

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

Third 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

**ABHIN P.T
(80521002)**

**DEPARTMENT OF COMPUTER SCIENCE
COCHIN UNIVERSITY OF SCIENCE AND TECHNOLOGY (CUSAT)
KOCHI-682022**

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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 **ABHIN P.T (80521002)**, 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.*

Faculty Member in-charge

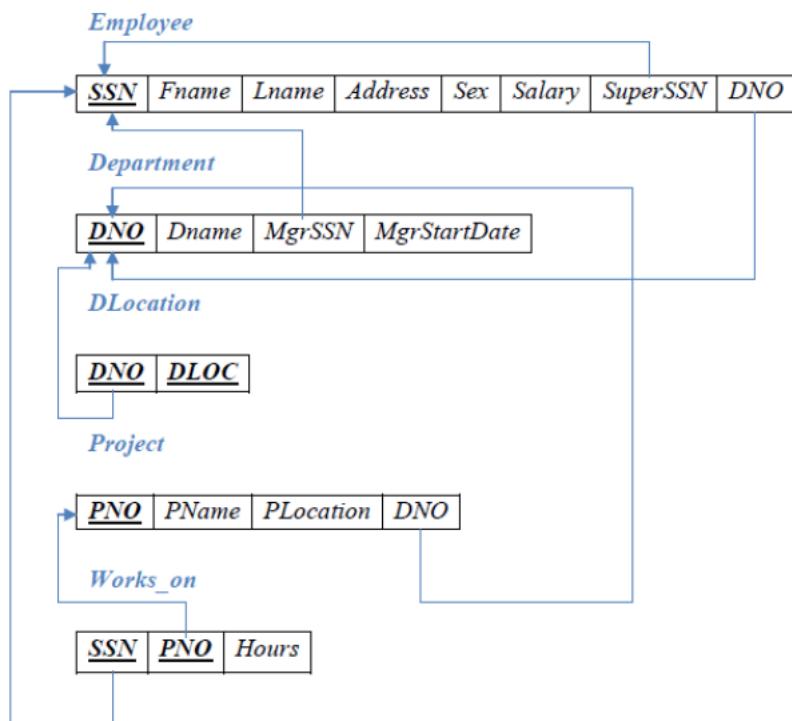
Sajmi Salaam
Guest Faculty
Department of Computer Science
CUSAT

Dr. Philip Samuel
Professor and Head
Department of Computer Science
CUSAT

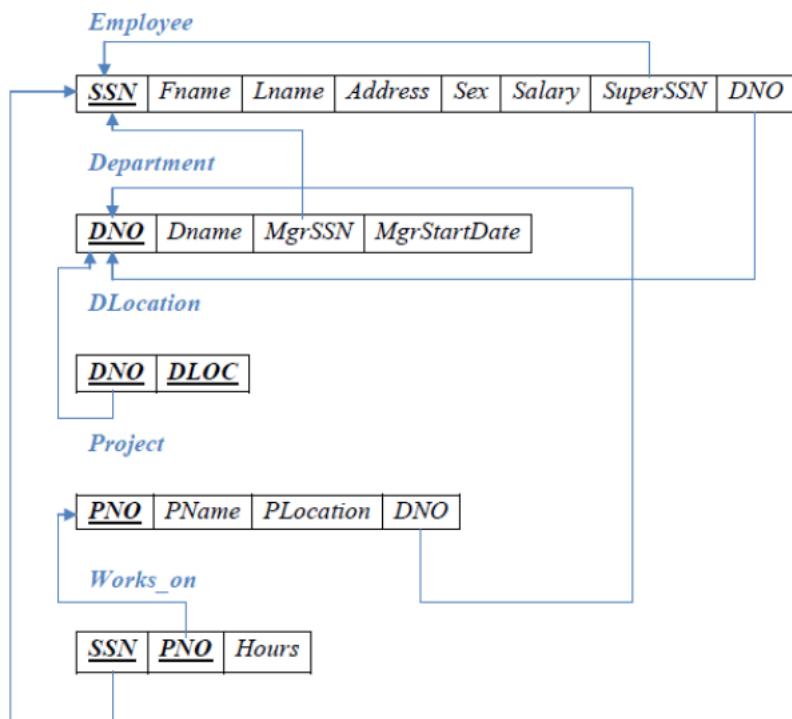
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SCHEMA DIAGRAM



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

```
create database company;

use company;

create table employee(SSN varchar(20),Name char(30),Address varchar(60),sex char(10),
salary int(90),superSSN varchar(20),DNo varchar(20));

create table department(DNo varchar(20),Dname char(50),
MgrSSN varchar(30),MgrStartDate date);

create table dlocation(DNo varchar(30),DLoc varchar(90));

create table project(PNo varchar(30),Pname char(90),Plocation varchar(80),
DNo varchar(50));

create table works_on(SSN varchar(60),PNo varchar(50),Hours time);

alter table employee add constraint primary key(SSN);
alter table department add constraint primary key(DNo);
alter table project add constraint primary key(PNo);
alter table employee add foreign key(DNo) references department(DNo);
alter table department add foreign key(MgrSSN)
references employee(SSN);
alter table dlocation add foreign key(DNo) references employee(DNo);
alter table works_on add foreign key(SSN) references employee(SSN);

desc employee;
desc works_on;
desc project;
desc dlocation;
desc department;
```

DATABASE TABLES

```
mysql> desc employee;
+-----+-----+-----+-----+-----+
| Field | Type   | Null | Key  | Default | Extra |
+-----+-----+-----+-----+-----+
| SSN   | varchar(20) | NO   | PRI   | NULL    |
| Name  | char(30)    | YES  |       | NULL    |
| Address | varchar(60) | YES  |       | NULL    |
| sex   | char(10)    | YES  |       | NULL    |
| salary | int      | YES  |       | NULL    |
| superSSN | varchar(20) | YES  |       | NULL    |
| DNo   | varchar(20) | YES  | MUL   | NULL    |
+-----+-----+-----+-----+-----+
7 rows in set (0.00 sec)

mysql> desc works_on;
+-----+-----+-----+-----+-----+
| Field | Type   | Null | Key  | Default | Extra |
+-----+-----+-----+-----+-----+
| SSN   | varchar(60) | YES  | MUL   | NULL    |
| PNo   | varchar(50)  | YES  |       | NULL    |
| Hours | time     | YES  |       | NULL    |
+-----+-----+-----+-----+-----+
3 rows in set (0.00 sec)

mysql> desc project;
+-----+-----+-----+-----+-----+
| Field | Type   | Null | Key  | Default | Extra |
+-----+-----+-----+-----+-----+
| PNo   | varchar(30) | NO   | PRI   | NULL    |
| Pname | char(90)   | YES  |       | NULL    |
| Plocation | varchar(80) | YES  |       | NULL    |
| DNo   | varchar(50)  | YES  |       | NULL    |
+-----+-----+-----+-----+-----+
4 rows in set (0.00 sec)

mysql> desc department;
+-----+-----+-----+-----+-----+
| Field | Type   | Null | Key  | Default | Extra |
+-----+-----+-----+-----+-----+
| DNo   | varchar(20) | NO   | PRI   | NULL    |
| Dname | char(50)   | YES  |       | NULL    |
| MgrSSN | varchar(30) | YES  | MUL   | NULL    |
| MgrStartDate | date | YES  |       | NULL    |
+-----+-----+-----+-----+-----+
4 rows in set (0.00 sec)

mysql> desc dlocation;
+-----+-----+-----+-----+-----+
| Field | Type   | Null | Key  | Default | Extra |
+-----+-----+-----+-----+-----+
| DNo   | varchar(30) | YES  | MUL   | NULL    |
| DLoc  | varchar(90)  | YES  |       | NULL    |
+-----+-----+-----+-----+-----+
2 rows in set (0.00 sec)
```

Questions : 2

Add another column Age with datatype integer in employee table

QUERY

```
alter table employee add column Age int;
desc employee;
```

DATABASE TABLES

```
mysql> desc employee;
+-----+-----+-----+-----+-----+-----+
| Field | Type   | Null | Key  | Default | Extra |
+-----+-----+-----+-----+-----+-----+
| SSN   | varchar(20) | NO   | PRI  | NULL    |       |
| Name  | char(30)    | YES  |       | NULL    |       |
| Address | varchar(60) | YES  |       | NULL    |       |
| sex   | char(10)    | YES  |       | NULL    |       |
| salary | int        | YES  |       | NULL    |       |
| superSSN | varchar(20) | YES  |       | NULL    |       |
| DNo   | varchar(20) | YES  | MUL  | NULL    |       |
| Age   | int        | YES  |       | NULL    |       |
+-----+-----+-----+-----+-----+-----+
8 rows in set (0.00 sec)
```

Questions : 3

Drop a table named Project

QUERY

```
drop table project;
desc project;
```

Query OK, 0 rows affected (0.01 sec)

DATABASE TABLES

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

Questions : 4

Truncate a table named WORKS_ON

QUERY

```
TRUNCATE TABLE works_on;
```

DATABASE TABLES

```
mysql> desc works_on;
+-----+-----+-----+-----+-----+
| Field | Type      | Null | Key | Default | Extra |
+-----+-----+-----+-----+-----+
| SSN   | varchar(60) | YES  | MUL | NULL    |
| PNo   | varchar(50)  | YES  |      | NULL    |
| Hours | time       | YES  |      | NULL    |
+-----+-----+-----+-----+
3 rows in set (0.00 sec)
```

