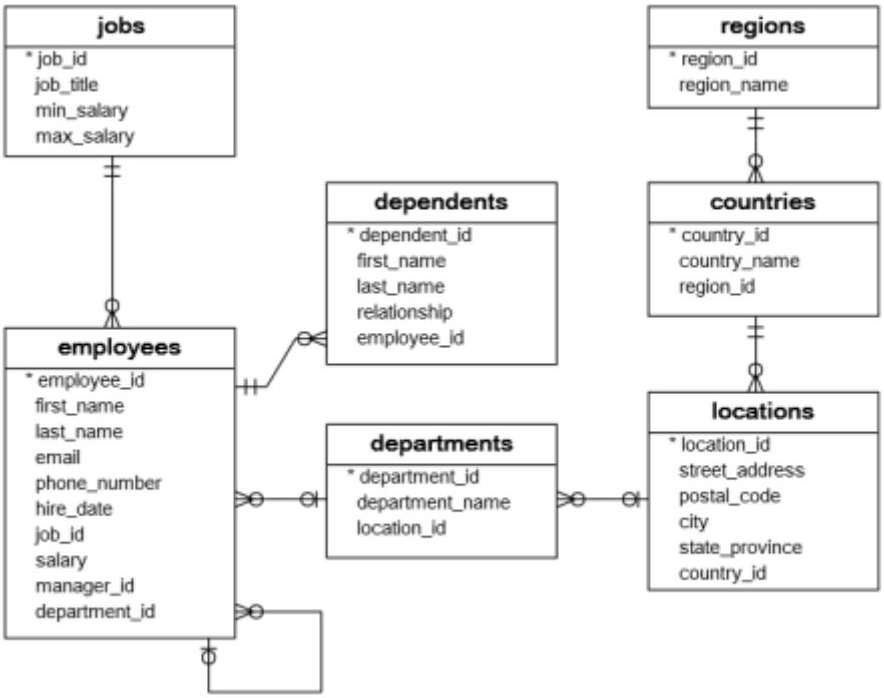
EXERCISE 1

Date: 13/02/2024



The company database has seven tables:

1. The employees table stores the data of employees.
2. The jobs table stores the job data including job title and salary range.
3. The departments table stores department data.
4. The dependents table stores the employee's dependents.
5. The locations table stores the location of the departments of the company.
6. The countries table stores the data of countries where the company is doing business.
7. The regions table stores the data of regions such as Asia, Europe, America, and the Middle East and Africa. The countries are grouped into regions.

I. WRITE QUERIES IN MYSQL TO DO THE FOLLOWING: -

DDL COMMANDS

1. Design and create database which consists of above seven tables.
2. Rename Departments table to Dept.
3. Modify Column Salary from int to smallint
4. Add Commission column to the Employees table.

DML COMMANDS

5. Enter appropriate queries to insert values in Employees table.

(Note: Check the columns in the table before you insert data and do

appropriate modifications)

