e004 | p1004 |     5 | e003 | Anu      | Priya  | Chennai | Female |  22500 | s1003    | d03  |   23 |
| e004 | p1004 |     5 | e001 | Arun     | Kumar  | Kochi   | Male   |  25000 | s1001    | d01  |   25 |
| e005 | p1005 |     6 | e005 | Hanan    | Khan   | Mumbai  | Male   |  30000 | s1005    | d04  |   22 |
| e005 | p1005 |     6 | e004 | Sidharth | Shukla | Pune    | Male   |  17000 | s1004    | d04  |   22 |
| e005 | p1005 |     6 | e003 | Anu      | Priya  | Chennai | Female |  22500 | s1003    | d03  |   23 |
| e005 | p1005 |     6 | e001 | Arun     | Kumar  | Kochi   | Male   |  25000 | s1001    | d01  |   25 |
+------+-------+-------+------+----------+--------+---------+--------+--------+----------+------+------+
20 rows in set (0.00 sec)
```

VIEWS

AIM

Develop SQL Queries for creating and dropping Views

Questions : 1

Create a view VW_emp on employee table

QUERY

```
mysql> create view VW_emp as select*from EMPLOYEE;
Query OK, 0 rows affected (0.00 sec)
```

DATABASE TABLES

```
mysql> select * from VW_emp;
+------+----------+--------+---------+--------+--------+----------+------+------+
| SSN  | Fname    | Lname  | Address | Sex    | Salary | SuperSSN | DNO  | Age  |
+------+----------+--------+---------+--------+--------+----------+------+------+
| e001 | Arun     | Kumar  | Kochi   | Male   |  25000 | s1001    | d01  |   25 |
| e003 | Anu      | Priya  | Chennai | Female |  22500 | s1003    | d03  |   23 |
| e004 | Sidharth | Shukla | Pune    | Male   |  17000 | s1004    | d04  |   22 |
| e005 | Hanan    | Khan   | Mumbai  | Male   |  30000 | s1005    | d04  |   22 |
+------+----------+--------+---------+--------+--------+----------+------+------+
4 rows in set (0.00 sec)
```

Questions : 2

Create another view VW_SSN contains SuperSSN and Dno of female employees

QUERY

```
mysql> create  view VW_SSN as select SuperSSN, DNO from EMPLOYEE
where Sex = 'Female';
Query OK, 0 rows affected (0.01 sec)
```

DATABASE TABLES

```
mysql> select * from VW_SSN;
+----------+------+
| SuperSSN | DNO  |
+----------+------+
| s1003    | d03  |
+----------+------+
1 row in set (0.00 sec)
```

Questions : 3

Update the address of employee to Chennai whose id is e100 in view VW_emp

QUERY

```
mysql> UPDATE VW_emp SET Address="Chennai" WHERE SSN='e1001';
Query OK, 1 row affected (0.01 sec)
Rows matched: 1  Changed: 1  Warnings: 0
```

DATABASE TABLES

```
mysql> select * from VW_emp;
+------+----------+--------+---------+--------+--------+----------+------+------+
| SSN  | Fname    | Lname  | Address | Sex    | Salary | SuperSSN | DNO  | Age  |
+------+----------+--------+---------+--------+--------+----------+------+------+
| e001 | Arun     | Kumar  | Chennai | Male   |  25000 | s1001    | d01  |   25 |
| e003 | Anu      | Priya  | Chennai | Female |  22500 | s1003    | d03  |   23 |
| e004 | Sidharth | Shukla | Pune    | Male   |  17000 | s1004    | d04  |   22 |
| e005 | Hanan    | Khan   | Mumbai  | Male   |  30000 | s1005    | d04  |   22 |
+------+----------+--------+---------+--------+--------+----------+------+------+
4 rows in set (0.00 sec)
```

Questions : 4

Delete the view VW_emp

QUERY

```
mysql> drop view VW_emp;
Query OK, 0 rows affected (0.00 sec)
```

DATABASE TABLES

```
mysql> select * from VW_emp;
ERROR 1146 (42S02): Table 'company.vw_emp' doesn't exist
```

FUNCTIONS AND PROCEDURES

AIM

Develop PL/SQL program to familiarize with Function and Procedure

Questions : 1

Write a PL/SQL function to find factorial of a number

QUERY

```
SQL> connect
Enter user-name: system
Enter password:
Connected.


SQL> set serveroutput on
SQL> edit@factorial.sql

create or replace function get_factorial(N int)
return varchar
is
fact int := 1;
begin
for i in 1..N loop
fact := fact*i;
end loop;
return 'Factorial is  '  || fact ;
end;
/
select get_factorial(5) from dual;


SQL> @XEfactorial.sql

Function created.
```

DATABASE TABLES

```
SQL> @XEfactorial.sql

Function created.

GET_FACTORIAL(5)

Factorial is 120
```

Questions : 2

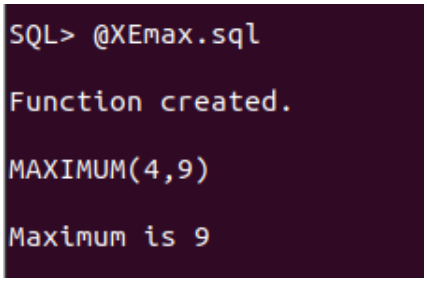
Write a PL/SQL function to find maximum of two numbers

QUERY

```
SQL> connect
Enter user-name: system
Enter password:
Connected.


SQL> set serveroutput on
SQL> edit@max.sql

create or replace function maximum(n1 int, n2 int)
return varchar
is
m int := 0;
begin
if n1>n2 then
m := n1;
else
m := n2;
end if;
return  'Maximum is  ' ||m;
end;
/
select maximum(4,9) from dual;

SQL> @XEmax.sql
```

```
Function created.
```

DATABASE TABLES



Questions : 3

Write a PL/SQL procedure to print the prime

QUERY

```
SQL> connect
Enter user-name: *******
Enter password:*******
Connected.


SQL> set serveroutput on

SQL> edit@prime.sql

DECLARE
     i NUMBER(3);
     j NUMBER(3);
BEGIN
dbms_output.Put_line('The prime numbers are:');
dbms_output.new_line;
     i := 2;
     LOOP
         j := 2;
         LOOP
             EXIT WHEN( ( MOD(i, j) = 0 )
                         OR ( j = i ) );
             j := j + 1;
         END LOOP;
         IF( j = i )THEN
```

```
          dbms_output.Put(i||'   ');
         END IF;
         i := i + 1;
         exit WHEN i = 50;
     END LOOP;
dbms_output.new_line;
END;
/

SQL> @XEprime.sql

Function created.
```

DATABASE TABLES

```
SQL> @XEprime.sql

2
3
5
7

PL/SQL procedure successfully completed.
```

Questions : 4

Write a PL/SQL procedure to display numbers from 1 to 10 using while loop

QUERY

```
Enter user-name: system
Enter password:******
Connected.


SQL> set serveroutput on
SQL> edit@numbers.sql

DECLARE
     i INTEGER := 1;
BEGIN
     WHILE i <= 10 LOOP
```

```
        DBMS_OUTPUT.PUT_LINE(i);
    i := i+1;
    END LOOP;
END;
/

SQL> @XEnumbers.sql

Function created.
```

DATABASE TABLES

```
SQL> @XEnumbers.sql
1
2
3
4
5
6
7
8
9
10

PL/SQL procedure successfully completed.
```

CURSOR

AIM

Develop PL/SQL program to implement Cursor

Question : 1

Write a PL/SQL cursor program to update the salary of each employee of department number D001 in the Employee table as per the schema

QUERY

```
SQL> create table Employee(SSN varchar(30),Fname varchar(30),Lname varchar(30),Address
varchar(50),Sex varchar(15),Salary number(30),SuperSSN varchar(30),DNO varchar(20));

Table created.

SQL> create table Department(DNO varchar(20),Dname varchar(30),MgrSSN varchar(30),
MgrStartDate varchar(20));

Table created.

SQL> insert into Employee values('e1001','Archana','Suresh','13B,Highway Gardens,
Kozhikode','Female',60000,'SP1002','D001');

1 row created.

SQL> insert into Employee values('e1002','Justin','Varghese','Rose Villa,Kochi','Male',
50000,'SP1001','D002');

1 row created.

SQL> insert into Employee values('e1003','Meera','Kumar','11B,Arcadia Building,Mumbai',
'Female',70000,'SP1004','D001');

1 row created.

SQL> insert into Employee values('e1004','Kailas','Nath','V3,DD Homes,Bangalore','Male',
30000,'SP1003','D003');

1 row created.
```

```
SQL> insert into Employee values('e1005 ','Sara','Khaild','Ashok Nagar,West Delhi',
'Female',45000,'SP1005','D004');

1 row created.

SQL> insert into Employee values('e1006 ','Rahul','Ashok','LV Road,Bengaluru','Male',
55000,'SP1005','D005');

1 row created.

SQL> create table Department(DNO varchar(20),Dname varchar(30),MgrSSN varchar(30),
MgrStartDate varchar(20));

Table created.

SQL> insert into Department values('D001','Accounts','M1003','2015-09-01');
1 row created.

SQL> insert into Department values('D002','HR','M1002','2016-12-05');

1 row created.

SQL> insert into Department values('D003','Marketing','M1005','2012-04-04');

1 row created.

SQL> insert into Department values('D004','Sales','M1004','2019-08-20');

1 row created.

SQL> insert into Department values('D005','Management','M1001','2017-03-09');

1 row created.