Questions : 5

View the structure of the table Department

QUERY

```
desc department;
```

DATABASE TABLES

```
mysql> desc department;
+-----+-----+-----+-----+-----+
| Field     | Type      | Null | Key | Default | Extra |
+-----+-----+-----+-----+-----+
| DNo       | varchar(20) | NO   | PRI | NULL    |
| Dname     | char(50)   | YES  |      | NULL    |
| MgrSSN    | varchar(30) | YES  | MUL | NULL    |
| MgrStartDate | date     | YES  |      | 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

```
SET FOREIGN_KEY_CHECKS=0;
insert into employee values('1001','Vasu','hn1,vadayam,kuttiadi,kozhikode',
'm',50000,'s001','d001',45);
insert into employee values('1002','Haridasan','hn2,vadayam,kuttiadi,kozhikode',
'm',55000,'s002','d002',51);
insert into employee values('1003','Sajeevan','hn3,vadayam,kuttiadi,kozhikode',
'm',59000,'s003','d003',48);
insert into employee values('1004','Dineshan','hn4,vadayam,kuttiadi,kozhikode',
'm',55000,'s004','d004',46);
insert into employee values('1005','Janaki','hn5,vadayam,kuttiadi,kozhikode',
'f',38000,'s005','d005',53);
insert into department values('d1','computer science','1005','2022-04-16');
insert into department values('d2','DOE','1002','2022-01-15');
insert into department values('d3','SMS','1001','2022-08-10');
insert into department values('d4','SLS','1003','2022-12-12');
insert into department values('d5','computer science','1004','2022-04-16');
insert into dlocation values('d1','near university library');
insert into dlocation values('d2','1st floor of dcs dept');
insert into dlocation values('d3','near sbi cusat');
insert into dlocation values('d4','opposite of cusat sports arena');
insert into dlocation values('d5','opposite of cusat sports arena');
insert into works_on values('1001','p1','10:00:00');
insert into works_on values('1002','p3','06:00:00');
insert into works_on values('1003','p2','12:00:00');
insert into works_on values('1004','p5','09:00:00');
insert into works_on values('1005','p4','11:00:00');
SET FOREIGN_KEY_CHECKS=1;
```

Questions : 2

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

QUERY

```
select * from employee;
select * from department;
select * from works_on;
select * from dlocation;
```

DATABASE TABLES

```
mysql> select * from employee;
+----+-----+-----+-----+-----+-----+-----+-----+
| SSN | Name      | Address          | sex | salary | superSSN | DNo | Age |
+----+-----+-----+-----+-----+-----+-----+-----+
| 1001 | Vasu       | hn1,vadayam,kuttiadi,kozhikode | m   | 1000   | s001    | d001 | NULL |
| 1002 | Haridasan  | hn2,vadayam,kuttiadi,kozhikode | m   | 55000  | s002    | d002 | 51   |
| 1003 | Sajeevan    | hn3,vadayam,kuttiadi,kozhikode | m   | 59000  | s003    | d003 | NULL |
| 1004 | Dineshan    | hn4,vadayam,kuttiadi,kozhikode | m   | 55000  | s004    | d004 | NULL |
| 1005 | Janaki     | hn5,vadayam,kuttiadi,kozhikode | f   | 38000  | s005    | d005 | NULL |
+----+-----+-----+-----+-----+-----+-----+-----+
5 rows in set (0.00 sec)
```

```
mysql> select * from department;
+----+-----+-----+-----+
| DNo | Dname           | MgrSSN | MgrStartDate |
+----+-----+-----+-----+
| d1  | computer science | 1005   | 2022-04-16   |
| d2  | DOE              | 1002   | 2022-01-15   |
| d3  | SMS               | 1001   | 2022-08-10   |
| d4  | SLS               | 1003   | 2022-12-12   |
| d5  | computer science | 1004   | 2022-04-16   |
+----+-----+-----+-----+
5 rows in set (0.00 sec)
```

```
mysql> select * from works_on;
+----+----+-----+
| SSN | PNo | Hours        |
+----+----+-----+
| 1001 | p1  | 10:00:00 |
| 1002 | p3  | 06:00:00 |
| 1003 | p2  | 12:00:00 |
| 1004 | p5  | 09:00:00 |
| 1005 | p4  | 11:00:00 |
+----+----+-----+
5 rows in set (0.00 sec)
```

```
mysql> select * from dlocation;
+----+-----+
| DNo | DLoc          |
+----+-----+
| d1  | near university library |
| d2  | 1st floor of dcs dept   |
| d3  | near sbi cusat         |
| d4  | oposite of cusat sports arena |
| d5  | oposite of cusat sports arena |
+----+-----+
5 rows in set (0.00 sec)
```

Questions : 3

Modify the salary of the employee as 25000 whose SSN is e1001

QUERY

```
update employee set salary = 25000 where SSN = '1001';
```

DATABASE TABLES

```
mysql> select * from employee;
+----+-----+-----+-----+-----+-----+-----+-----+
| SSN | Name   | Address          | sex | salary | superSSN | DNo | Age |
+----+-----+-----+-----+-----+-----+-----+-----+
| 1001 | Vasu    | hn1,vadayam,kuttiadi,kozhikode | m   | 25000 | s001    | d001 | NULL |
| 1002 | Haridasan | hn2,vadayam,kuttiadi,kozhikode | m   | 55000 | s002    | d002 | 51   |
| 1003 | Sajeevan | hn3,vadayam,kuttiadi,kozhikode | m   | 59000 | s003    | d003 | NULL |
| 1004 | Dineshan | hn4,vadayam,kuttiadi,kozhikode | m   | 55000 | s004    | d004 | NULL |
| 1005 | Janaki   | hn5,vadayam,kuttiadi,kozhikode | f   | 38000 | s005    | d005 | NULL |
+----+-----+-----+-----+-----+-----+-----+-----+
5 rows in set (0.00 sec)
```

Questions : 4

Delete the details of the employee whose SSN is "e1002"

QUERY

```
delete from employee where SSN = '1002';
```

DATABASE TABLES

```
mysql> select * from employee;
+----+-----+-----+-----+-----+-----+-----+-----+
| SSN | Name   | Address          | sex | salary | superSSN | DNo | Age |
+----+-----+-----+-----+-----+-----+-----+-----+
| 1001 | Vasu    | hn1,vadayam,kuttiadi,kozhikode | m   | 25000 | s001    | d001 | NULL |
| 1003 | Sajeevan | hn3,vadayam,kuttiadi,kozhikode | m   | 59000 | s003    | d003 | NULL |
| 1004 | Dineshan | hn4,vadayam,kuttiadi,kozhikode | m   | 55000 | s004    | d004 | NULL |
| 1005 | Janaki   | hn5,vadayam,kuttiadi,kozhikode | f   | 38000 | s005    | d005 | NULL |
+----+-----+-----+-----+-----+-----+-----+-----+
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

```
create user 'user1'@'localhost' IDENTIFIED by 'password';  
  
grant select on company.employee to 'user1'@'localhost';
```

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 (0.00 sec)
```

Questions : 2

Revoking a privilege to all users in a table

QUERY

```
revoke select on employee from 'user1'@'localhost';
```

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

```
select name from employee where name like "%a_";
```

DATABASE TABLES

	name
▶	Sajeevan
	Dineshan

Questions : 2

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

QUERY

```
select Sex,count(Sex) from employee group by Sex;
```

DATABASE TABLES

	Sex	count(Sex)
▶	m	3
	f	1

Questions : 3

Calculate the average salary of the female employees.

QUERY

```
select avg(Salary) from employee where Sex = "F" ;
```

DATABASE TABLES

	avg(Salary)
▶	38000.0000

Questions : 4

Calculate the sum of salaries of male employees.

QUERY

```
select sum(Salary) from employee where Sex = "M";
```

DATABASE TABLES

	sum(Salary)
▶	139000

Questions : 5

Display the maximum and minimum salaries of male employees.

QUERY

```
select max(Salary),min(Salary) from employee where Sex = "M";
```

DATABASE TABLES

	max(Salary)	min(Salary)
▶	59000	25000

Questions : 6

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

QUERY

```
select * from employee where salary between 25000 and 50000;
```

DATABASE TABLES

	SSN	Name	Address	sex	salary	superSSN	DNo	Age
▶	1001	Vasu	hn1,vadayam,kuttiadi,kozhikode	m	25000	s001	d001	NULL
	1005	Janaki	hn5,vadayam,kuttiadi,kozhikode	f	38000	s005	d005	NULL

Questions : 7

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

QUERY

```
select * from employee where salary = 30000 or salary = 40000 or salary = 50000;
```

DATABASE TABLES

	SSN	Name	Address	sex	salary	superSSN	DNo	Age
▶	1005	Janaki	hn5,vadayam,kuttiadi,kozhikode	f	40000	s005	d005	NULL

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