ER Diagram: -

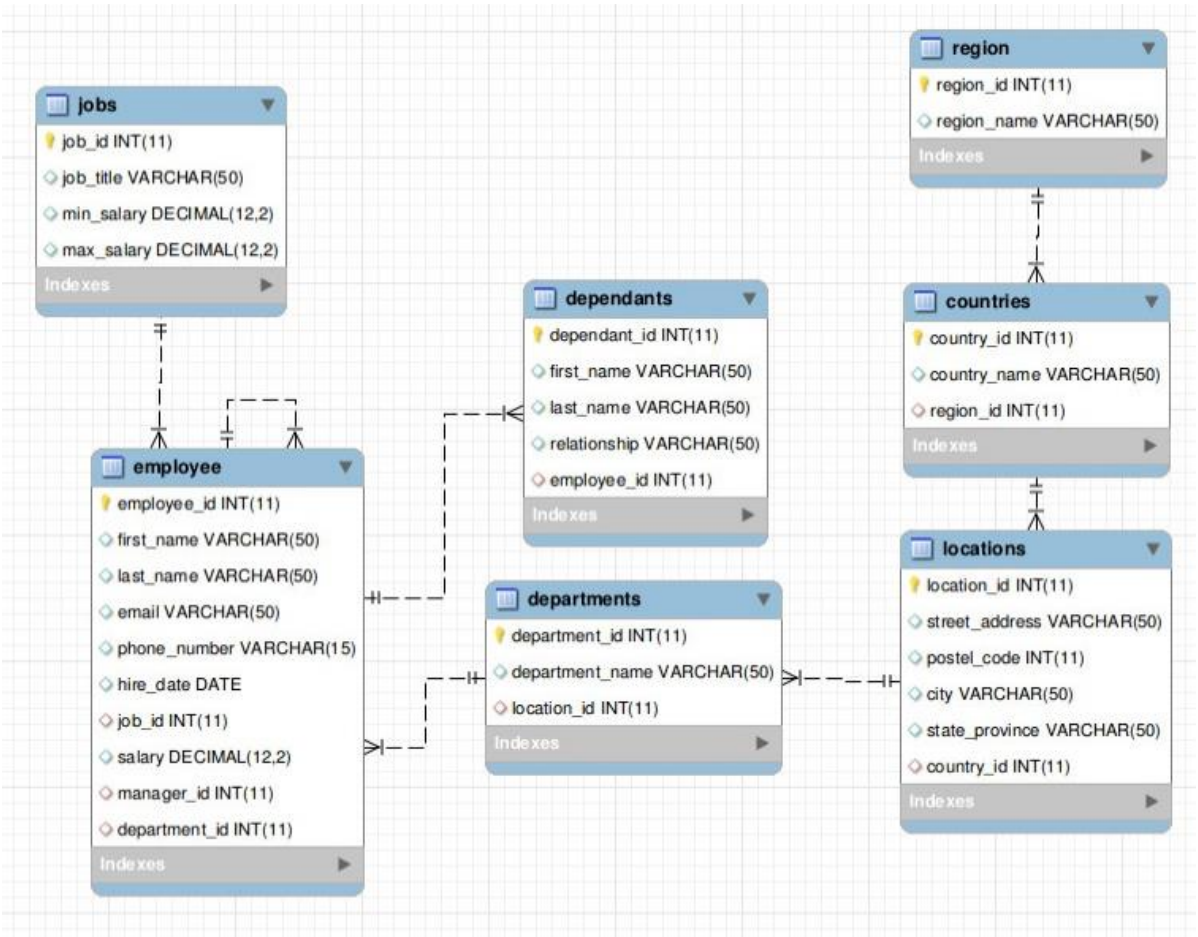


Table structure of regions:-

#	Field	Type	Null	Key	Default	Extra
1	region_id	int(11)	NO	PRI	NULL	
2	region_name	varchar(50)	YES		NULL	

Table structure of countries: -

#	Field	Type	Null	Key	Default	Extra
1	country_id	varchar(10)	NO	PRI	NULL	
2	country_name	varchar(50)	YES		NULL	
3	region_id	int(11)	YES	MUL	NULL	

SQL QUERIES: -

1. **Design and create database which consists of above seven tables.**

```
create database company;

use company;

create table jobs (job_id varchar(10) primary key, job_title varchar(50), min_salary
double(10,2),max_salary double(10,2));


create table regions(region_id varchar(10) primary key,region_name varchar(50));


create table countries(country_id varchar(10) primary key, country_name varchar(50), region_id
varchar(10) ,foreign key (region_id) references regions(region_id));


create table locations(location_id varchar(10) primary key, street_address varchar(50), postal_code
varchar(50), city varchar(50),state_province varchar(50),country_id varchar(10), foreign key
(country_id) references countries(country_id));


create table departments(department_id varchar(10) primary key, department_name varchar(50),
location_id varchar(10),foreign key (location_id)references locations(location_id));


create table employees(employee_id  varchar(10) primary key, first_name varchar(50),last_name
varchar(50),email varchar(50),phone_number varchar(50), hire_date date,job_id varchar(10), salary
double(10,2), manager_id varchar(10), department_id varchar(10),foreign key (department_id)
references departments(department_id),foreign key(job_id) references jobs (job_id), foreign
key(manager_id) references employees(employee_id));


create table dependents(dependent_id varchar(10),first_name varchar(50),last_name
varchar(50),relationship varchar(50), employee_id varchar(10),foreign key (employee_id)references
employees(employee_id));
```

2. **Rename Departments table to Dept.**

```
alter table departments rename dept;
```

3. **Modify Column Salary from int to smallint**

```
alter table employees modify column salary SMALLINT;
```

4. **Add Commission column to the Employees table**.

```
alter table employees add commission int;
```

Table structure of dependants: -

#	Field	Type	Null	Key	Default	Extra
1	dependant_id	int(11)	NO	PRI	NULL	
2	first_name	varchar(50)	YES		NULL	
3	last_name	varchar(50)	YES		NULL	
4	relationship	varchar(50)	YES		NULL	
5	employee_id	int(11)	YES	MUL	NULL	

Table structure of departments: -

#	Field	Type	Null	Key	Default	Extra
1	department_id	int(11)	NO	PRI	NULL	
2	department_name	varchar(50)	YES		NULL	
3	location_id	int(11)	YES	MUL	NULL	

Table structure of employees: -

#	Field	Type	Null	Key	Default	Extra
1	employee_id	int(11)	NO	PRI	NULL	
2	first_name	varchar(50)	YES		NULL	
3	last_name	varchar(50)	YES		NULL	
4	email	varchar(50)	YES		NULL	
5	phone_number	varchar(15)	YES		NULL	
6	hire_date	date	YES		NULL	
7	job_id	int(11)	YES	MUL	NULL	
8	salary	decimal(12,2)	YES		NULL	
9	manager_id	int(11)	YES	MUL	NULL	
10	department_id	int(11)	YES	MUL	NULL	

Table structure of jobs: -

#	Field	Type	Null	Key	Default	Extra
1	job_id	int(11)	NO	PRI	NULL	
2	job_title	varchar(50)	YES		NULL	
3	min_salary	decimal(12,2)	YES		NULL	
4	max_salary	decimal(12,2)	YES		NULL	

Data for regions: -

INSERT INTO regions(region_id,region_name) VALUES ('1','Europe');

INSERT INTO regions(region_id,region_name) VALUES ('2','Americas');

INSERT INTO regions(region_id,region_name) VALUES ('3','Asia');

INSERT INTO regions(region_id,region_name) VALUES ('4','Middle East and Africa');

Data for countries: -

INSERT INTO countries(country_id,country_name,region_id) VALUES ('AR','Argentina','2');