SQL> declare cursor employee_cur is
  2  select SSN,Salary from Employee where DNO = 'D001'
  3  for update;
  4  incr_sal number;
  5  begin
  6  for employee_rec in employee_cur loop
```

```
 7  if employee_rec.Salary < 50000 then
 8  incr_sal := .15;
 9  else
10  incr_sal := .10;
11  end if;
12  update Employee set Salary = Salary + Salary * incr_sal where current of
employee_cur;
13  end loop;
14  end;
15  /

PL/SQL procedure successfully completed.
```

DATABASE TABLES

```
SQL> select * from Employee;

SSN                          FNAME
---------------------------- ----------------------------
LNAME
----------------------------
ADDRESS                                          SEX                SALARY
------------------------------------------------ --------------- ----------
SUPERSSN                     DNO
---------------------------- --------------------
e1001                        Archana
Suresh
13B,Highway Gardens,Kozhikode                    Female              60000
SP1002                       D001


SSN                          FNAME
---------------------------- ----------------------------
LNAME
----------------------------
ADDRESS                                          SEX                SALARY
------------------------------------------------ --------------- ----------
SUPERSSN                     DNO
---------------------------- --------------------
e1002                        Justin
Varghese
Rose Villa,Kochi                                 Male                50000
SP1001                       D002
```

```
SSN                          FNAME
---------------------------- ----------------------------
LNAME
----------------------------
ADDRESS                                          SEX                SALARY
------------------------------------------------ -------------- ----------
SUPERSSN                     DNO
---------------------------- --------------------
e1003                        Meera
Kumar
11B,Arcadia Building,Mumbai                      Female              70000
SP1004                       D001


SSN                          FNAME
---------------------------- ----------------------------
LNAME
----------------------------
ADDRESS                                          SEX                SALARY
------------------------------------------------ -------------- ----------
SUPERSSN                     DNO
---------------------------- --------------------
e1004                        Kailas
Nath
V3,DD Homes,Bangalore                            Male                30000
SP1003                       D003
```

```
SSN                          FNAME
---------------------------- ----------------------------
LNAME
----------------------------
ADDRESS                                          SEX                SALARY
------------------------------------------------ -------------- ----------
SUPERSSN                     DNO
---------------------------- --------------------
e1005                        Sara
Khaild
Ashok Nagar,West Delhi                           Female              45000
SP1005                       D004


SSN                          FNAME
---------------------------- ----------------------------
LNAME
----------------------------
ADDRESS                                          SEX                SALARY
------------------------------------------------ -------------- ----------
SUPERSSN                     DNO
---------------------------- --------------------
e1006                        Rahul
Ashok
LV Road,Bengaluru                                Male                55000
SP1005                       D005
```

```
SQL> select * from Department;

DNO                  DNAME
-------------------- ------------------------------
MGRSSN                         MGRSTARTDATE
------------------------------ --------------------
D001                 Accounts
M1003                          2015-09-01

D002                 HR
M1002                          2016-12-05

D003                 Marketing
M1005                          2012-04-04


DNO                  DNAME
-------------------- ------------------------------
MGRSSN                         MGRSTARTDATE
------------------------------ --------------------
D004                 Sales
M1004                          2019-08-20

D005                 Management
M1001                          2017-03-09
```

```
SQL> select * from Employee;

SSN                            FNAME
------------------------------ ------------------------------
LNAME
------------------------------
ADDRESS                                            SEX                SALARY
-------------------------------------------------- --------------- ----------
SUPERSSN                       DNO
------------------------------ --------------------
e1001                          Archana
Suresh
13B,Highway Gardens,Kozhikode                      Female               66000
SP1002                         D001


SSN                            FNAME
------------------------------ ------------------------------
LNAME
------------------------------
ADDRESS                                            SEX                SALARY
-------------------------------------------------- --------------- ----------
SUPERSSN                       DNO
------------------------------ --------------------
e1002                          Justin
Varghese
Rose Villa,Kochi                                   Male                 50000
SP1001                         D002
```

```
SSN                          FNAME
---------------------------- ----------------------------
LNAME
----------------------------
ADDRESS                                            SEX                SALARY
-------------------------------------------------- -------------- ----------
SUPERSSN                     DNO
---------------------------- --------------------
e1003                        Meera
Kumar
11B,Arcadia Building,Mumbai                        Female              77000
SP1004                       D001


SSN                          FNAME
---------------------------- ----------------------------
LNAME
----------------------------
ADDRESS                                            SEX                SALARY
-------------------------------------------------- -------------- ----------
SUPERSSN                     DNO
---------------------------- --------------------
e1004                        Kailas
Nath
V3,DD Homes,Bangalore                              Male                30000
SP1003                       D003


SSN                          FNAME
---------------------------- ----------------------------
LNAME
----------------------------
ADDRESS                                            SEX                SALARY
-------------------------------------------------- -------------- ----------
SUPERSSN                     DNO
---------------------------- --------------------
e1005                        Sara
Khaild
Ashok Nagar,West Delhi                             Female              45000
SP1005                       D004


SSN                          FNAME
---------------------------- ----------------------------
LNAME
----------------------------
ADDRESS                                            SEX                SALARY
-------------------------------------------------- -------------- ----------
SUPERSSN                     DNO
---------------------------- --------------------
e1006                        Rahul
Ashok
LV Road,Bengaluru                                  Male                55000
SP1005                       D005
```

Question : 2

Write a PL/SQL cursor program to retrieve Dno and DName from Department table as per the schema

QUERY

```
SQL> declare cursor department_cur is
```

```
 2  select DNO,Dname from Department;
 3  data1 Department.DNO%type;
 4  data2 Department.Dname%type;
 5  begin
 6  open department_cur;
 7  loop
 8  fetch department_cur into data1,data2;
 9  exit when department_cur%notfound;
10  dbms_output.put_line('DNO : '||data1||'::Dname : '||data2);
11  end loop;
12  close department_cur;
13  end;
14  /
```

DATABASE TABLES

```
DNO : D001::Dname : Accounts
DNO : D002::Dname : HR
DNO : D003::Dname : Marketing
DNO : D004::Dname : Sales
DNO : D005::Dname : Management

PL/SQL procedure successfully completed.
```

TRIGGER

AIM

Develop PL/SQL program to implement Trigger

Question : 1

Write PL/SQL trigger program to display the salary differences between the old values and new values in the table employee as per the schema

QUERY

```
SQL> create table Customer(ID Number(38),NAME Varchar(50),ADDRESS Varchar(50),
SALARY Number(38),AGE Number(38));

Table created.

SQL> desc Customer;
 Name                                      Null?    Type
 ----------------------------------------- -------- ----------------------------
 ID                                                 NUMBER(38)
 NAME                                               VARCHAR2(50)
 ADDRESS                                            VARCHAR2(50)
 SALARY                                             NUMBER(38)
 AGE                                                NUMBER(38)

SQL> insert into Customer values(10978,'Aleena James','Mumbai',90000,28);
1 row created.

SQL> insert into Customer values(21547,'Sidharth Anand','Delhi',67500,35);
1 row created.

SQL> insert into Customer values(17903,'Tanya Malhotra','Pune',85000,31);
1 row created.

SQL> insert into Customer values(78436,'Jaison Thomas','Kochi',95000,25);
1 row created.
```

```
SQL> select * from Customer;

        ID NAME
---------- --------------------------------------------------
ADDRESS                                                SALARY        AGE
-------------------------------------------------- ---------- ----------
     10978 Aleena James
Mumbai                                                  90000         28

     21547 Sidharth Anand
Delhi                                                   67500         35

     17903 Tanya Malhotra
Pune                                                    85000         31


        ID NAME
---------- --------------------------------------------------
ADDRESS                                                SALARY        AGE
-------------------------------------------------- ---------- ----------
     78436 Jaison Thomas
Kochi                                                   95000         25
```

DATABASE TABLES


```
SQL> select * from Customer;

        ID NAME
---------- --------------------------------------------------
ADDRESS                                                SALARY        AGE
-------------------------------------------------- ---------- ----------
     10978 Aleena James
Mumbai                                                  90000         28

     21547 Sidharth Anand
Delhi                                                   67500         35

     17903 Tanya Malhotra
Pune                                                    85000         31


        ID NAME
---------- --------------------------------------------------
ADDRESS                                                SALARY        AGE
-------------------------------------------------- ---------- ----------
     78436 Jaison Thomas
Kochi                                                   95000         25
```

```
SQL> @C:\Users\user\Documents\salary_difference.sql

Trigger created.
```

```
SQL> @C:\Users\user\Documents\m.sql
Old salary :  90000
New salary :  95000
Salary difference :  5000
Old salary :  67500
New salary :  72500
Salary difference :  5000
Old salary :  85000
New salary :  90000
Salary difference :  5000
Old salary :  95000
New salary :  100000
Salary difference :  5000

PL/SQL procedure successfully completed.
```

Question : 2

Write PL/SQL trigger program to display the hour differences between the old values and new values in the table Works_on as per the schema

QUERY

```
SQL> create table Works_on(SSN varchar(20),PNO varchar(20),Hours int);

Table created.

SQL> insert into Works_on values('S001','P002',9);

1 row created.

SQL> insert into Works_on values('S002','P005',12);

1 row created.

SQL> insert into Works_on values('S003','P001',4);

1 row created.

SQL> insert into Works_on values('S004','P003',8);

1 row created.