```
update employee set salary = salary + 0.25* salary  
where Address = 'chennai';
```

DATABASE TABLES

	SSN	Name	Address	sex	salary	superSSN	DNo	Age
▶	1001	Vasu	hn1,vadayam,kuttiadi,kozhikode	m	25000	s001	d001	NULL
	1003	Sajeewan	chennai	m	115235	s003	d003	NULL
	1004	Dineshan	hn4,vadayam,kuttiadi,kozhikode	m	55000	s004	d004	NULL
	1005	Janaki	chennai	f	78125	s005	d005	NULL

Questions : 2

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

QUERY

```
select name,Dloc from employee,dlocation,works_on where dlocation.Dno = employee.Dno and w
```

DATABASE TABLES

	name	Dloc
▶	Vasu	near university library
	Sajeewan	near sbi cusat
	Dineshan	opposite of cusat sports arena
	Janaki	opposite of cusat sports arena

Questions : 3

Left join employee table and works_on table

QUERY

```
select * from EMPLOYEE left join works_on on employee.SSN = works_on.SSN;
```

DATABASE TABLES

	SSN	Name	Address	sex	salary	superSSN	DNo	Age	SSN	PNo	Hours
▶	1001	Vasu	vadakara	m	25000	s001	d1	NULL	1001	p1	10:00:00
	1003	Sajeevan	chennai	m	115235	s003	d3	NULL	1003	p2	12:00:00
	1004	Dineshan	d4	m	55000	s004	d4	NULL	1004	p5	09:00:00
	1005	Janaki	d5	f	78125	s005	d5	NULL	1005	p4	11:00:00

Questions : 4

Right join works_on table and employee table

QUERY

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

DATABASE TABLES

	SSN	PNo	Hours	SSN	Name	Address	sex	salary	superSSN	DNo	Age
▶	1001	p1	10:00:00	1001	Vasu	vadakara	m	25000	s001	d1	NULL
	1003	p2	12:00:00	1003	Sajeevan	chennai	m	115235	s003	d3	NULL
	1004	p5	09:00:00	1004	Dineshan	d4	m	55000	s004	d4	NULL
	1005	p4	11:00:00	1005	Janaki	d5	f	78125	s005	d5	NULL

Questions : 5

Full join works_on table and employee table

QUERY

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

DATABASE TABLES

	SSN	PNo	Hours	SSN	Name	Address	sex	salary	superSSN	DNo	Age
▶	1005	p4	11:00:00	1001	Vasu	vadakara	m	25000	s001	d1	NULL
	1004	p5	09:00:00	1001	Vasu	vadakara	m	25000	s001	d1	NULL
	1003	p2	12:00:00	1001	Vasu	vadakara	m	25000	s001	d1	NULL
	1002	p3	06:00:00	1001	Vasu	vadakara	m	25000	s001	d1	NULL
	1001	p1	10:00:00	1001	Vasu	vadakara	m	25000	s001	d1	NULL
	1005	p4	11:00:00	1003	Sajeevan	chennai	m	115235	s003	d3	NULL
	1004	p5	09:00:00	1003	Sajeevan	chennai	m	115235	s003	d3	NULL
	1003	p2	12:00:00	1003	Sajeevan	chennai	m	115235	s003	d3	NULL
	1002	p3	06:00:00	1003	Sajeevan	chennai	m	115235	s003	d3	NULL
	1001	p1	10:00:00	1003	Sajeevan	chennai	m	115235	s003	d3	NULL
	1005	p4	11:00:00	1004	Dineshan	d4	m	55000	s004	d4	NULL
	1004	p5	09:00:00	1004	Dineshan	d4	m	55000	s004	d4	NULL
	1003	p2	12:00:00	1004	Dineshan	d4	m	55000	s004	d4	NULL
	1002	p3	06:00:00	1004	Dineshan	d4	m	55000	s004	d4	NULL
	1001	p1	10:00:00	1004	Dineshan	d4	m	55000	s004	d4	NULL
	1005	p4	11:00:00	1005	Janaki	d5	f	78125	s005	d5	NULL
	1004	p5	09:00:00	1005	Janaki	d5	f	78125	s005	d5	NULL
	1003	p2	12:00:00	1005	Janaki	d5	f	78125	s005	d5	NULL
	1002	p3	06:00:00	1005	Janaki	d5	f	78125	s005	d5	NULL
	1001	p1	10:00:00	1005	Janaki	d5	f	78125	s005	d5	NULL

VIEWS

AIM

Develop SQL Queries for creating and dropping Views

Questions : 1

Create a view VW_emp on employee table

QUERY

```
create view VW_emp as select * from employee;
```

DATABASE TABLES

```
mysql> select * from VW_emp;
+----+-----+-----+-----+-----+-----+-----+-----+
| SSN | Name   | Address | sex  | salary | superSSN | DNo  | Age   |
+----+-----+-----+-----+-----+-----+-----+-----+
| 1001 | Vasu    | vadakara | m    | 25000  | s001    | d1    | NULL  |
| 1003 | Sajeevan | chennai  | m    | 115235 | s003    | d3    | NULL  |
| 1004 | Dineshan |           | d4   | 55000  | s004    | d4    | NULL  |
| 1005 | Janaki   | d5       | f    | 78125  | s005    | d5    | NULL  |
+----+-----+-----+-----+-----+-----+-----+-----+
4 rows in set (0.00 sec)
```

Questions : 2

Create another view VW_SSN contains SuperSSN and Dno of female employees

QUERY

```
create view VW_SSN as select SuperSSN,Dno from VW_emp where Sex = "F";
```

DATABASE TABLES

```
mysql> select * from VW_SSN;
+-----+-----+
| SuperSSN | Dno  |
+-----+-----+
| s005     | d5   |
+-----+-----+
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

```
UPDATE VW_emp SET Address="Chennai" WHERE SSN = "1001";
```

DATABASE TABLES

```
mysql> select * from VW_emp;
+-----+-----+-----+-----+-----+-----+-----+-----+
| SSN | Name      | Address | sex   | salary | superSSN | DNo    | Age   |
+-----+-----+-----+-----+-----+-----+-----+-----+
| 1001 | Vasu       | Chennai | m     | 25000  | s001    | d1     | NULL  |
| 1003 | Sajeevan   | chennai | m     | 115235 | s003    | d3     | NULL  |
| 1004 | Dineshan   | d4       | m     | 55000  | s004    | d4     | NULL  |
| 1005 | Janaki     | d5       | f     | 78125  | s005    | d5     | NULL  |
+-----+-----+-----+-----+-----+-----+-----+-----+
4 rows in set (0.00 sec)
```

Questions : 4

Delete the view VW_emp

QUERY

```
drop view VW_EMP;
```

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

```
SQL> @XEmax.sql
Function created.

MAXIMUM(4,9)

Maximum is 9
```

Questions : 3

Write a PL/SQL procedure to print the prime

QUERY

```
SQL> connect
Enter user-name: system
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;
    END LOOP;
```

```
    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

```
SQL> connect
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	SEX	SALARY
<hr/>			
LNAME			
ADDRESS			
SUPERSSN	DNO		
e1001	Archana		
Suresh			
13B,Highway Gardens,Kozhikode		Female	60000
SP1002	D001		
<hr/>			
SSN	FNAME	SEX	SALARY
<hr/>			
LNAME			
ADDRESS			
SUPERSSN	DNO		
e1002	Justin		
Varghese			
Rose Villa,Kochi		Male	50000
SP1001	D002		

SSN	FNAME	
LNAME		
ADDRESS	SEX	SALARY
SUPERSSN	DNO	
e1003 Kumar 11B,Arcadia Building,Mumbai SP1004	Meera	Female 70000
D001		
SSN	FNAME	
LNAME		
ADDRESS	SEX	SALARY
SUPERSSN	DNO	
e1004 Nath V3,DD Homes,Bangalore SP1003	Kailas	Male 30000
D003		
SSN	FNAME	
LNAME		
ADDRESS	SEX	SALARY
SUPERSSN	DNO	
e1005 Khaild Ashok Nagar,West Delhi SP1005	Sara	Female 45000
D004		
SSN	FNAME	
LNAME		
ADDRESS	SEX	SALARY
SUPERSSN	DNO	
e1006 Ashok LV Road,Bengaluru SP1005	Rahul	Male 55000
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			SP1002	D001	
SSN	FNAME	LNAME	ADDRESS	SEX	SALARY
SUPERSSN	DNO				
e1002	Justin	Varghese	Rose Villa, Kochi	Male	50000
SP1001			SP1001	D002	

SSN	FNAME		
LNAME			
ADDRESS		SEX	SALARY
SUPERSSN	DNO		
e1003 Kumar 11B,Arcadia Building,Mumbai SP1004	Meera	Female	77000
	D001		
SSN	FNAME		
LNAME			
ADDRESS		SEX	SALARY
SUPERSSN	DNO		
e1004 Nath V3,DD Homes,Bangalore SP1003	Kailas	Male	30000
	D003		
SSN	FNAME		
LNAME			
ADDRESS		SEX	SALARY
SUPERSSN	DNO		
e1005 Khaild Ashok Nagar,West Delhi SP1005	Sara	Female	45000
	D004		
SSN	FNAME		
LNAME			
ADDRESS		SEX	SALARY
SUPERSSN	DNO		
e1006 Ashok LV Road,Bengaluru SP1005	Rahul	Male	55000
	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

```
CREATE OR REPLACE TRIGGER display_salary_changes
BEFORE DELETE OR INSERT OR UPDATE ON employeetable
FOR EACH ROW
WHEN (NEW.ID > 0)
DECLARE
sal_diff number;
BEGIN
sal_diff := :NEW.Salary - :OLD.Salary;
dbms_output.put_line('Old salary: ' || :OLD.salary);
dbms_output.put_line('New salary: ' || :NEW.salary);
dbms_output.put_line('Salary difference: ' || sal_diff);
END;
/
Trigger created.

DECLARE
BEGIN
UPDATE employeetable
SET Salary = Salary + 4000;
END;
/
```