INSERT INTO countries(country_id,country_name,region_id) VALUES ('AU','Australia','3');

INSERT INTO countries(country_id,country_name,region_id) VALUES ('BE','Belgium','1');

INSERT INTO countries(country_id,country_name,region_id) VALUES ('BR','Brazil','2');

INSERT INTO countries(country_id,country_name,region_id) VALUES ('CA','Canada','2');

INSERT INTO countries(country_id,country_name,region_id) VALUES ('CH','Switzerland','1');

INSERT INTO countries(country_id,country_name,region_id) VALUES ('CN','China','3');

Data for locations: -

INSERT INTO locations(location_id,street_address,postal_code,city,state_province,country_id) VALUES ('1400','2014 Jabberwocky Rd','26192','Southlake','Texas','US');

INSERT INTO locations(location_id,street_address,postal_code,city,state_province,country_id) VALUES ('1500','2011 Interiors Blvd','99236','South San Francisco','California','US');

INSERT INTO locations(location_id,street_address,postal_code,city,state_province,country_id) VALUES ('1700','2004 Charade Rd','98199','Seattle','Washington','US');

INSERT INTO locations(location_id,street_address,postal_code,city,state_province,country_id) VALUES ('1800','147 Spadina Ave','M5V 2L7','Toronto','Ontario','CA');

INSERT INTO locations(location_id,street_address,postal_code,city,state_province,country_id) VALUES ('2400','8204 Arthur St',NULL,'London',NULL,'UK');

INSERT INTO locations(location_id,street_address,postal_code,city,state_province,country_id) VALUES ('2500','Magdalen Centre, The Oxford Science Park','OX99ZB','Oxford','Oxford','UK');

INSERT INTO locations(location_id,street_address,postal_code,city,state_province,country_id) VALUES ('2700','Schwanthalerstr. 7031','80925','Munich','Bavaria','DE');

Table structure of locations: -

#	Field	Type	Null	Key	Default	Extra
1	location_id	int(11)	NO	PRI	NULL	
2	street_address	varchar(50)	YES		NULL	
3	postel_code	varchar(10)	YES		NULL	
4	city	varchar(50)	YES		NULL	
5	state_province	varchar(50)	YES		NULL	
6	country_id	varchar(10)	YES	MUL	NULL	

Table of regions:-

region_id	region_name
1	Europe
2	Americas
3	Asia
4	Middle East and Africa

Table of countries: -

country_id	country_name	region_id
AR	Argentina	2
AU	Australia	3
BE	Belgium	1
BR	Brazil	2
CA	Canada	2
CH	Switzerland	1
CN	China	3
DE	Germany	1
DK	Denmark	1
EG	Egypt	4
FR	France	1
HK	HongKong	3
IL	Israel	4
IN	India	3
IT	Italy	1

Table of locations: -

location_id	street_address	postal_code	city	state_province	country_id
1400	2014 Jabberwocky Rd	26192	Southlake	Texas	US
1500	2011 Interiors Blvd	99236	South San Francisco	California	US
1700	2004 Charade Rd	98199	Seattle	Washington	US
1800	147 Spadina Ave	M5V 2L7	Toronto	Ontario	CA
2400	8204 Arthur St	NULL	London	NULL	UK
2500	Magdalen Centre, The Oxford Science Park	OX99ZB	Oxford	Oxford	UK
2700	Schwanthalerstr. 7031	80925	Munich	Bavaria	DE

Data for jobs: -

INSERT INTO jobs(job_id,job_title,min_salary,max_salary) VALUES ('1','Public Accountant',4200.00,9000.00);

INSERT INTO jobs(job_id,job_title,min_salary,max_salary) VALUES ('2','Accounting Manager',8200.00,16000.00);

INSERT INTO jobs(job_id,job_title,min_salary,max_salary) VALUES ('3','Administration Assistant',3000.00,6000.00);

INSERT INTO jobs(job_id,job_title,min_salary,max_salary) VALUES ('4','President',20000.00,40000.00);

INSERT INTO jobs(job_id,job_title,min_salary,max_salary) VALUES ('5','Administration Vice President',15000.00,30000.00);

INSERT INTO jobs(job_id,job_title,min_salary,max_salary) VALUES ('6','Accountant',4200.00,9000.00);

INSERT INTO jobs(job_id,job_title,min_salary,max_salary) VALUES ('7','Finance Manager',8200.00,16000.00);

INSERT INTO jobs(job_id,job_title,min_salary,max_salary) VALUES ('8','Human Resources Representative',4000.00,9000.00);

Data for departments: -

INSERT INTO dept(department_id,department_name,location_id) VALUES ('1','Administration','1700');

INSERT INTO dept(department_id,department_name,location_id) VALUES ('2','Marketing','1800');

INSERT INTO dept(department_id,department_name,location_id) VALUES ('3','Purchasing','1700');

INSERT INTO dept(department_id,department_name,location_id) VALUES ('4','Human Resources','2400');

INSERT INTO dept(department_id,department_name,location_id) VALUES ('5','Shipping','1500');

INSERT INTO dept(department_id,department_name,location_id) VALUES ('6','IT','1400');

INSERT INTO dept(department_id,department_name,location_id) VALUES ('7','Public Relations','2700');