SQL> insert into Works_on values('S005','P004',10);
```

```
1 row created.
```

```
SQL> select * from Works_on;

SSN                  PNO                        HOURS
-------------------- -------------------- ----------
S001                 P002                          9
S002                 P005                         12
S003                 P001                          4
S004                 P003                          8
S005                 P004                         10
```

DATABASE TABLES

```
SQL> select * from Works_on;

SSN                  PNO                        HOURS
-------------------- -------------------- ----------
S001                 P002                          9
S002                 P005                         12
S003                 P001                          4
S004                 P003                          8
S005                 P004                         10
```

```
SQL> @C:\Users\user\Documents\XEhours_difference.sql

Trigger created.
```

```
SQL> @C:\Users\user\Documents\XEH.sql
Old Hours : 9
New Hours : 14
Hour difference : 5
Old Hours : 12
New Hours : 17
Hour difference : 5
Old Hours : 4
New Hours : 9
Hour difference : 5
Old Hours : 8
New Hours : 13
Hour difference : 5
Old Hours : 10
New Hours : 15
Hour difference : 5

PL/SQL procedure successfully completed.
```

TCL

AIM

Develop SQL Queries to understand the concept of Transaction Control Language

Question : 1

Creating Check points in the program

QUERY

```
mysql> start transaction;
Query OK, 0 rows affected (0.01 sec)

mysql> savepoint save1;
Query OK, 0 rows affected (0.00 sec)

mysql> insert into Employee values("e1006","Anju","Rajesh","Sobha Marina,Kochi","Female",
80000,"SP1004","D005",29);
Query OK, 1 row affected (0.01 sec)

mysql> savepoint save2;
Query OK, 0 rows affected (0.00 sec)
```

DATABASE TABLES

```
mysql> select * from Employee;
+-------+---------+--------+-----------------------------+--------+--------+----------+------+------+
| SSN   | Fname   | Lname  | Address                     | Sex    | Salary | SuperSSN | DNO  | Age  |
+-------+---------+--------+-----------------------------+--------+--------+----------+------+------+
| e1001 | Archana | Suresh | Chennai                     | Female |  25000 | SP1002   | D001 |   28 |
| e1002 | Akash   | Raj    | 4B,Renegade Villas,Pune     | Male   |  40000 | SP1001   | D003 |   24 |
| e1003 | Meera   | Kumar  | 11B,Arcadia Building,Mumbai | Female |  70000 | SP1004   | D005 |   31 |
| e1004 | Kailas  | Nath   | V3,DD Homes,Bangalore       | Male   |  30000 | SP1003   | D002 |   25 |
| e1005 | Sara    | Khalid | Ashok Nagar,West Delhi      | Female |  56250 | SP1005   | D004 |   27 |
+-------+---------+--------+-----------------------------+--------+--------+----------+------+------+
5 rows in set (0.00 sec)

mysql> start transaction;
Query OK, 0 rows affected (0.01 sec)

mysql> savepoint save1;
Query OK, 0 rows affected (0.00 sec)

mysql> insert into Employee values("e1006","Anju","Rajesh","Sobha Marina,Kochi","Female",80000,"SP1004","D005",29);
Query OK, 1 row affected (0.01 sec)
```

```
mysql> select * from Employee;
+-------+---------+--------+-----------------------------+--------+--------+----------+------+------+
| SSN   | Fname   | Lname  | Address                     | Sex    | Salary | SuperSSN | DNO  | Age  |
+-------+---------+--------+-----------------------------+--------+--------+----------+------+------+
| e1001 | Archana | Suresh | Chennai                     | Female |  25000 | SP1002   | D001 |   28 |
| e1002 | Akash   | Raj    | 4B,Renegade Villas,Pune     | Male   |  40000 | SP1001   | D003 |   24 |
| e1003 | Meera   | Kumar  | 11B,Arcadia Building,Mumbai | Female |  70000 | SP1004   | D005 |   31 |
| e1004 | Kailas  | Nath   | V3,DD Homes,Bangalore       | Male   |  30000 | SP1003   | D002 |   25 |
| e1005 | Sara    | Khalid | Ashok Nagar,West Delhi      | Female |  56250 | SP1005   | D004 |   27 |
| e1006 | Anju    | Rajesh | Sobha Marina,Kochi          | Female |  80000 | SP1004   | D005 |   29 |
+-------+---------+--------+-----------------------------+--------+--------+----------+------+------+
6 rows in set (0.00 sec)

mysql> savepoint save2;
Query OK, 0 rows affected (0.00 sec)
```

Question : 2

Rollback to a previously created Checkpoint in the program

QUERY

```
mysql> rollback to save1;
Query OK, 0 rows affected (0.01 sec)
```

DATABASE TABLES

```
mysql> rollback to save1;
Query OK, 0 rows affected (0.01 sec)

mysql> select * from Employee;
+-------+---------+--------+----------------------------+--------+--------+----------+------+------+
| SSN   | Fname   | Lname  | Address                    | Sex    | Salary | SuperSSN | DNO  | Age  |
+-------+---------+--------+----------------------------+--------+--------+----------+------+------+
| e1001 | Archana | Suresh | Chennai                    | Female |  25000 | SP1002   | D001 |   28 |
| e1002 | Akash   | Raj    | 4B,Renegade Villas,Pune    | Male   |  40000 | SP1001   | D003 |   24 |
| e1003 | Meera   | Kumar  | 11B,Arcadia Building,Mumbai | Female |  70000 | SP1004   | D005 |   31 |
| e1004 | Kailas  | Nath   | V3,DD Homes,Bangalore      | Male   |  30000 | SP1003   | D002 |   25 |
| e1005 | Sara    | Khalid | Ashok Nagar,West Delhi     | Female |  56250 | SP1005   | D004 |   27 |
+-------+---------+--------+----------------------------+--------+--------+----------+------+------+
5 rows in set (0.00 sec)
```

Question : 3

Commit the program

QUERY

```
mysql> commit;
Query OK, 0 rows affected (0.00 sec)
```

DATABASE TABLES

```
mysql> commit;
Query OK, 0 rows affected (0.00 sec)

mysql>
```

MongoDB

AIM

Develop program to perform operations in MongoDB

Question : 1

Create a database emp

QUERY

```
test> use emp
```

DATABASE TABLES

```
test> use emp
switched to db emp
emp> db
emp
```

Question : 2

Create new Collection

QUERY

```
emp> db.createCollection("Department")
{ ok: 1 }
```

DATABASE TABLES

```
emp> db.createCollection("Department")
{ ok: 1 }
emp> db.getCollectionNames()
[ 'Department' ]
```

Question : 3

Check the collection list created and drop collection

QUERY

```
emp> db.getCollectionNames()
emp> db.Department.drop()
```

DATABASE TABLES

```
emp> db.getCollectionNames()
[ 'Department' ]
emp> db.Department.drop()
true
```

Question : 4

Insert document in selected Collection

QUERY

```
emp> db.Employee.insertOne({"Empno" : "E1001" , "Empname" : "Archana" ,
"Salary" : 140000})
{
  acknowledged: true,
  insertedId: ObjectId("63c51ae5fd5856e66b201526")
}
emp> try{ db.Employee.insertMany([{"Empno" : "E1002" , "Empname" : "Rahul" ,
"Salary" : 120000},{"Empno" : "E1003" , "Empname" : "Sara" , "Salary" : 170000}]);
... }
... catch(e){
... print(e);
... }
{
  acknowledged: true,
  insertedIds: {
    '0': ObjectId("63c51bb7fd5856e66b201527"),
    '1': ObjectId("63c51bb7fd5856e66b201528")
  }
}
```

DATABASE TABLES

```
emp> db.Employee.find()
[
  {
    _id: ObjectId("63c51ae5fd5856e66b201526"),
    Empno: 'E1001',
    Empname: 'Archana',
    Salary: 140000
  },
  {
    _id: ObjectId("63c51bb7fd5856e66b201527"),
    Empno: 'E1002',
    Empname: 'Rahul',
    Salary: 120000
  },
  {
    _id: ObjectId("63c51bb7fd5856e66b201528"),
    Empno: 'E1003',
    Empname: 'Sara',
    Salary: 170000
  }
]
```

Question : 5

To get the list documents in Collection

QUERY

```
emp> db.Employee.find()
```

DATABASE TABLES

```
emp> db.Employee.find()
[
  {
    _id: ObjectId("63c51ae5fd5856e66b201526"),
    Empno: 'E1001',
    Empname: 'Archana',
    Salary: 140000
  },
  {
    _id: ObjectId("63c51bb7fd5856e66b201527"),
    Empno: 'E1002',
    Empname: 'Rahul',
    Salary: 120000
  },
  {
    _id: ObjectId("63c51bb7fd5856e66b201528"),
    Empno: 'E1003',
    Empname: 'Sara',
    Salary: 170000
  }
]
```

Question : 6

Update the document in Collection

QUERY

```
emp> db.Employee.updateOne({"Empno" : "E1001"},
... {
... $set : {"Salary" : 160000},
... $currentDate : {lastModified : true}
... }
... )
{
  acknowledged: true,
  insertedId: null,
  matchedCount: 1,
  modifiedCount: 1,
  upsertedCount: 0
}
```

DATABASE TABLES

```
emp> db.Employee.find()
[
  {
    _id: ObjectId("63c51ae5fd5856e66b201526"),
    Empno: 'E1001',
    Empname: 'Archana',
    Salary: 160000,
    lastModified: ISODate("2023-01-16T09:42:01.053Z")
  },
  {
    _id: ObjectId("63c51bb7fd5856e66b201527"),
    Empno: 'E1002',
    Empname: 'Rahul',
    Salary: 120000
  },
  {
    _id: ObjectId("63c51bb7fd5856e66b201528"),
    Empno: 'E1003',
    Empname: 'Sara',
    Salary: 170000
  }
]
```

Question : 7

Delete the document in selected Collection

QUERY

```
emp> db.Employee.deleteOne({"Empname" : "Sara"});
{ acknowledged: true, deletedCount: 1 }
```

DATABASE TABLES

```
emp> db.Employee.find()
[
  {
    _id: ObjectId("63c51ae5fd5856e66b201526"),
    Empno: 'E1001',
    Empname: 'Archana',
    Salary: 160000,
    lastModified: ISODate("2023-01-16T09:42:01.053Z")
  },
  {
    _id: ObjectId("63c51bb7fd5856e66b201527"),
    Empno: 'E1002',
    Empname: 'Rahul',
    Salary: 120000
  }
]
```

Question : 8

Projection using find() method

QUERY

```
emp> db.Employee.find({}, {"Empname" : 1}).pretty()
```

DATABASE TABLES

```
emp> db.Employee.find({}, {"Empname" : 1}).pretty()
[
  { _id: ObjectId("63c51ae5fd5856e66b201526"), Empname: 'Archana' },
  { _id: ObjectId("63c51bb7fd5856e66b201527"), Empname: 'Rahul' }
]
```

Question : 9

Drop database emp

QUERY