DATABASE TABLES

```
Trigger created.

SQL> set serveroutput on
SQL> @C:\Users\Sona\Desktop\h.sql
Old time: 7
New time: 5
Time difference: -2
Old time: 10
New time: 8
Time difference: -2
Old time: 9
New time: 7
Time difference: -2
Old time: 10
New time: 8
Time difference: -2
Old time: 4
New time: 2
Time difference: -2

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

```
CREATE OR REPLACE TRIGGER display_hour_changes
BEFORE DELETE OR INSERT OR update on Work_on
for each row
when (NEW.HOURS > 0)
DECLARE
hour_diff number;
BEGIN
hour_diff := :NEW.HOURS - :OLD.HOURS;
dbms_output.put_line('Old time: ' || :OLD.HOURS);
dbms_output.put_line('New time: ' || :NEW.HOURS);
dbms_output.put_line('Salary difference: ' || hour_diff);
END;
/
Trigger created.

DECLARE
BEGIN
UPDATE Works_on
SET HOURS = HOURS - 4;
```

END;

/

DATABASE TABLES

```
Old salary: 15000
New salary: 21000
Salary difference: 6000
Old salary: 20000
New salary: 26000
Salary difference: 6000
Old salary: 17000
New salary: 23000
Salary difference: 6000
Old salary: 15000
New salary: 21000
Salary difference: 6000
Old salary: 25000
New salary: 31000
Salary difference: 6000

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> |
```

GRAPH SQL

AIM

Develop a GraphQL program to print "Hello world"

OUTPUT

/geography

The screenshot shows a SPARQL query interface with the following details:

- SPARQL Endpoint:** /geography/
- Content Type (SELECT):** JSON
- Content Type (GRAPH):** Turtle
- Example Queries:**
 - Selection of triples
 - Selection of classes
- Prefixes:** rdf, rdfs, owl, xsd
- SPARQL Query:**

```

1+ prefix table:<http://www.mooney.net/geo#>
2 select ?name ?city
3 where
4 { ?geo table:isCityOf ?city
5 }
6

```
- Results:**

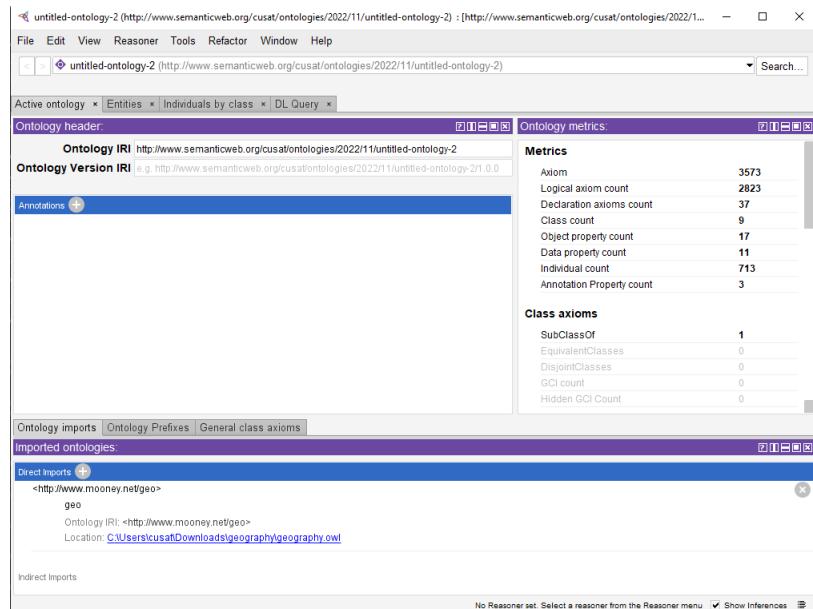
	City
1	< http://www.mooney.net/geo#alabama >
2	< http://www.mooney.net/geo#alabama >
3	< http://www.mooney.net/geo#alabama >
4	< http://www.mooney.net/geo#alabama >
5	< http://www.mooney.net/geo#alabama >
6	< http://www.mooney.net/geo#tennessee >
- Log Output:**

```

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>fuseki-server --update --mem /ds
[023:55: INFO Server   :: Apache Jena Fuseki 4.6.1]
[023:58: INFO Config  :: FUSEKI_HOME=C:\Users\cusat\Downloads\apache-jena-fuseki-4.6.1\apache-jena-fuseki-4.6.1\run
[023:58: INFO Config  :: FUSEKI_BASE=C:\Users\cusat\Downloads\apache-jena-fuseki-4.6.1\apache-jena-fuseki-4.6.1\run\shiro.ini
[024:00: INFO Config  :: Shiro file: file:///C:/Users/cusat/Downloads/apache-jena-fuseki-4.6.1/apache-jena-fuseki-4.6.1/run/shiro.ini
[024:00: INFO Config  :: Template file: templates/config-mem
[024:05: INFO Server   :: Database: in-memory
[024:05: INFO Server   :: Path = /ds
[024:05: INFO Server   :: System
[024:05: INFO Server   :: Memory: 1.2 GiB
[024:05: INFO Server   :: Java: 19.0.1
[024:05: INFO Server   :: OS: Windows 10 10.0 amd64
[024:05: INFO Server   :: PID: 11092
[024:06: INFO Server   :: Started 2022/12/15 10:24:06 IST on port 3030
[024:48: INFO Admin    :: [3] Create database : name = /geography
[024:49: ERROR Fuseki  :: [line: 1, col: 1] Content is not allowed in prolog.
[024:50: ERROR Fuseki  :: [7] Upload error: [line: 1, col: 1] Content is not allowed in prolog.
[024:50:00: INFO Fuseki :: [7] 500 Server Error (632 ms)
[024:50:12: INFO Fuseki :: [8] POST http://localhost:3030/geography/data
[024:50:12: ERROR Fuseki :: [line: 1, col: 1] Content is not allowed in prolog.
[024:50:12: INFO Fuseki :: [8] Upload error: [line: 1, col: 1] Content is not allowed in prolog.
[024:50:12: INFO Fuseki :: [8] 500 Server Error (417 ms)
[024:50:56: INFO Fuseki :: [9] POST http://localhost:3030/geography/data
[024:50:56: ERROR Fuseki :: [9] Upload error: [line: 1, col: 1] Content is not allowed in prolog.
[024:50:56: INFO Fuseki :: [9] 500 Server Error (433 ms)
[024:50:56: INFO Fuseki :: [25] POST http://localhost:3030/geography/data
[024:50:56: ERROR Fuseki :: [line: 1, col: 1] Content is not allowed in prolog.
[024:50:56: INFO Fuseki :: [25] Upload error: [line: 1, col: 1] Content is not allowed in prolog.
[024:50:56: INFO Fuseki :: [25] 500 Server Error (477 ms)
[024:50:48: INFO Fuseki :: [29] POST http://localhost:3030/geography/data
[024:50:48: ERROR Fuseki :: [line: 1, col: 1] Content is not allowed in prolog.
[024:50:48: INFO Fuseki :: [29] Upload error: [line: 1, col: 1] Content is not allowed in prolog.
[024:50:48: INFO Fuseki :: [29] 500 Server Error (433 ms)
[024:50:13: INFO Fuseki :: [29] POST http://localhost:3030/geography/data
[024:50:13: ERROR Fuseki :: [line: 1, col: 1] Content is not allowed in prolog.
[024:50:13: INFO Fuseki :: [29] Upload error: [line: 1, col: 1] Content is not allowed in prolog.
[024:50:13: INFO Fuseki :: [29] 500 Server Error (433 ms)
[024:50:13: INFO Fuseki :: [30] Filename: geography.owl, Content-Type=application/octet-stream, Charset=null => RDF/XML : Count=3589 Triples=3589 Quads=0
[024:50:03: INFO Fuseki :: [30] 200 OK (1.272 s)
[024:50:36: INFO Fuseki :: [31] POST http://localhost:3030/geography/
[024:50:36: INFO Fuseki :: [31] Query - SELECT ?subject ?predicate ?object WHERE { ?subject ?predicate ?object } LIMIT 25
[024:50:36: INFO Fuseki :: [31] 200 OK (65 ms)
[024:50:18: INFO Fuseki :: [34] POST http://localhost:3030/geography/
[024:50:18: INFO Fuseki :: [34] Query - prefix table:<https://www.mooney.net/geo> select ?name where { ?geo table:isCityOf ?city }
[024:50:18: INFO Fuseki :: [34] 200 OK (6 ms)
[024:50:59: INFO Fuseki :: [35] POST http://localhost:3030/geography/
[024:50:59: INFO Fuseki :: [35] Query - prefix table:<https://www.mooney.net/geo> select ?name where { ?geo table:isCityOf ?city }
[024:50:59: INFO Fuseki :: [35] 200 OK (4 ms)
[024:50:59: INFO Fuseki :: [36] POST http://localhost:3030/geography/
[024:50:59: INFO Fuseki :: [36] Query - prefix table:<https://www.mooney.net/geo> select ?name where { ?geo table:isCityOf ?city }
[024:50:59: INFO Fuseki :: [36] 200 OK (5 ms)
[024:50:59: INFO Fuseki :: [36] POST http://localhost:3030/geography/
[024:50:59: INFO Fuseki :: [36] Query - prefix table:<https://www.mooney.net/geo> select ?name where { ?geo table:isCityOf ?city }
[024:50:59: INFO Fuseki :: [36] 200 OK (5 ms)
[024:50:59:45: INFO Fuseki :: [37] POST http://localhost:3030/geography/
[024:50:59:45: INFO Fuseki :: [37] Query - prefix table:<https://www.mooney.net/geo> select ?name where { ?geo table:isCityOf ?city }
[024:50:59:45: INFO Fuseki :: [37] 200 OK (4 ms)
[024:50:48: INFO Fuseki :: [38] POST http://localhost:3030/geography/
[024:50:48: INFO Fuseki :: [38] Query - prefix table:<https://www.mooney.net/geo> select ?name where { ?geo table:isCityOf ?city }
[024:50:48: INFO Fuseki :: [38] 200 OK (5 ms)
[024:50:59:50: INFO Fuseki :: [39] POST http://localhost:3030/geography/
[024:50:59:50: INFO Fuseki :: [39] Query - prefix table:<https://www.mooney.net/geo> select ?name where { ?geo table:isCityOf ?city }

```



JAVA DATABASE CONNECTIVITY

AIM

Develop program to implement Java Database Connectivity

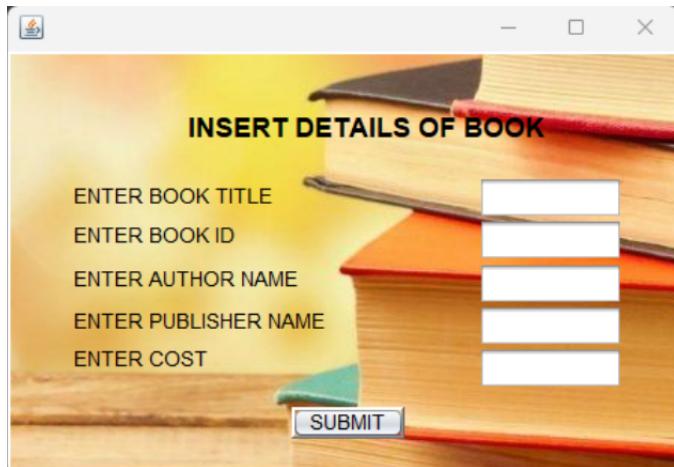
Question : 1

Write a program which connects to an online book database and insert the details of the books in to the database.

QUERY