INSERT INTO dept(department_id,department_name,location_id) VALUES ('8','Sales','2500');

INSERT INTO dept(department_id,department_name,location_id) VALUES ('9','Executive','1700');

INSERT INTO dept(department_id,department_name,location_id) VALUES ('10','Finance','1700');

INSERT INTO dept(department_id,department_name,location_id) VALUES (11,'Accounting',1700);

Table of dependants: -

dependent_id	first_name	last_name	relationship	employee_id
1	Penelope	Gietz	Child	206
2	Nick	Higgins	Child	205
3	Ed	Whalen	Child	200
4	Jennifer	King	Child	100
5	Johnny	Kochhar	Child	101
6	Bette	De Haan	Child	102
7	Grace	Faviet	Child	109
8	Matthew	Chen	Child	110
9	Joe	Sciarra	Child	111
10	Christian	Urman	Child	112
11	Zero	Popp	Child	113
12	Karl	Greenberg	Child	108
13	Uma	Mavris	Child	203
14	Vivien	Hunold	Child	103
15	Cuba	Ernst	Child	104

Table of departments: -

department_id	department_name	location_id
1	Administration	1700
10	Finance	1700
11	Accounting	1700
2	Marketing	1800
3	Purchasing	1700
4	Human Resources	2400
5	Shipping	1500
6	IT	1400
7	Public Relations	2700
8	Sales	2500
9	Executive	1700

Data for employees: -

INSERT INTO employees(employee_id,first_name,last_name,email,phone_number,hire_date,job_id,salary, manager_id, department_id) VALUES

(100,'Steven','King','steven.king@sqltutorial.org','515.123.4567','1987-06-17',4,24000.00,NULL,9),

(101,'Neena','Kochhar','neena.kochhar@sqltutorial.org','515.123.4568','1989-09-21',5,17000.00,100,9),

(102,'Lex','DeHaan','lex.de haan@sqltutorial.org','515.123.4569','1993-01-13',5,17000.00,100,9),

(103,'Alexander','Hunold','alexander.hunold@sqltutorial.org','590.423.4567','1990-01-03',9,9000.00,102,6),

(104,'Bruce','Ernst','bruce.ernst@sqltutorial.org','590.423.4568','1991-05-21',9,6000.00,103,6),

(206,'William','Gietz','william.gietz@sqltutorial.org','515.123.8181','1994-06-07',1,8300.00,205,11);

Data for dependants: -

INSERT INTO dependents(dependent_id,first_name,last_name,relationship,employee_id) VALUES (1,'Penelope','Gietz','Child',206);

INSERT INTO dependents(dependent_id,first_name,last_name,relationship,employee_id) VALUES (2,'Nick','Higgins','Child',205);

INSERT INTO dependents(dependent_id,first_name,last_name,relationship,employee_id) VALUES (3,'Ed','Whalen','Child',200);

INSERT INTO dependents(dependent_id,first_name,last_name,relationship,employee_id) VALUES (4,'Jennifer','King','Child',100);

INSERT INTO dependents(dependent_id,first_name,last_name,relationship,employee_id) VALUES (5,'Johnny','Kochhar','Child',101);

INSERT INTO dependents(dependent_id,first_name,last_name,relationship,employee_id) VALUES (6,'Bette','De Haan','Child',102);

INSERT INTO dependents(dependent_id,first_name,last_name,relationship,employee_id) VALUES (7,'Grace','Faviet','Child',109);

Table of employees: -

employee_id	first_name	last_name	email	phone_number	hire_date	job_id	salary	manager_id	department_id	comission
100	Steven	King	steven.king@sqltutorial.org	515.123.4567	1987-06-17	4	24000.00	NULL	9	NULL
101	Neena	Kochhar	neena.kochhar@sqltutorial.org	515.123.4568	1989-09-21	5	17000.00	100	9	NULL
102	Lex	DeHaan	lex.de haan@sqltutorial.org	515.123.4569	1993-01-13	5	17000.00	100	9	NULL
103	Alexander	Hunold	alexander.hunold@sqltutorial.org	590.423.4567	1990-01-03	9	9000.00	102	6	NULL
104	Bruce	Ernst	bruce.ernst@sqltutorial.org	590.423.4568	1991-05-21	9	6000.00	103	6	NULL
105	David	Austin	david.austin@sqltutorial.org	590.423.4569	1997-06-25	9	4800.00	103	6	NULL
106	Valli	Pataballa	valli.pataballa@sqltutorial.org	590.423.4560	1998-02-05	9	4800.00	103	6	NULL
107	Diana	Lorentz	diana.lorentz@sqltutorial.org	590.423.5567	1999-02-07	9	4200.00	103	6	NULL
108	Nancy	Greenberg	nancy.greenberg@sqltutorial.org	515.124.4569	1994-08-17	7	12000.00	101	10	NULL
109	Daniel	Faviet	daniel.faviet@sqltutorial.org	515.124.4169	1994-08-16	6	9000.00	108	10	NULL

Table of jobs: -

job_id	job_title	min_salary	max_salary
1	Public Accountant	4200.00	9000.00
10	Marketing Manager	9000.00	15000.00
11	Marketing Representative	4000.00	9000.00
12	Public Relations Representative	4500.00	10500.00
13	Purchasing Clerk	2500.00	5500.00
14	Purchasing Manager	8000.00	15000.00
15	Sales Manager	10000.00	20000.00
16	Sales Representative	6000.00	12000.00
17	Shipping Clerk	2500.00	5500.00
18	Stock Clerk	2000.00	5000.00
19	Stock Manager	5500.00	8500.00
2	Accounting Manager	8200.00	16000.00
3	Administration Assistant	3000.00	6000.00
4	President	20000.00	40000.00
5	Administration Vice President	15000.00	30000.00
6	Accountant	4200.00	9000.00
7	Finance Manager	8200.00	16000.00
8	Human Resources Representa...	4000.00	9000.00
9	Programmer	4000.00	10000.00

RESULT: -

Queries are executed and output is verified.