```
emp> db.dropDatabase()
```

DATABASE TABLES

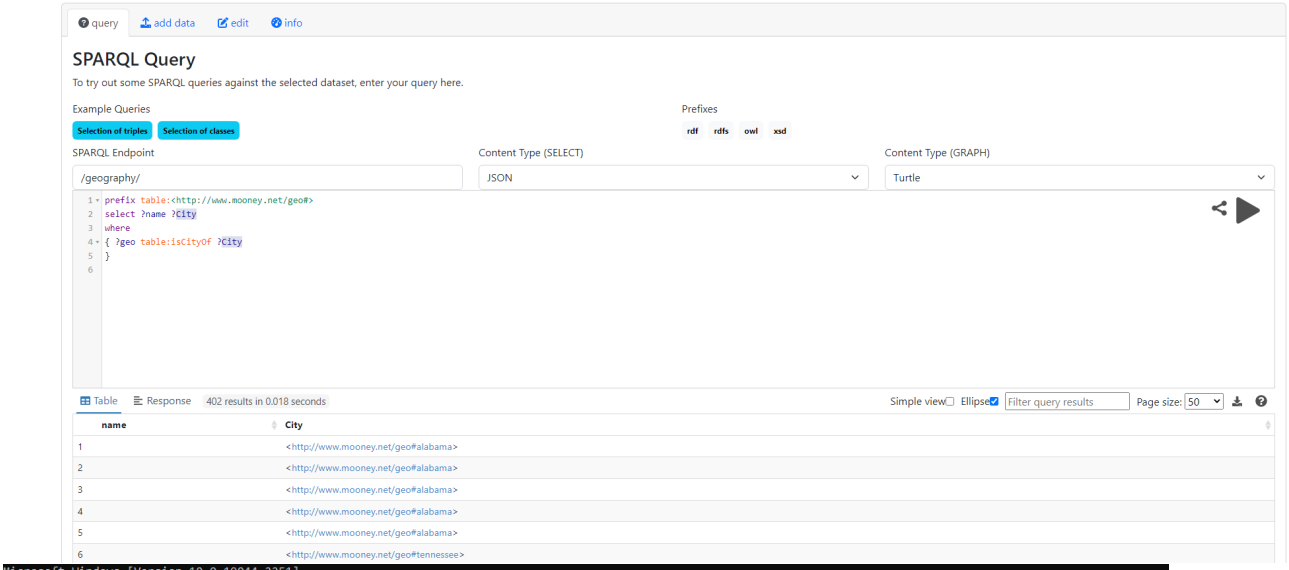
```
emp> db.dropDatabase()
{ ok: 1, dropped: 'emp' }
emp>
```

GraphQL

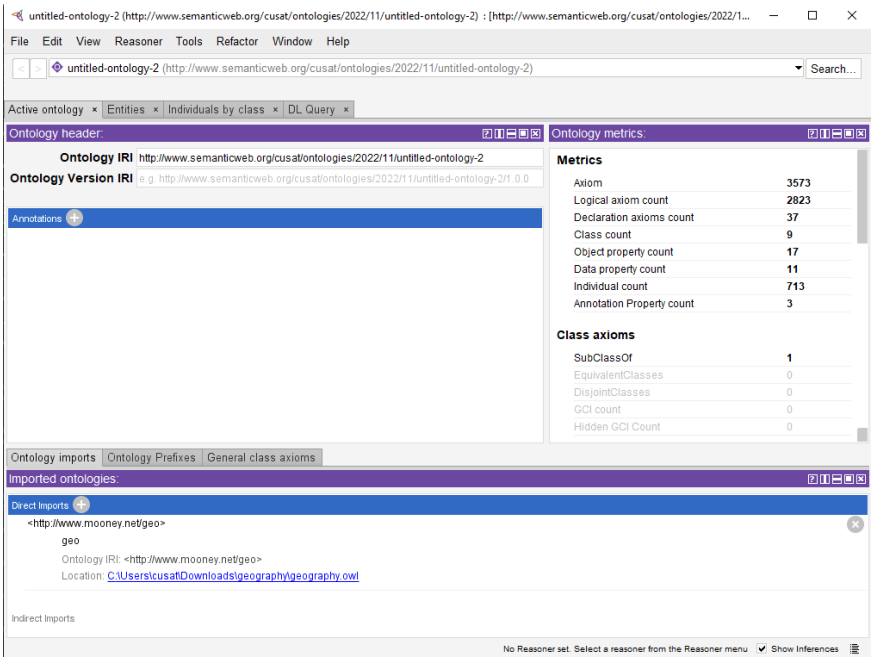
AIM

Develop program to perform GraphQL

/geography




```
Microsoft Windows [Version 10.0.19044.2251]
(c) Microsoft Corporation. All rights reserved.

C:\Users\cusat>cd C:\Users\cusat\Downloads\apache-jena-fuseki-4.6.1\apache-jena-fuseki-4.6.1