```
private void jButton1ActionPerformed(java.awt.event.ActionEvent evt) {  
    try {  
        Class.forName("com.mysql.cj.jdbc.Driver");  
    }  
    catch (ClassNotFoundException ex) {  
        Logger.getLogger(insert.class.getName()).log(Level.SEVERE, null, ex);  
    }  
    try (Connection con = DriverManager.getConnection  
        ("jdbc:mysql://localhost:3306/book","root","root")) {  
        String sql = "insert into books values(?,?,?,?,?)";  
        PreparedStatement ps = con.prepareStatement(sql);  
        ps.setString(1,jTextField1.getText());  
        ps.setString(2,jTextField2.getText());  
        ps.setString(3, jTextField3.getText());  
        ps.setString(4, jTextField4.getText());  
        ps.setInt(5,Integer.parseInt(jTextField5.getText()));  
        ps.execute();  
        JOptionPane.showMessageDialog(this,"data saved successfully");  
    }  
    catch(HeadlessException | NumberFormatException | SQLException e){  
        JOptionPane.showMessageDialog(this,e);  
    }  
}
```

DATABASE TABLES

**Question : 2**

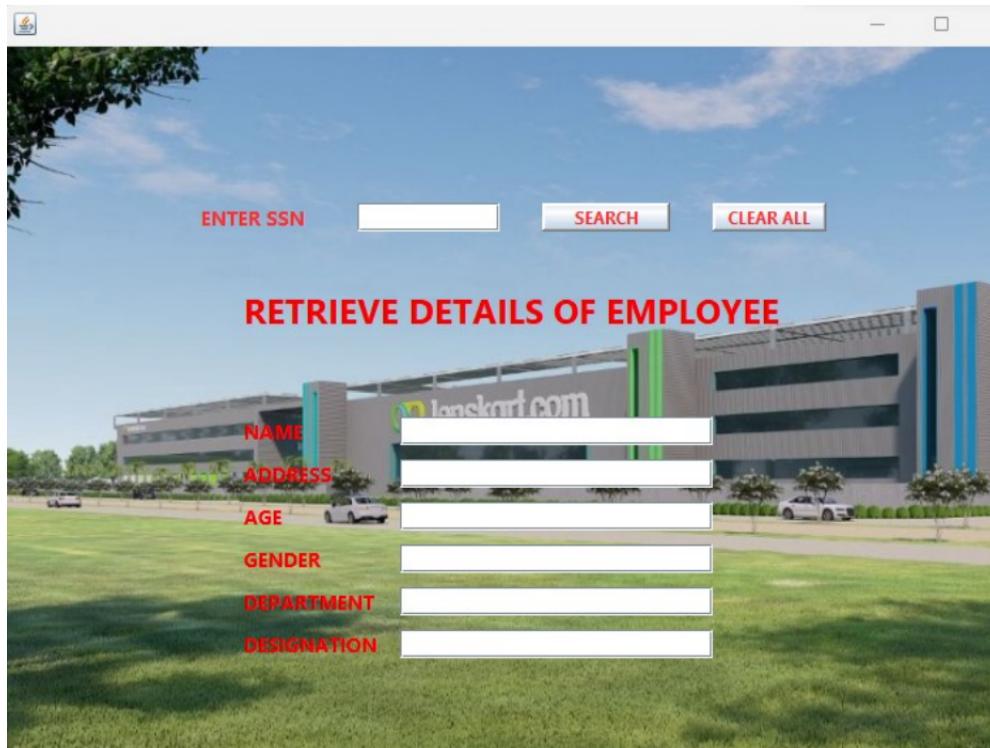
Write a program which connects to an online Employee database and retrieve the details of the employees in the database as per the schema.

QUERY

```
private void jButton1ActionPerformed(java.awt.event.ActionEvent evt) {  
    try {  
        Class.forName("com.mysql.cj.jdbc.Driver");  
    }  
    catch (ClassNotFoundException ex) {  
        Logger.getLogger(Retrieve.class.getName()).log(Level.SEVERE, null, ex);  
    }  
    try (Connection con = DriverManager.getConnection  
        ("jdbc:mysql://localhost:3306/company", "root", "root")) {  
        String sql = "select * from employee where SSN = ?";  
        PreparedStatement ps = con.prepareStatement(sql);  
        ps.setString(1, ssn.getText());  
        ResultSet rs = ps.executeQuery();  
        if(rs.next()){  
            Name.setText(rs.getString("Name"));  
            address.setText(rs.getString("Address"));  
            Age.setText(rs.getString("Age"));  
            gender.setText(rs.getString("Sex"));  
        }  
        else{  
            JOptionPane.showMessageDialog(this, "data Not Found");  
        }  
    }  
    catch(HeadlessException | NumberFormatException | SQLException e){
```

```
JOptionPane.showMessageDialog(this,e);
}
}
```

DATABASE TABLES



Question : 3

Write a program which connects to an online hospital database and update the details of the patients in the database.

QUERY

```
private void jButton3ActionPerformed(java.awt.event.ActionEvent evt) {
try {
Class.forName("com.mysql.cj.jdbc.Driver");
}
catch (ClassNotFoundException ex) {
Logger.getLogger(Update.class.getName()).log(Level.SEVERE, null, ex);
}
try (Connection con = DriverManager.getConnection
("jdbc:mysql://localhost:3306/hospital","root","root")) {
```