EXERCISE 2

Date: 26/02/2024

1. Write a query to display all the countries.
2. Write a query to display specific columns like email and phone number for all the employees.
3. Write a query to display the data of employee whose last name is “Fay”.
4. Write a query to find the hire date for employees whose last name is “Grant” or “Whalen”.
5. Write a query to display name of the employee who is shipping clerk.
6. Write a query to get all the employees who work for department 8.
7. Write a query to display the departments in the descending order.
8. Write a query to display all the employees whose last name starts with “K”.
9. Display name of the employees whose hire dates are between 1995 and 1997.
10. Write a query to display jobs where the maximum salary is less than 5000.
11. Write a query to display email address in lower case.
12. Write a query to display name of the employees who were hired in 1995.
13. Write a query to insert an employee “Paul Newton” in department 11.
14. Write a query to delete the shipping department.

1)

#	country_name
1	Argentina
2	Australia
3	Belgium
4	Brazil
5	Canada
6	Switzerland
7	China
8	Germany
9	Denmark
10	Egypt
11	France
12	HongKong
13	Israel
14	India
15	Italy
16	Japan

2)

#	email	phone_number
1	steven.king@sqltutorial.org	515.123.4567
2	neena.kochhar@sqltutorial.org	515.123.4568
3	lex.de haan@sqltutorial.org	515.123.4569
4	alexander.hunold@sqltutorial.org	590.423.4567
5	bruce.ernst@sqltutorial.org	590.423.4568
6	david.austin@sqltutorial.org	590.423.4569
7	valli.pataballa@sqltutorial.org	590.423.4560
8	diana.lorentz@sqltutorial.org	590.423.5567
9	nancy.greenberg@sqltutorial.org	515.124.4569
10	daniel.faviet@sqltutorial.org	515.124.4169
11	john.chen@sqltutorial.org	515.124.4269
12	ismael.sciarra@sqltutorial.org	515.124.4369
13	jose manuel.urman@sqltutorial...	515.124.4469
14	luis.popp@sqltutorial.org	515.124.4567
15	den.raphaely@sqltutorial.org	515.127.4561

3)

#	employee_id	first_name	last_name	email	phone_number	hire_date	job_id	salary	manager_id	department_id	commission
1	202	Pat	Fay	pat.fay@sqltutorial.org	603.123.6666	1997-08-17	11	6000	201	2	NULL

SQL QUERIES: -

use company;

1) select country_name from countries;

2) select email, phone_number from employees;

3) select * from employees where last_name = "fay";

4) select hire_date from employees where last_name = "Grant" or last_name = "Whalen";

5) select first_name, last_name from employees where job_id = (select job_id from jobs where job_title = 'Shipping Clerk');

6) select first_name, last_name from employees where department_id = 8;

7) select department_name from dept order by department_name DESC;

8) select employee_id,first_name,last_name from employees where last_name like 'k%';

9) select employee_id,first_name,last_name from employees where hire_date between '1995-01-01' and '1997-12-31';

4)

hire_date
1999-05-24
1987-09-17

5)

#	first_name	last_name
1	Sarah	Bell
2	Britney	Everett

6)

#	first_name	last_name
1	John	Russell
2	Karen	Partners
3	Jonathon	Taylor
4	Jack	Livingston
5	Kimberely	Grant
6	Charles	Johnson

7)

#	department_name
1	Shipping
2	Sales
3	Purchasing
4	Public Relations
5	Marketing
6	IT
7	Human Resources
8	Finance
9	Executive
10	Administration
11	Accounting

8)

#	employee_id	first_name	last_name
1	100	Steven	King
2	101	Neena	Kochhar
3	115	Alexander	Khoo
4	122	Payam	Kaufling

10) select job_title from jobs where max_salary < 5000;

11) select lower(email) as emails from employees;

12) select first_name,last_name from employees where year(hire_date) = '1995';

13) insert into employees(employee_id,first_name,last_name,department_id)
values(207,'Paul','Newton',11);

14) delete from dept where department_name = 'Shipping';

9)

#	employee_id	first_name	last_name
1	105	David	Austin
2	110	John	Chen
3	111	Ismael	Sciarra
4	115	Alexander	Khoo
5	116	Shelli	Baida
6	117	Sigal	Tobias
7	120	Matthew	Weiss
8	121	Adam	Fripp
9	122	Payam	Kaufling
10	123	Shanta	Vollman

11)

#	emails
1	steven.king@sqltutorial.org
2	neena.kochhar@sqltutorial.org
3	lex.de haan@sqltutorial.org
4	alexander.hunold@sqltutorial.org
5	bruce.ernst@sqltutorial.org
6	david.austin@sqltutorial.org
7	valli.pataballa@sqltutorial.org
8	diana.lorentz@sqltutorial.org
9	nancy.greenberg@sqltutorial.org
10	daniel.faviet@sqltutorial.org

12)

#	first_name	last_name
1	Alexander	Khoo
2	Payam	Kaufling

13)

15:34:48	insert into employees(employee_id,first_name,last_name,depar...	1 row(s) affected

14)

15:51:51	delete from dept where department_name = 'Shipping'	1 row(s) affected

RESULT: -

Queries are executed and output is verified.