C:\Users\cusat\Downloads\apache-jena-fuseki-4.6.1\apache-jena-fuseki-4.6.1>fuseki-server --update --mem /ds
10:23:55 INFO  Server          :: Apache Jena Fuseki 4.6.1
10:23:58 INFO  Config          :: FUSEKI_HOME=C:\Users\cusat\Downloads\apache-jena-fuseki-4.6.1\apache-jena-fuseki-4.6.1\.
10:23:58 INFO  Config          :: FUSEKI_BASE=C:\Users\cusat\Downloads\apache-jena-fuseki-4.6.1\apache-jena-fuseki-4.6.1\run
10:23:58 INFO  Config          :: Shiro file: file://C:\Users\cusat\Downloads\apache-jena-fuseki-4.6.1\apache-jena-fuseki-4.6.1\run\shiro.ini
10:24:00 INFO  Config          :: Template file: templates/config-mem
10:24:05 INFO  Server          :: Database: in-memory
10:24:05 INFO  Server          :: Path = /ds
10:24:05 INFO  Server          :: System
10:24:05 INFO  Server          ::   Memory: 1.2 GiB
10:24:05 INFO  Server          ::   Java:   19.0.1
10:24:05 INFO  Server          ::   OS:     Windows 10 10.0 amd64
10:24:05 INFO  Server          ::   PID:    11092
10:24:06 INFO  Server          :: Started 2022/12/15 10:24:06 IST on port 3030
10:44:40 INFO  Admin           :: [3] Create database : name = /geography
10:44:59 INFO  Fuseki          :: [7] POST http://localhost:3030/geography/data
10:44:59 ERROR Fuseki          :: [line: 1, col: 1 ] Content is not allowed in prolog.
10:45:00 INFO  Fuseki          :: [7] Upload error: [line: 1, col: 1 ] Content is not allowed in prolog.
10:45:00 INFO  Fuseki          :: [7] 500 Server Error (632 ms)
10:46:12 INFO  Fuseki          :: [8] POST http://localhost:3030/geography/data
10:46:12 ERROR Fuseki          :: [line: 1, col: 1 ] Content is not allowed in prolog.
10:46:12 INFO  Fuseki          :: [8] Upload error: [line: 1, col: 1 ] Content is not allowed in prolog.
10:46:12 INFO  Fuseki          :: [8] 500 Server Error (417 ms)
10:46:56 INFO  Fuseki          :: [9] POST http://localhost:3030/geography/data
10:46:56 ERROR Fuseki          :: [line: 1, col: 1 ] Content is not allowed in prolog.
10:46:56 INFO  Fuseki          :: [9] Upload error: [line: 1, col: 1 ] Content is not allowed in prolog.
10:46:56 INFO  Fuseki          :: [9] 500 Server Error (433 ms)
10:48:13 INFO  Fuseki          :: [25] POST http://localhost:3030/geography/data
10:48:13 ERROR Fuseki          :: [line: 1, col: 1 ] Content is not allowed in prolog.
10:48:14 INFO  Fuseki          :: [25] Upload error: [line: 1, col: 1 ] Content is not allowed in prolog.
10:48:14 INFO  Fuseki          :: [25] 500 Server Error (477 ms)
10:48:40 INFO  Fuseki          :: [29] POST http://localhost:3030/geography/data
10:48:40 ERROR Fuseki          :: [line: 1, col: 1 ] Content is not allowed in prolog.
10:48:41 INFO  Fuseki          :: [29] Upload error: [line: 1, col: 1 ] Content is not allowed in prolog.
10:48:41 INFO  Fuseki          :: [29] 500 Server Error (488 ms)
10:50:02 INFO  Fuseki          :: [30] POST http://localhost:3030/geography/data