```
String sql = "select * from patients where phone = ?";  
PreparedStatement ps = con.prepareStatement(sql);  
ps.setString(1, phone.getText());  
ResultSet rs = ps.executeQuery();  
if(rs.next()) {  
    String sql2 = "update patients set Name=? ,Gender = ?,  
    bld_grp = ?,Age = ?,disease = ? where Phone = ?;";  
    PreparedStatement ps2 = con.prepareStatement(sql2);  
    ps2.setString(1, Name.getText());  
    ps2.setString(2, gender.getText());  
    ps2.setString(3, bld_grp.getText());  
    ps2.setInt(4, Integer.parseInt(Age.getText()));  
    ps2.setString(5, disease.getText());  
    ps2.setInt(6, Integer.parseInt(phone.getText()));  
    ps2.execute();  
    JOptionPane.showMessageDialog(this, "Data Updated Successfully");  
}  
else {  
    JOptionPane.showMessageDialog(this, "data Not Found");  
}  
}  
}  
}  
}  
catch (HeadlessException | NumberFormatException | SQLException e) {  
    JOptionPane.showMessageDialog(this, e);  
}  
}
```

DATABASE TABLES



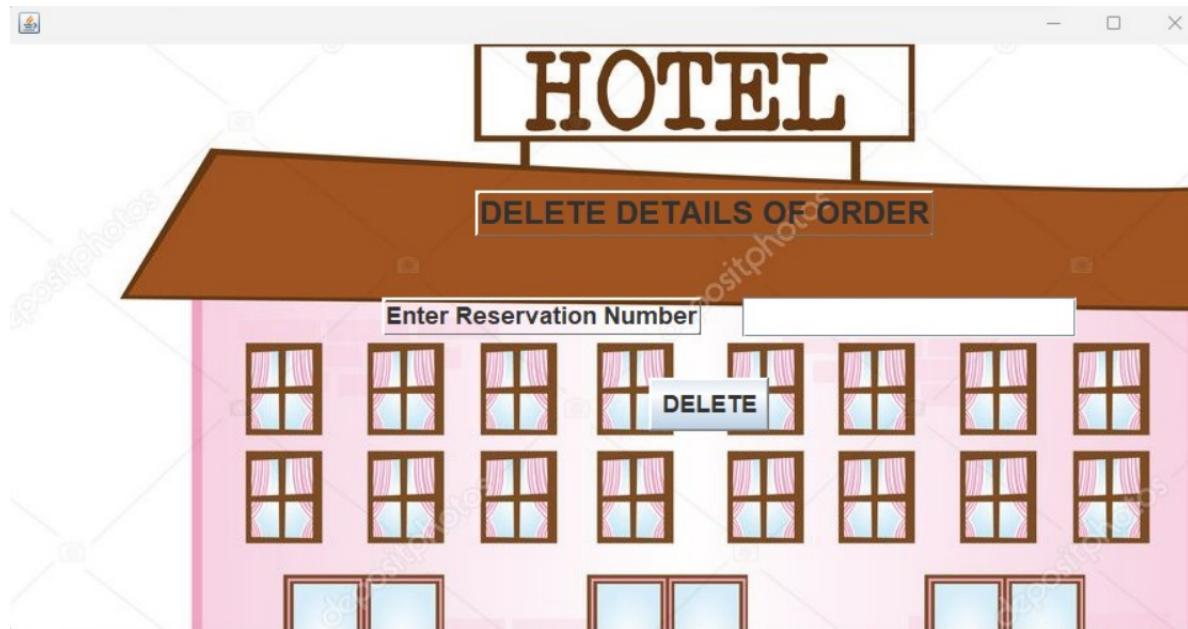
Question : 4

Write a program which connects to an online Hotel database and delete the details of the orders from the database

QUERY