EXERCISE 3

Date: 05/03/2024

A **UNIVERSITY** database for maintaining information concerning students, courses, and grades in a university environment is given below.

The **STUDENT** file stores data on each student, the **COURSE** file stores data on each course, the **SECTION** file stores data in each section of a course, the **GRADE_REPORT** file stores the grades that students receive in the various section they have completed, and the **PREREQUISITE** files stores the prerequisites of each course.

STUDENT

Name	Student_number	Class	Major
Smith	17	1	CS
Brown	8	2	CS

COURSE

Course_name	Course_number	Credit_hours	Department
Intro to Computer Science	CS1310	4	CS
Data Structures	CS3320	4	CS
Discrete Mathematics	MATH2410	3	MATH
Database	CS3380	3	CS

SECTION

Section_identifier	Course_number	Semester	Year	Instructor
85	MATH2410	Fall	07	King
92	CS1310	Fall	07	Anderson
102	CS3320	Spring	08	Knuth
112	MATH2410	Fall	08	Chang
119	CS1310	Fall	08	Anderson
135	CS3380	Fall	08	Stone

GRADE_REPORT

Student_number	Section_identifier	Grade
17	112	B
17	119	C
8	85	A
8	92	A
8	102	B
8	135	A

PREREQUISITE

Course_number	Prerequisite_number
CS3380	CS3320
CS3380	MATH2410
CS3320	CS1310

Table of STUDENT:-

Name	Student_number	Class	Major
Brown	8	2	CS
Smith	17	1	CS

Table of COURSE:-

Course_name	Course_number	Credit_hours	Department
Intro to Computer Science	CS1310	4	CS
Data Structures	CS3320	4	CS
Database	CS3380	3	CS
Discrete Mathamatics	MATH2410	3	MATH

Table of SECTION:-

Section_identifier	Course_number	Semester	Year	Instructor
85	MATH2410	Fall	7	King
92	CS1310	Fall	7	Anderson
102	CS3320	Spring	8	Knuth
112	MATH2410	Fall	8	Chang
119	CS1310	Fall	8	Anderson
135	CS3380	Fall	8	Stone

Table of PREREQUISITE:-

Course_number	Prerequisite_number
CS3320	CS1310
CS3380	CS3320
CS3380	MATH2410

Table of GRADE REPORT:-

Student_number	Section_identifier	Grade
8	85	A
8	92	A
8	102	B
8	135	A
17	112	B
17	119	C

SQL QUERIES: -

1) Write appropriate MYQL DDL statements to define UNIVERSITY database.

- Create Database

- create database UNIVERSITY;
- use UNIVERSITY;

- Create Table: STUDENT

- create table STUDENT (Name varchar(10), Student_number int(2) primary key, Class int(2), Major varchar(20));

- Create Table: COURSE

- create table COURSE (Course_name varchar(30),Course_number varchar(20) primary key, Credit_hours int(2), Department varchar(15));

- Create Table: SECTION

- create table SECTION (Section_identifier int(3) primary key,Course_number varchar(20), Semester varchar(10),Year int(2),Instructor varchar(15),foreign key (Course_number) references COURSE(Course_number));

- Create Table: GRADE_REPORT

- create table GRADE_REPORT (Student_number int(2),Section_identifier int(3),Grade varchar(2),foreign key (Student_number) references STUDENT(Student_number),foreign key (Section_identifier) references SECTION(Section_identifier),primary key (Student_number,Section_identifier));

- Create Table: PREREQUISITE

- create table PREREQUISITE (Course_number varchar(20) ,Prerequisite_number varchar(20),foreign key (Course_number) references COURSE(Course_number),foreign key (Prerequisite_number) references COURSE(Course_number),primary key (Course_number,Prerequisite_number));

2) Write queries to insert values in all the five tables.

- Inserting Data to Table: STUDENT

- insert into STUDENT values("Smith",17,1,"CS"),("Brown",8,2,"CS");

- Inserting Data to Table: COURSE

- insert into COURSE values("Intro to Computer Science","CS1310",4,"CS"),("Data Structures","CS3320",4,"CS"),("Discrete Mathamatics","MATH2410",3,"MATH"), ("Database","CS3380",3,"CS");

- Inserting Data to Table: SECTION

- insert into SECTION values (85,"MATH2410","Fall",07,"King") ,(92,"CS1310","Fall",07, "Anderson"),(102,"CS3320","Spring",08,"Knuth"),(112,"MATH2410","Fall",08,"Chang"), (119,"CS1310","Fall",08,"Anderson"),(135,"CS3380","Fall",08,"Stone");