10:50:02 INFO  Fuseki          :: [30] Filename: geography.owl, Content-Type=application/octet-stream, Charset=null => RDF/XML : Count=3589 Triples=3589 Quads=0
10:50:03 INFO  Fuseki          :: [30] 200 OK (1.272 s)
10:50:36 INFO  Fuseki          :: [33] POST http://localhost:3030/geography/
10:50:36 INFO  Fuseki          :: [33] Query = SELECT ?subject ?predicate ?object WHERE {   ?subject ?predicate ?object } LIMIT 25
10:50:36 INFO  Fuseki          :: [33] 200 OK (65 ms)
10:56:18 INFO  Fuseki          :: [34] POST http://localhost:3030/geography/
10:56:18 INFO  Fuseki          :: [34] Query = prefix table:<https://www.mooney.net/geo> select ?name where { ?geo table:isCityOf ?city }
10:56:18 INFO  Fuseki          :: [34] 200 OK (6 ms)
10:56:59 INFO  Fuseki          :: [35] POST http://localhost:3030/geography/
10:56:59 INFO  Fuseki          :: [35] Query = prefix table:<https://www.mooney.net/geo#> select ?name where { ?geo table:isCityOf ?city }
10:56:59 INFO  Fuseki          :: [35] 200 OK (5 ms)
10:58:29 INFO  Fuseki          :: [36] POST http://localhost:3030/geography/
10:58:29 INFO  Fuseki          :: [36] Query = prefix table:<https://www.mooney.net/geo#> select ?name where { ?geo table:isCityOf ?city }
10:58:29 INFO  Fuseki          :: [36] 200 OK (6 ms)
10:59:45 INFO  Fuseki          :: [37] POST http://localhost:3030/geography/
10:59:45 INFO  Fuseki          :: [37] Query = prefix table:<https://www.mooney.net/geo#> select ?name where { ?geo table:isCityOf ?City }
10:59:45 INFO  Fuseki          :: [37] 200 OK (4 ms)
10:59:48 INFO  Fuseki          :: [38] POST http://localhost:3030/geography/
10:59:48 INFO  Fuseki          :: [38] Query = prefix table:<https://www.mooney.net/geo#> select ?name where { ?geo table:isCityOf ?City }
10:59:48 INFO  Fuseki          :: [38] 200 OK (5 ms)
10:59:50 INFO  Fuseki          :: [39] POST http://localhost:3030/geography/
10:59:50 INFO  Fuseki          :: [39] Query = prefix table:<https://www.mooney.net/geo#> select ?name where { ?geo table:isCityOf ?City }
```


untitled-ontology-2 (http://www.semanticweb.org/cusat/ontologies/2022/11/untitled-ontology-2) : [http://www.semanticweb.org/cusat/ontologies/2022/1...
File Edit View Reasoner Tools Refactor Window Help
untitled-ontology-2 (http://www.semanticweb.org/cusat/ontologies/2022/11/untitled-ontology-2)
Search...
Active ontology
Entities
Individuals by class
DL Query
Ontology header:
Ontology IRI http://www.semanticweb.org/cusat/ontologies/2022/11/untitled-ontology-2
Ontology Version IRI e.g. http://www.semanticweb.org/cusat/ontologies/2022/11/untitled-ontology-2/1.0.0
Annotations
Ontology metrics:
Metrics
Axiom 3573
Logical axiom count 2823
Declaration axioms count 37
Class count 9
Object property count 17
Data property count 11
Individual count 713
Annotation Property count 3
Class axioms
SubClassOf 1
EquivalentClasses 0
DisjointClasses 0
GCI count 0
Hidden GCI Count 0
Ontology imports
Ontology Prefixes
General class axioms
Imported ontologies:
Direct Imports