```
private void jButton1ActionPerformed(java.awt.event.ActionEvent evt) {
    String res = jTextField1.getText();
    try {
        Class.forName("com.mysql.cj.jdbc.Driver");
    }
    catch (ClassNotFoundException ex) {
        Logger.getLogger(delete_order.class.getName()).log(Level.SEVERE, null, ex);
    }
    try (Connection con = DriverManager.getConnection
        ("jdbc:mysql://localhost:3306/hotel","root","root")) {
        if (res.equals("")){
            JOptionPane.showMessageDialog(this,"Empty Field Not Allowed");
        }
        PreparedStatement statement = (PreparedStatement)con.prepareStatement
        ("select * from orders where reservation_no = ?;");
        statement.setString(1, res);
        ResultSet result = statement.executeQuery();
        if (!result.next()){
            JOptionPane.showMessageDialog(this,"Data not in the DataBase");
        }
        else{
            PreparedStatement ps = (PreparedStatement)con.prepareStatement
            ("delete from orders where reservation_no = ?;");
            ps.setString(1,res);
            ps.execute();
            JOptionPane.showMessageDialog(this,"data deleted succesfully");
            con.close();
            statement.close();
            result.close();
            ps.close();
        }
    }
    catch(HeadlessException | NumberFormatException | SQLException e){
        JOptionPane.showMessageDialog(this,e);
    }
}
```

DATABASE TABLES



PROJECT

AIM

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

PROJECT DESCRIPTION

Software to allocate projects to students based on their field of expertise and interest and provide the domain expert mentors. The projects concentrates on matching key words by providing a set of unique features to both students and teachers which then is matched with each other and allocation is carried out accordingly. The project also work as a database collecting tool which contain all the key information regarding each member of the department. The application provides the Head of Department with a complete control over project allocation and professor assignment. The allocation system is purely based on field of interest of student and is not intervened by any external media. It is an user friendly platform which is comfortable to both beginners and experts.

USERS AND FUNCTIONALITIES

*User HOD :

- Access to all data
- Add/remove Professors
- Add/remove projects
- Customize student project details
- Sent messages using notice board

*User Professor:

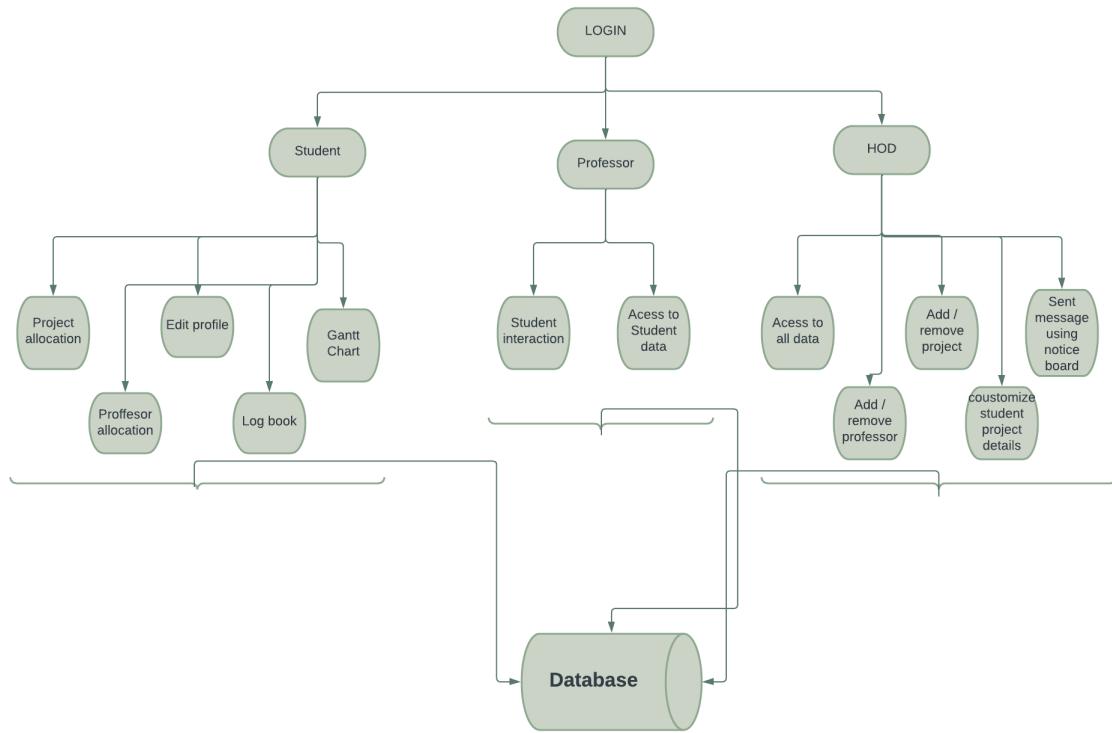
- Access to all students data
- Access to all project data
- Professor student interaction log

*User Student:

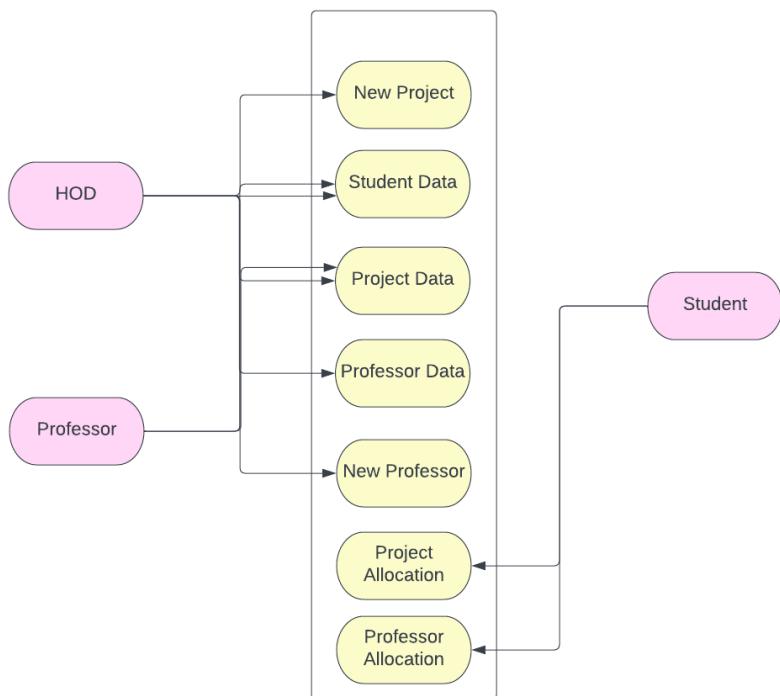
- Edit profile
- Log book
- Update Gantt chart and display

REFERENCE DESIGN

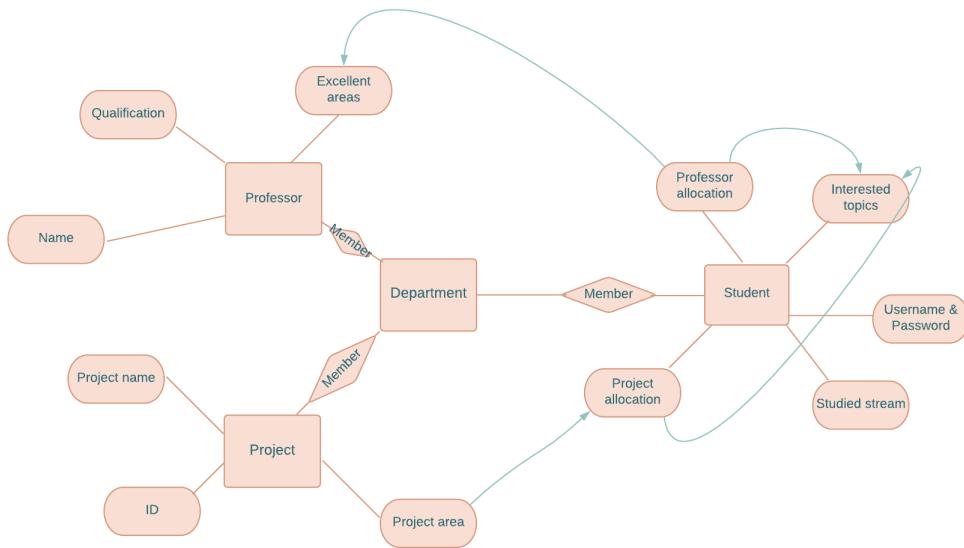
Activity diagram



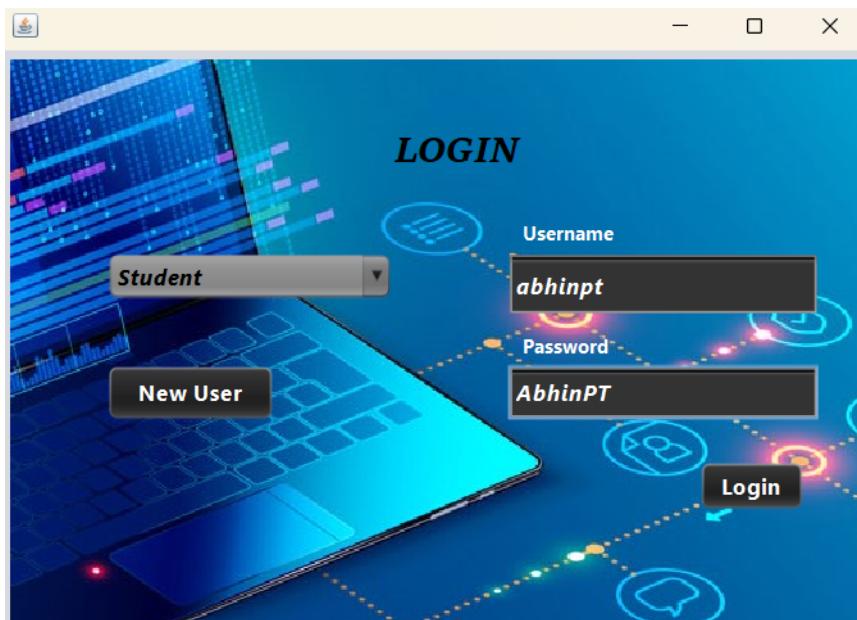
UML diagram

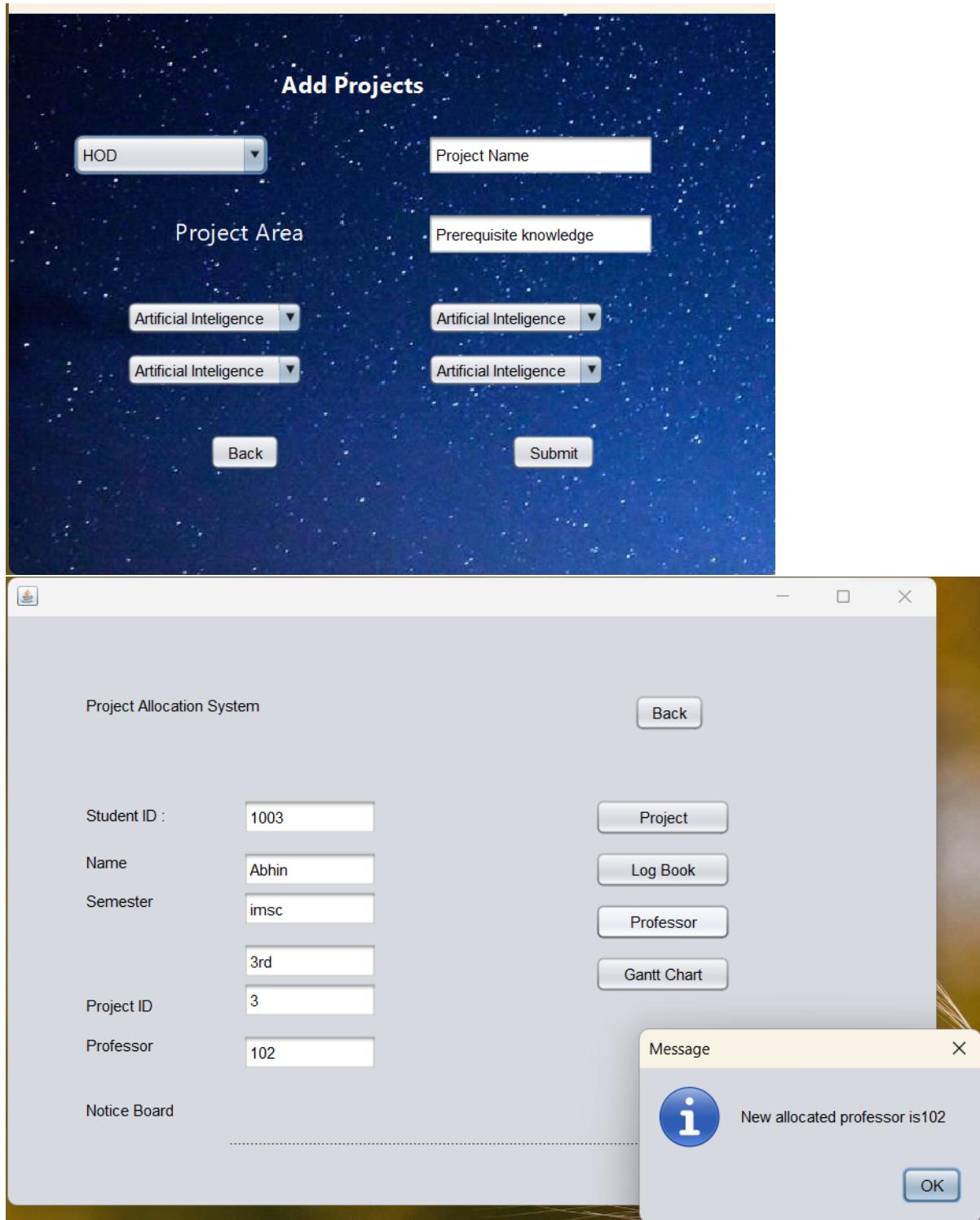


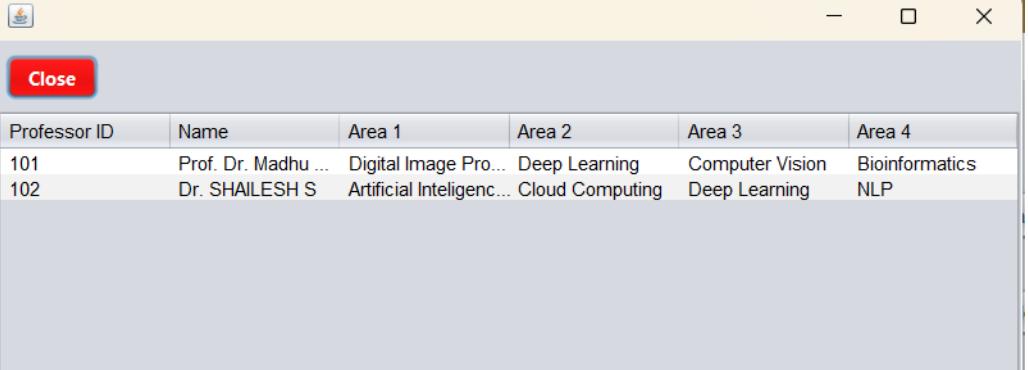
ER diagram



GUI







A screenshot of a Java Swing application window. The window has a title bar with a logo icon, minimize, maximize, and close buttons. A red 'Close' button is visible in the top-left corner of the main content area. The main content is a table with the following data:

Professor ID	Name	Area 1	Area 2	Area 3	Area 4
101	Prof. Dr. Madhu ...	Digital Image Pro...	Deep Learning	Computer Vision	Bioinformatics
102	Dr. SHAILESH S	Artificial Inteligenc...	Cloud Computing	Deep Learning	NLP

SOFTWARE TOOLS

java.sql.Connection
java.sql.DriverManager
java.sql.SQLException
javax.swing.JOptionPane
javax.swing.table.DefaultTableModel
java.sql.ResultSet

IMPLEMENTATION

User login :