3) All Courses and grades of Smith

Course_name	Grade
Discrete Mathamatics	B
Intro to Computer Science	C

4) Names and grades of students who took 'Database' course offered in fall 2008

Name	Grade
Brown	A

5) Prerequisite for Database Course

Course_name
Data Structures
Discrete Mathamatics

6) Senior Students

Name
Brown

7) Courses taught by Professor King in 2007 and 2008

Course_name
Discrete Mathamatics

8) Details on section taught by King

Course_number	Semester	Year	No_of_student
MATH2410	Fall	7	1

9) Name and transcript of each senior majoring in CS

Name	Course_name	Course_number	Semester	Year	Grade
Brown	Discrete Mathamatics	MATH2410	Fall	7	A
Brown	Intro to Computer Science	CS1310	Fall	7	A
Brown	Data Structures	CS3320	Spring	8	B
Brown	Database	CS3380	Fall	8	A

- Inserting Data to Table: GRADE_REPORT

- insert into GRADE_REPORT values (17,112,"B"),(17,119,"C"),(8,85,"A"),(8,92,"A"), (8,102,"B"),(8,135,"A");

- Inserting Data to Table: PREREQUISITE

- insert into PREREQUISITE values("CS3380","CS3320"),("CS3380","MATH2410"), ("CS3320","CS1310");

3) Retrieve the list of all courses and grades of "Smith".

- select c.Course_name, g.Grade from STUDENT s inner join GRADE_REPORT g on s.Student_number = g.Student_number inner join SECTION se on g.Section_identifier= se.Section_identifier inner join COURSE c on se.Course_number=c.Course_number where s.Name="Smith";

4) List the names of students who took the section of 'Database' course offered in fall 2008 and their grades in that section.

- select s.Name,g.Grade from STUDENT s join GRADE_REPORT g on s.Student_number = g.Student_number inner join SECTION se on g.Section_identifier= se.Section_identifier inner join COURSE c on se.Course_number=c.Course_number where c.Course_name= "Database" and se.Semester="Fall" and se.Year=08 ;

5) List the prerequisites of the 'Database' course.

- select Course_name from COURSE where Course_number in (select p.Prerequisite_number from PREREQUISITE p join COURSE c on p.Course_number=c.Course_number where p.Course_number=(select Course_number from COURSE where Course_name="Database"));

6) Create a view to retrieve the names of all senior students majoring in 'CS' (computer science).

- create view seniors as select * from STUDENT where class=2;
- select Name from seniors;

7) Retrieve the names of all courses taught by Professor King in 2007 and 2008.

- select c.Course_name from COURSE c join SECTION s on c.Course_number = s.Course_number where s.Instructor="King";

8) For each section taught by Professor King, retrieve the course number, semester, year, and number of students who tool the section.

- select s.Course_number,s.Semester,s.Year,count(g.Student_number) as No_of_students from SECTION s join GRADE_REPORT g on s.Section_identifier=g.Section_identifier where s.Instructor="King" group by g.Section_identifier;

9) Retrieve the name and transcript of each senior student (Class=2) majoring in CS. A transcript includes course name, course number, credit hours, semester, year and grade for each course completed by the student.

- select s.Name,c.Course_name,c.Course_number,se.Semester,se.Year,g.Grade from student s join grade_report g on s.Student_number = g.Student_number join section se on g.Section_identifier = se.Section_identifier join course c on se.Course_number = c.Course_number where s.Class=2 and s.Major="CS";

10 a) Insert new student Johnson.

Name	Student_number	Class	Major
Johnson	25	1	Math

10 b) Update class of Smith to 2

Name	Student_number	Class	Major
Smith	17	2	CS

10 c) Inset new course Knowledge Engineering

Course_name	Course_number	Credit_hours	Department
Knowledge Engineering	CS4390	3	CS

10 d) Delete student Smith.

Name	Student_number	Class	Major
Brown	8	2	CS
Johnson	25	1	Math

10) Write SQL update statements to do the following on the database schema.

a) Insert a new student, < 'Johnson',25,1, 'Math'>, in the database.
- insert into STUDENT values("Johnson",25,1,"Math");
- select * from student where Student_number=25;

b) Change the class of student 'Smith' to 2.
- update STUDENT set Class=2 where Name="Smith";
- select * from student where Name="Smith";

c) Insert a new course, < 'Knowledge Engineering', 'CS4390', 3, 'CS'>.
- insert into COURSE values("Knowledge Engineering","CS4390",3,"CS");
- select * from course where Course_number="CS4390";

d) Delete the record for the student whose name is 'Smith' and whose student number is 17.
- delete from STUDENT where Student_name="Smith";
- select * from student;

RESULT: -

Queries are executed and output is verified.

EXERCISE 4

Date: 11/03/2024

PLSQL

Create **PLSQL procedures** and write appropriate **SQL queries** to call the procedures.

1. Write a procedure to check if a number is even or odd.

2. Write a procedure to display the grade for a mark.

3. Write a procedure to check if a number is positive, negative or zero.

4. Write a procedure to display the weekday of a specific day.

5. Write a procedure to find factorial of a number.

1) Even or Odd

Number	Result
7	odd

2) Grade

Marks	Grade
87	Grade is B

1) Write a procedure to check if a number is even or odd.

Procedure

```
CREATE PROCEDURE `even_odd`(in num int)
BEGIN
    declare r varchar(10);
    if num%2=0
    then
        set r="even";
    else
        set r="odd";
    end if;
    select num as Number, r as Result;
END
```

SQL Query

- call even_odd(7);

2) Write a procedure to display the grade for a mark.