<http://www.mooney.net/geo>
geo
Ontology IRI: <http://www.mooney.net/geo>
Location: C:\Users\cusat\Downloads\geography\geography.owl
Indirect Imports
No Reasoner set. Select a reasoner from the Reasoner menu
Show Inferences

PROJECT

AIM

Develop an Application software using java and mySQL for an Information Management Purpose.

PROJECT DESCRIPTION

The project, Hotel Management System is a gui-based application that allows the hotel admin to handle all hotel activities . Interactive GUI and the ability to manage various hotel bookings and rooms make this system very flexible and convenient. Hotel management project provides rooms and can mange room detail. The system allows the manager to post available rooms in the system. Customers can check in and checkout rooms

USERS AND FUNCTIONALITIES

Admin

Admin can login in into admin page Admin can manage the room details Add Update search and delete room

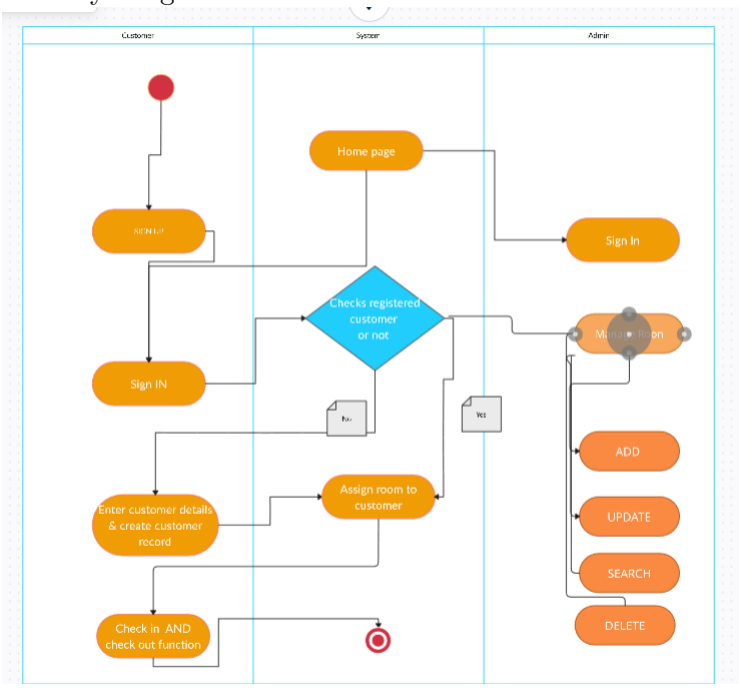
Customer

Customer can sign up and sign in Select room and check in or check out room Update their details

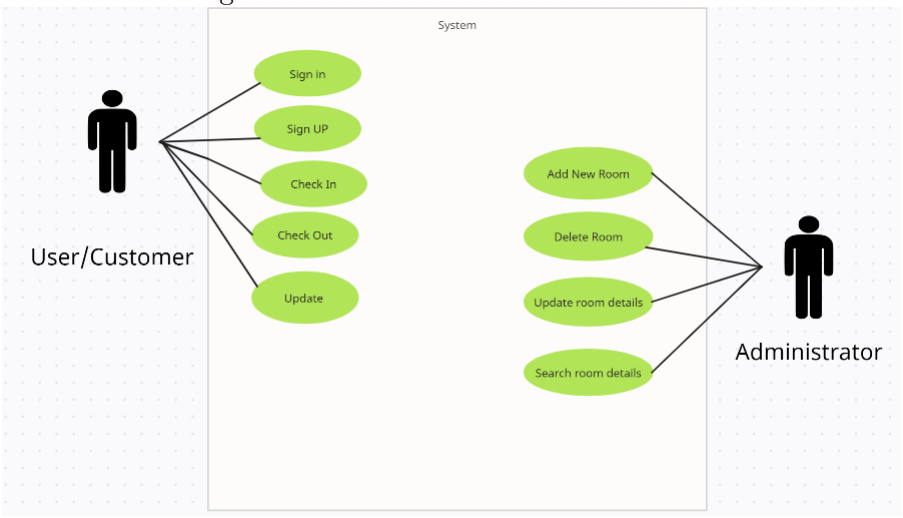
REFERENCE DESIGN

UML diagrams

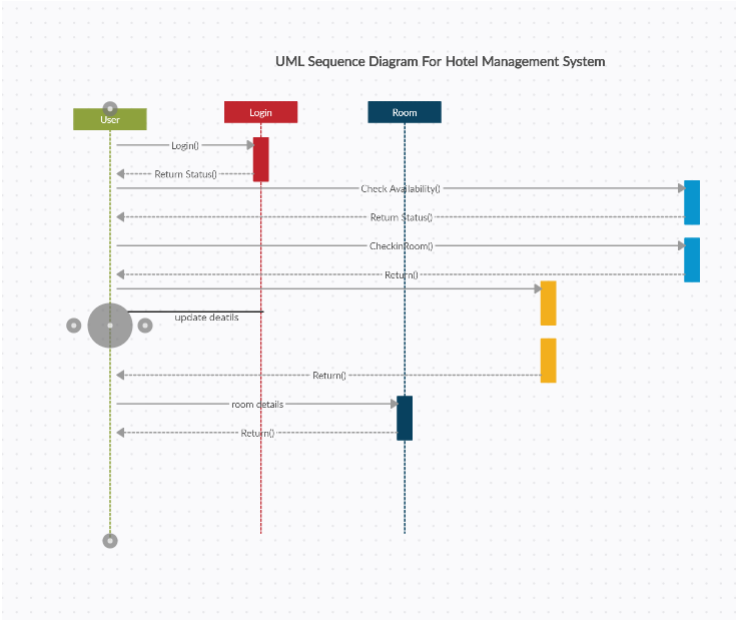
Activity Diagram



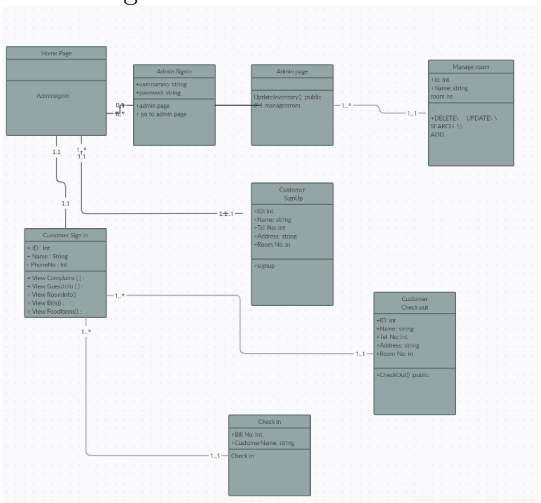
Use Case Diagram



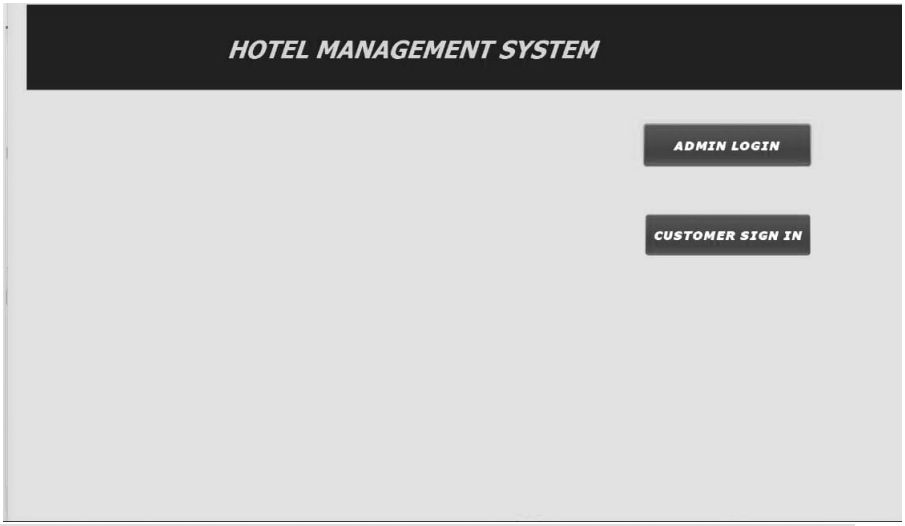
Sequence Diagram

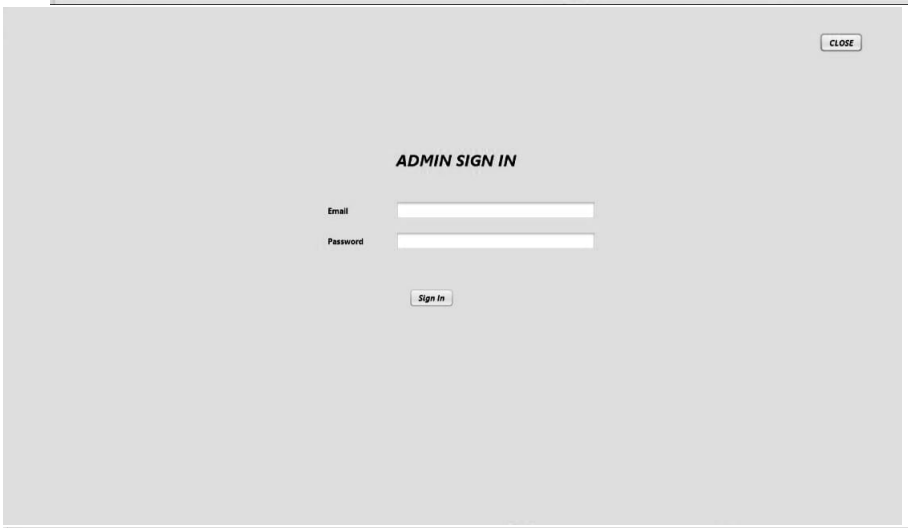


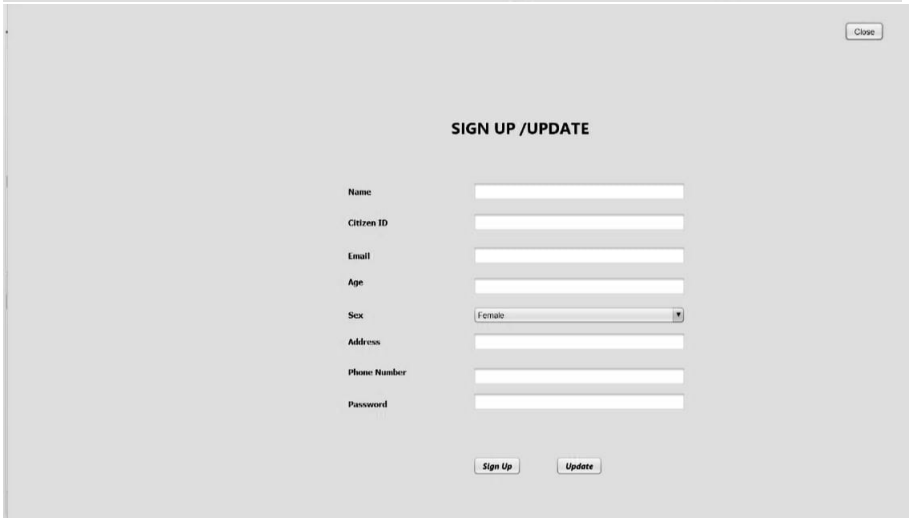
Class Diagram

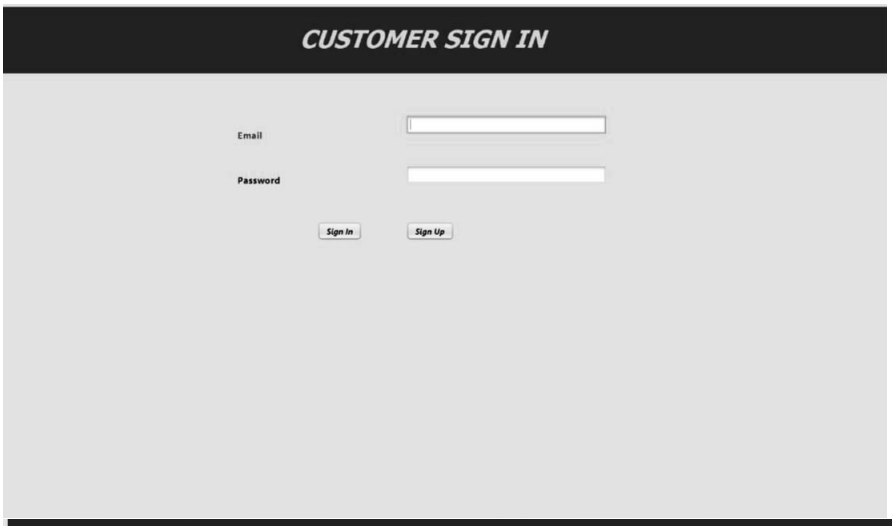


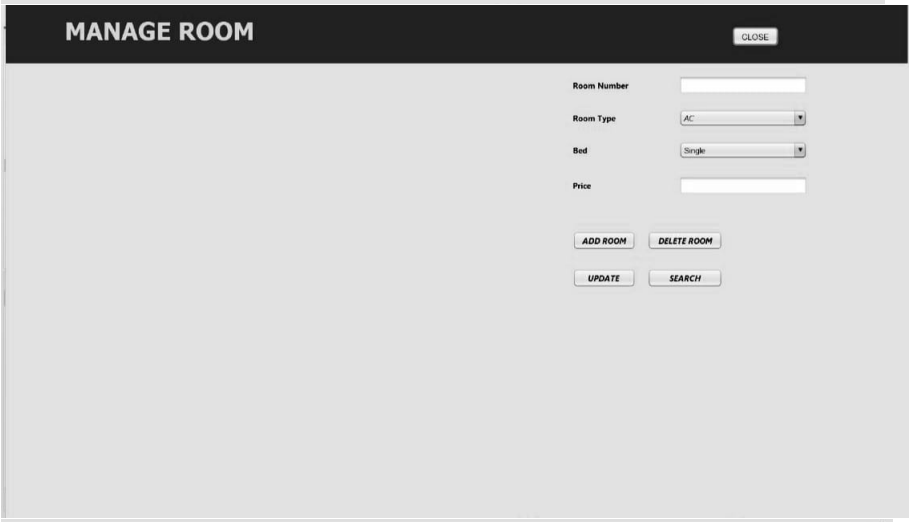
Wireframes of the GUI

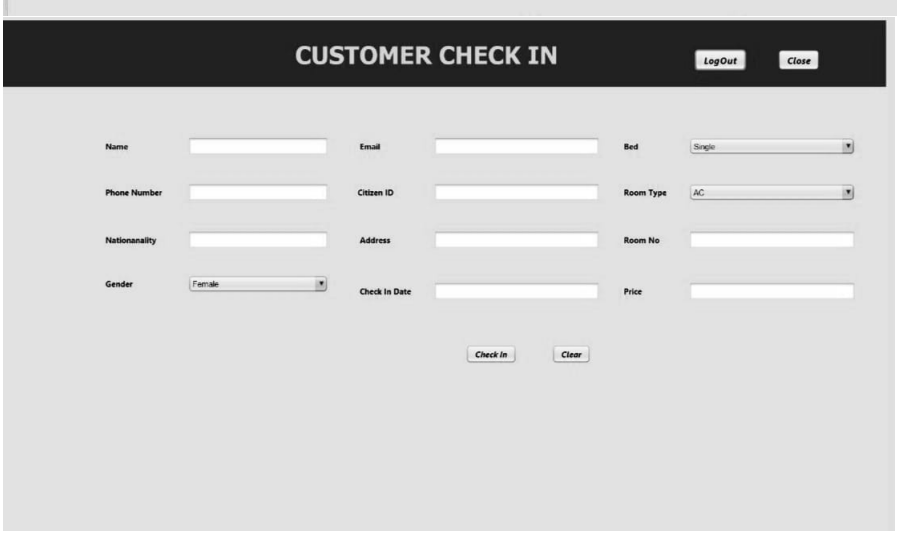


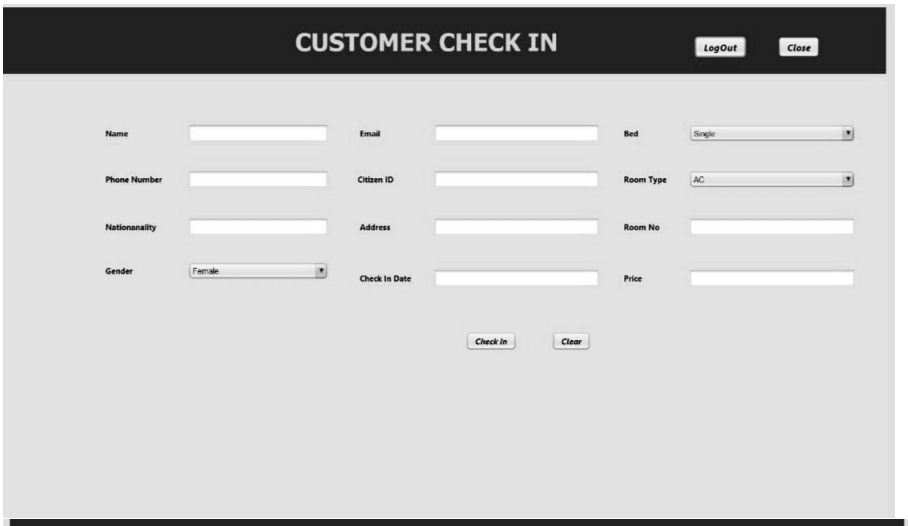


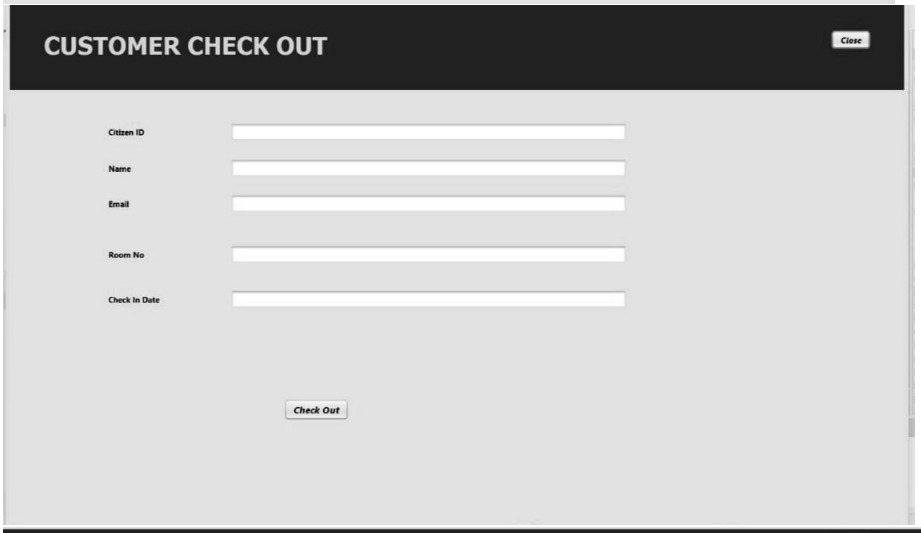


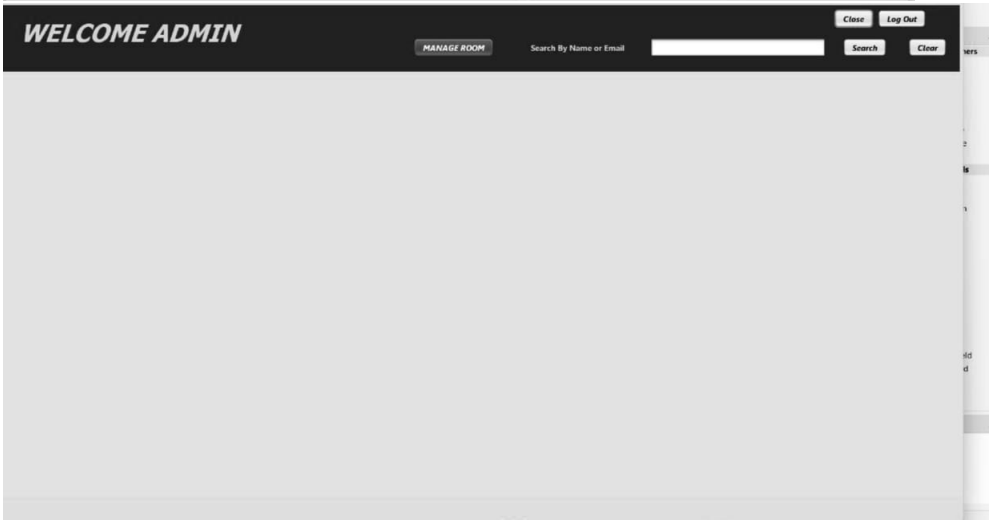

CUSTOMER SIGN IN
Email
Password
Sign In
Sign Up


MANAGE ROOM
CLOSE
Room Number
Room Type
AC
Bed
Single
Price
ADD ROOM
DELETE ROOM
UPDATE
SEARCH

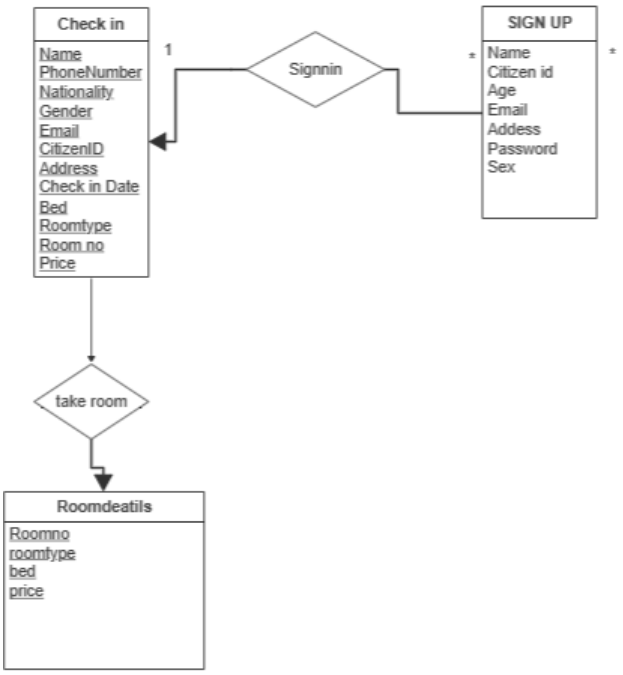

CUSTOMER CHECK IN
LogOut
Close
Name
Email
Bed
Single
Phone Number
Citizen ID
Room Type
AC
Nationanality
Address
Room No
Gender
Female
Check In Date
Price
Check In
Clear


CUSTOMER CHECK IN
LogOut
Close
Name
Email
Bed
Single
Phone Number
Citizen ID
Room Type
AC
Nationanality
Address
Room No
Gender
Female
Check In Date
Price
Check In
Clear


CUSTOMER CHECK OUT
Close
Citizen ID
Name
Email
Room No
Check In Date
Check Out


WELCOME ADMIN
Close
Log Out
MANAGE ROOM
Search By Name or Email
Search
Clear

Database Design - schema



SOFTWARE TOOLS

Apache Netbeans

Apache NetBeans is top level Apache Project dedicated to providing rock solid software development products (the Apache NetBeans IDE and the Apache NetBeans Platform) that address the needs of developers, users and the businesses who rely on NetBeans as a basis for their products; particularly, to enable them to develop these products quickly, efficiently and easily by leveraging the strengths of the Java platform and other relevant industry standards.