```
private void loginActionPerformed(java.awt.event.ActionEvent evt)
{
    String userName = username.getText();
    String pass = password.getText();
    String usertype = (String)login_combobox.getSelectedItem();

    if(usertype == "HOD"){
        if(userName.equals("hod") && pass.equals("hodpass")){
            System.out.println(userName+" "+pass);
            HOD h = new HOD();
            h.setVisible(true);
            this.setVisible(false);
        }
    }
}
```

```
JOptionPane.showMessageDialog(null  
,"Invalid Credentials");  
}  
}  
  
else if(usertype == "Student"){  
try{  
    Class.forName("com.mysql.jdbc.Driver");  
    Connection con=DriverManager.getConnection("jdbc:  
mysql://localhost:3306/  
projectallocationsystem","root","root");  
    Statement stml=con.createStatement();  
    ResultSet rs=stml.executeQuery("select * from student  
where username = '" +userName+ "' and  
passwords = '" +pass+ "'");  
  
    if(rs.next())  
    {  
        dispose();  
        Student S = new Student(rs);  
        S.setVisible(true);  
    }  
    else{  
        JOptionPane.showMessageDialog(null,  
        "Invalid Credentials");  
    }  
}  
catch(Exception e){  
    System.out.println(e);  
}  
}
```

```
        else if(userType == "Professor"){
            try{
                Class.forName("com.mysql.jdbc.Driver");
                Connection con=DriverManager.getConnection("jdbc:mysql://localhost:3306/projectallocationsystem","root","root");
                Statement stml=con.createStatement();
                ResultSet rs=stml.executeQuery("select * from professor where username = '" + userName + "' and password = '" + pass + "'");
                if(rs.next())
                {
                    dispose();
                    Professor P = new Professor(rs);
                    P.setVisible(true);
                }
                else{
                    JOptionPane.showMessageDialog(null, "Invalid Credentials");
                }
            }
            catch(Exception e){
                System.out.println(e);
            }
        }
    }
}
```

New User Sign In

```
private void SubmitButtonActionPerformed(java.awt.
```

```
event.ActionEvent evt) {  
    String name = Tname.getText();  
    String course = Tcourse.getText();  
    String semString = Tsem.getText();  
    //      int sem = Integer.parseInt(semString);  
    String stream = Tstream.getText();  
    String area1 = (String)Combo1.getSelectedItem();  
    String area2 = (String)Combo2.getSelectedItem();  
    String area3 = (String)Combo3.getSelectedItem();  
    String area4 = (String)Combo4.getSelectedItem();  
    String password = pass.getText();  
    String usernamee = username.getText();  
    String passComfirm = passcomf.getText();  
    if(password.equals(passComfirm)){  
        try{  
            Class.forName("com.mysql.jdbc.Driver");  
            Connection con=DriverManager.getConnection("jdbc:mysql:  
//localhost:3306/projectallocationsystem","root","root");  
            Statement stml=con.createStatement();  
            String sql1 = "insert into student(sname,course,  
semester,BtechOrPlustwo,  
topic1,topic2,topic3,topic4,username,passwords)  
values('"+name+"','"+course+"','"+semString+"',  
'"+stream+"','"+area1+"','"+area2+"','"+area3+"',  
'"+area4+"','"+usernamee+"','"+password+"')";  
            stml.executeUpdate(sql1);  
            JOptionPane.showMessageDialog(null,"Sign in successfull");  
        }  
        catch(Exception e){  
            System.out.println(e);  
        }  
    }  
}
```

```
    }
    else{
        JOptionPane.showMessageDialog(null,"Password
        and Confirmation password are different");
    }
}
```

Project Allocation

```
private void getProjectActionPerformed(java.awt.
event.ActionEvent evt) {
    // TODO add your handling code here:
    int [] [] projectMatching = new int[3][2];
    for(int i=0;i<3;i++){
        projectMatching[i][1] = 0;
    }
    if(this.allocatedProject == 0){

try{
    Class.forName("com.mysql.jdbc.Driver");
    Connection con=DriverManager.getConnection("jdbc:
mysql://localhost:3306/projectallocationsystem"
    ,"root","root");
    Statement stml=con.createStatement();
    ResultSet rs=stml.executeQuery("select
    * from project");

    if(!rs.next())
    {
        JOptionPane.showMessageDialog(null,
        "No project available");
    }
}
}
```

```
    }

    else{

        rs_project = rs;

        int projectid=0;
        System.out.println("Projects : ");

        do{

            projectMatching[projectid][0] = rs.getInt("prid");

            for(int i =0;i<4;i++){
                for(int j=0;j<4;j++){
                    if(interestedTopics[i] ==
                        null ? rs.getString(j+4) == null :
                        interestedTopics[i].equals(rs.
                        getString(j+4))){
                        projectMatching[projectid][1]++;
                    }
                }
            }

            System.out.println(rs_project.getString(2));
            projectid++;
        }while(rs.next());

    }

    catch(HeadlessException | ClassNotFoundException
```

```
| SQLException e){  
    System.out.println(e);  
}  
  
  
for(int i =0;i<3;i++){  
    for(int j=0;j<2;j++){  
        System.out.print(projectMatching[i][j]+" ");  
    }  
    System.out.println(" ");  
}  
  
  
Arrays.sort(projectMatching, (final int []  
entry1, final int[] entry2) -> {  
    if(entry1[1] > entry2[1])  
        return 1;  
    else  
        return -1;  
});  
  
  
System.out.println(" ");  
System.out.println("After sort : ");  
System.out.println(" ");  
for(int i =0;i<3;i++){  
    for(int j=0;j<2;j++){  
        System.out.print(projectMatching[i][j]+" ");  
    }  
    System.out.println(" ");  
}  
  
  
try{
```

```
//Class.forName("com.mysql.jdbc.Driver");
Connection con=DriverManager.getConnection("jdbc:
mysql://localhost:3306/
projectallocationsystem","root","root");
Statement stml=con.createStatement();
String sql1 = "update student set
allocated_project = '" + projectMatching[2][0] +
where sid = '" + studentID + "' ;
stml.executeUpdate(sql1);
JOptionPane.showMessageDialog(null,"New Project
"+projectMatching[2][0]+" added");
jtextProject.setText(String.valueOf
(projectMatching[2][0]));
}
catch(Exception e){
    System.out.println(e);
}
this.allocatedProject = projectMatching[2][0];
}

else{
    JOptionPane.showMessageDialog(null,
    "Project is "+allocatedProject);
}
}
```

RESULT AND OUTPUT

Project Allocation System

Back

Student ID : 1003 Project

Name Abhin Log Book

Semester imsc Professor

3rd Gantt Chart

Project ID 3

Professor 102

Notice Board

Message

New allocated professor is 102

OK

Close

Student	Project ID	Professor ID	Interested Topic1	Interested Topic2	Interested Topic3	Interested Topic4
Abhin	3	102	Artificial Intelligence	ML	Deep Learning	Cloud Computing
Noble	2	102	Deep Learning	Quantum Computing	NLP	IOT
Abhishek	1	101	Deep Learning	Computer Vision	Bioinformatics	Digital Image Processing
Abhishek Mohan	2	102	Deep Learning	ML	IOT	Artificial Intelligence

Close

Enter Project ID

Search

Delete

Project ID	Project Name	Area1	Area2	Area3	Area4
1	Face Detection	ML	Deep Learning	Digital Image Processing	Computer Vision
2	Chatbox	Artificial Intelligence	NLP	IOT	Deep Learning
3	Language Identifier	NLP	Artificial Intelligence	Deep Learning	ML

CRITICAL EVALUATION

Login

No	Input	Expected o/p	Actual o/p
1	username = wrong, pswd = correct	fail	fail
2	username = correct, pswd = wrong	fail	fail
3	username =correct, pswd = correct	login	login

Project Searching and deleting using project id

No	Input	Expected o/p	Actual o/p
1	project id = 1	Face detection	Face detection
2	project id = 2	chatbox	chatbox
3	project id = 3	Language identifier	Language identifier

Project allocation

No	Input	Output
1	interested topic of student	matching project 2
2	interested topic of student	matching project 2
3	interested topic of student	matching project 1

Professor allocation

No	Input	Output
1	interested topic of student	matching professor 102
2	interested topic of student	matching professor 102
3	interested topic of student	matching professor 101

CONCLUSION

Project Allocation System is software that store basic details of a department also it allocate projects to students based on their field of expertise and interest and provide the domain expert mentors

REFERENCES

MySQL

JAVA Database Connectivity

JAVA Swing