The two base products, the Apache NetBeans IDE and Apache NetBeans Platform, are free for commercial and non-commercial use, under the Apache license. The source code to both is available to anyone to reuse as they see fit, within the terms of use.

The Apache NetBeans project is also a vibrant community in which people from across the globe can ask questions, give advice, contribute and ultimately share in the success of our products. On the NetBeans mailing lists and forums, you will find posts from students, developers from top companies, and individuals looking to expand their skills.

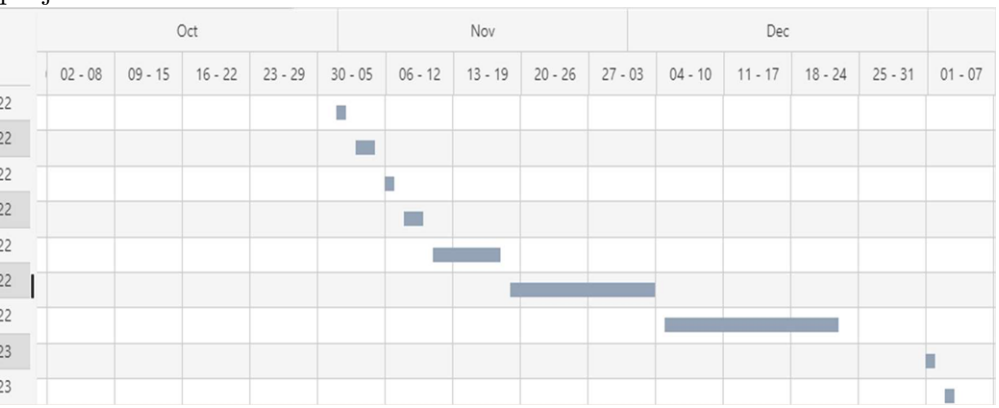
MySQL

MySQL is an open-source relational database management system. As with other relational databases, MySQL stores data in tables made up of rows and columns. Users can define, manipulate, control, and query data using Structured Query Language, more commonly known as SQL

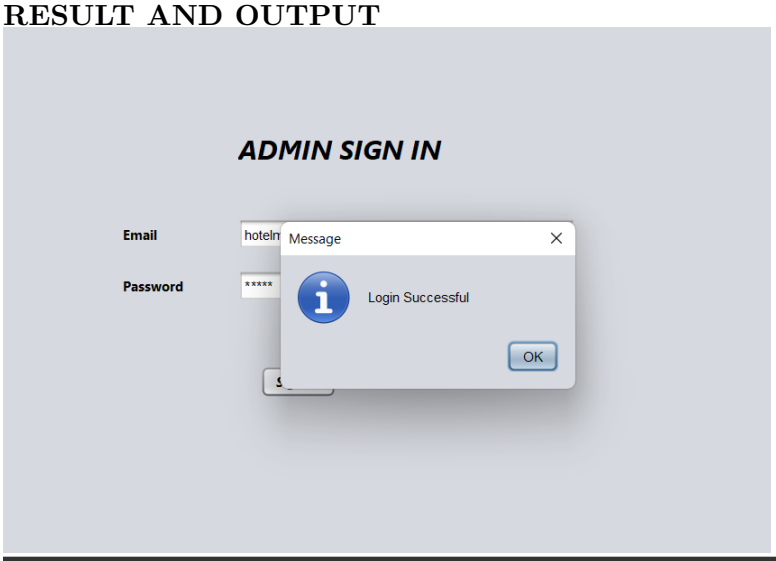
IMPLEMENTATION

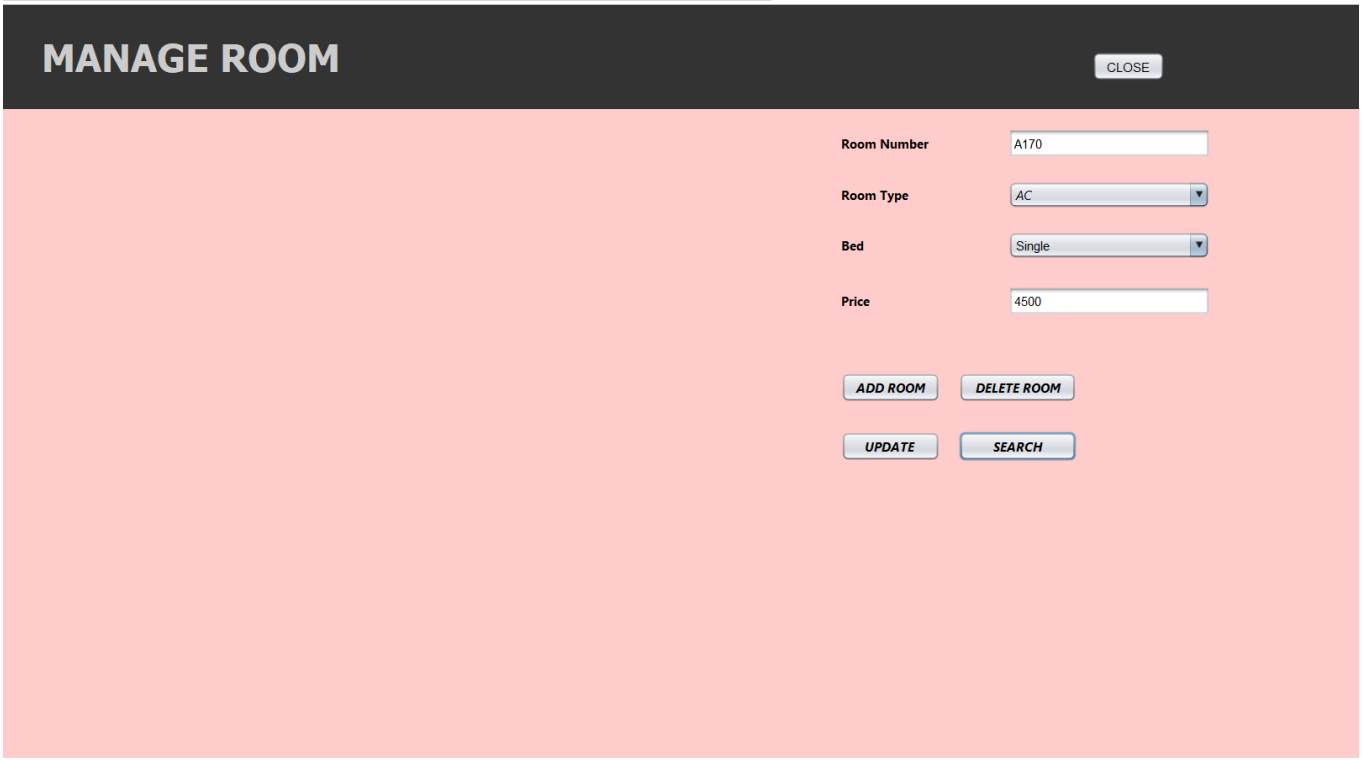
Implementation of the project

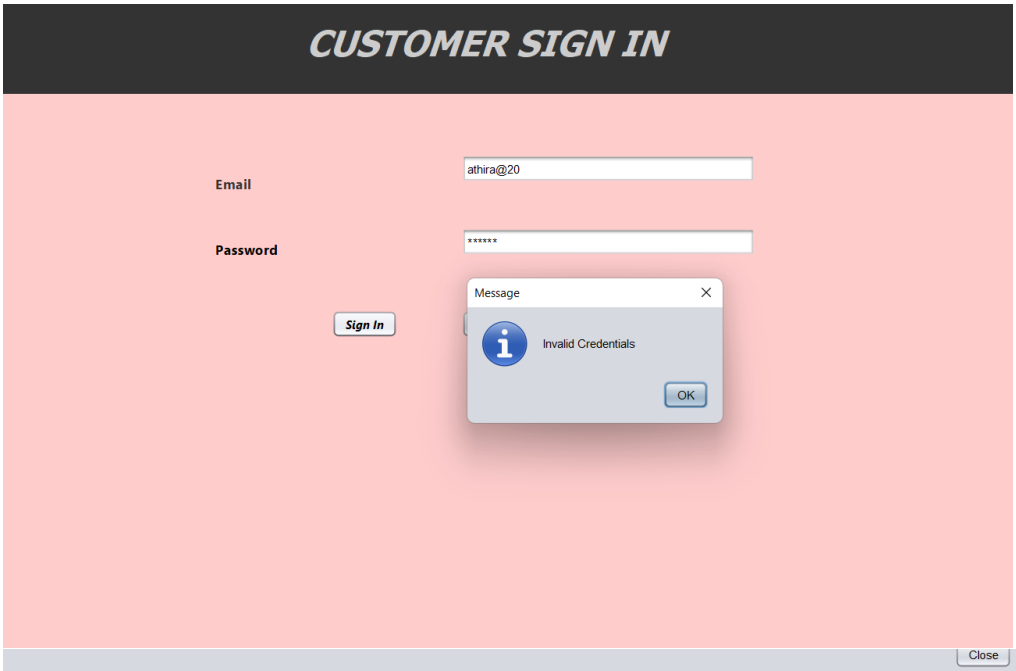
ID	Title	Start Time	End Time
1	Problem Identifi...	11/01/2022	11/02/2022
2	UI Design	11/03/2022	11/05/2022
3	UI Implementati...	11/06/2022	11/07/2022
4	Database Design	11/08/2022	11/10/2022
5	Database imple...	11/11/2022	11/18/2022
6	Back End Setting	11/19/2022	12/04/2022
7	Final Model	12/05/2022	12/23/2022
8	Testing	01/01/2023	01/02/2023
9	Buffering	01/03/2023	01/04/2023

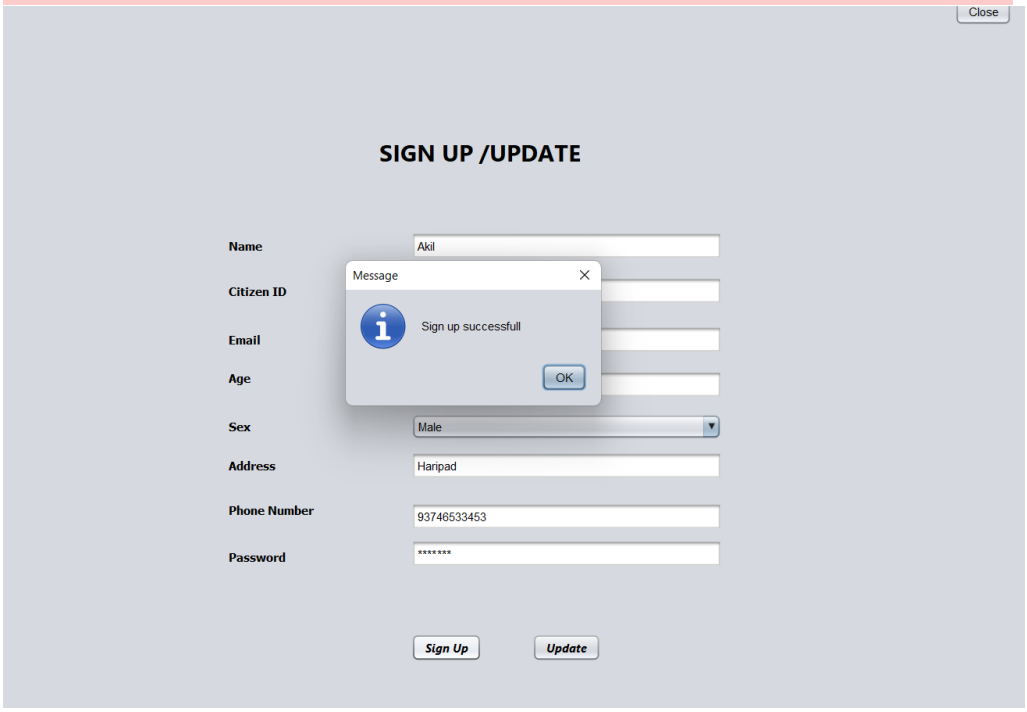


RESULT AND OUTPUT






CUSTOMER SIGN IN
Email
athira@20
Password
******
Sign In
Message
Invalid Credentials
OK


Close
SIGN UP /UPDATE
Name
Akil
Citizen ID
Email
Age
Sex
Male
Address
Haripad
Phone Number
93746533453
Password
****
Message
Sign up successfull
OK
Sign Up
Update


SIGN UP /UPDATE
Name
Akil
Citizen ID
Email
Age
Sex
Male
Address
Haripad
Phone Number
93746533453
Password
****
Sign Up
Update
Message
Update successfull
OK
CUSTOMER SIGN IN
Email
akilaki@gmail.com
Password
****
Sign In
Message
Sign In Sucessfuuly
OK

Test case no	Description	Input	Expected output	Actual Output	Result
1	Sign In whether the input username and password are right	Right username and password	Signin Success fully	Signin Sucess full	passed
2	Sign in whether the inputs username and password are wrong	Wrong username and password	signin Unsucess fully	Signin Unsucess full	Passed
3	Check whether the tables are created	Input are given	Tables created	table creates	passed
4	Check Whether Updation, Deletion, Search, are done according to the given inputs	Inputs are Given	Updation Deletion, Search Addition are are done	Done sucessfully	Passed

CRITICAL EVALUATION

CONCLUSION

Hotel management project provides room booking, other necessary hotel management features. The system allows the manager to post available rooms in the system. Customers can view and book room online. Admin has the power of either approving or disapproving the customer's booking request.

REFERENCES

References of the project