Procedure

```
CREATE PROCEDURE `grade`(in g int)
BEGIN
    declare des varchar(50);
    if g > 90
    then
        set des="Grade is A";
    elseif g > 80
    then
        set des="Grade is B";
    elseif g > 70
    then
        set des="Grade is C";
    elseif g > 60
    then
        set des="Grade is D";
    else
        set des="Grade is E";
    end if;
    select g as Marks,des as Grade;
END
```

SQL Query

- call grade(87);

3) Positive, Negative or Zero

Number	Result
-7	negative

4) WeekDay

Date	WeekDay
03/16/2024	5

3) Write a procedure to check if a number is positive, negative or zero.

Procedure

```
CREATE PROCEDURE `pos_neg_zero`(in num int)
BEGIN
    declare r varchar(10);
    if num >0
    then
        set r= "positive";
    elseif num<0
    then
        set r= "negative";
    else
        set r= "zero";
    end if;
    select num as Number, r as Result;
END
```

SQL Query

- call pos_neg_zero (-7);

4) Write a procedure to display the weekday of a specific day.

Procedure

```
CREATE PROCEDURE `day`(in d date)
BEGIN
    declare dat varchar(10);
    set dat=Weekday(d);
    select d as Date, dat as WeekDay;
END
```

SQL Query

- call day("2024-3-16");

5) Factorial

Number	Factorial
7	5040

5) Write a procedure to find factorial of a number.

Procedure

```
CREATE PROCEDURE `fact`(in num int)
BEGIN
    declare f int default 1;
    declare n1 int;
    set n1=num;
    while num >0
    do
        set f=f*num;
        set num=num-1;
    end while;
    select n1 as Number, f as Factorial;
END
```

SQL Query

- call fact(7);

RESULT: -

Procedure and queries are executed and output is verified.

EXERCISE 5

Date: 14/03/2024

Create a database **STORE** with table named **Product(**PdtId, PName, Price, Quantity) and create a stored procedure called **Insertproduct** that inserts a new product into the database, under some conditions. The stored procedure has input parameters (barcode, product name, price, and quantityInStock). The shared procedure should insert a row in the Product table only if the price is greater than 0 and the quantity is greater or equal to 0. If the conditions are not satisfied, the stored procedure just terminates (no errors generated).

Table structure of Product: -

Field	Type	Null	Key	Default	Extra
PdtId	varchar(4)	NO	PRI	NULL	
PName	varchar(20)	YES		NULL	
Price	double(5,2)	YES		NULL	
Qunatity	int	YES		NULL	

Inserted Values: -

PdtId	PName	Price	Qunatity
1001	Pen	10.5	10
1002	Pencil	5.75	15
1003	Book	25	5

SQL Query to create database and table:

- Create Database

- CREATE DATABASE STORE;
- USE STORE;

- Create Table: Product

- CREATE TABLE Product(PdtId varchar(4) primary key,PName varchar(20), Price double(5,2),Qunatity int(3));

Procedure to insert values to the table:

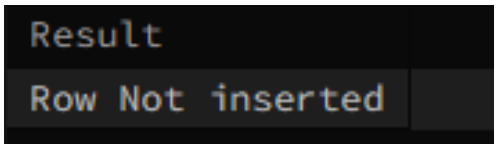
```
CREATE PROCEDURE `Insertproduct`(in barcode int,in name
varchar(20),in price double(5,2), in quantity int(3))
BEGIN
    declare Result varchar(20);
        if price>0 and quantity >0
        then
            insert into Product values
(barcode,name,price,quantity);
        else
            set Result= "Row Not inserted";
            select Result;
        end if;
END
```

SQL Query to call the procedure:

- call Insertproduct(1001,"Pen",10.5,10);
- call Insertproduct(1002,"Pencil",5.75,15);
- call Insertproduct(1003,"Book",25,5);

- select * from Product;

Invalid Values: -



- Inserting Invalid Values

- call Insertproduct(1004,"Eraser",-2,20);
- call Insertproduct(1005,"Paper",1.25,-10);
- call Insertproduct(1006,"Sharpner",-2.5,-20);

RESULT: -

Procedure and queries are executed and output is verified.

EXERCISE 6

Date: 02/04/2024

Triggers

Create three tables named:

- Product (PdtId, Pname, Price, Qtyinstock)
- Sale(saleId,Deliveryaddress)
- Saleitem(saleId,PdtId,Qty)

Create a trigger called updateAvailabeQuantity that updates the quantity in stock in the product table, for every product sold. The trigger should be executed after each insert operation on the Saleitem table: for the product with given PtdId(the one inserted into saleitem), update the available quantity in Product table to old quantity minus sold quantity.

Table structure: Product

Field	Type	Null	Key	Default	Extra
PdtId	int	NO	PRI	NULL	
Pname	varchar(20)	YES		NULL	
Price	double(3,2)	YES		NULL	
Qtyinstock	int	YES		NULL	

Table structure: Sale

Field	Type	Null	Key	Default	Extra
saleId	int	NO	PRI	NULL	
Deliveryaddress	varchar(50)	YES		NULL	

Table structure: Saleitem

Field	Type	Null	Key	Default	Extra
saleId	int	NO	PRI	NULL	
PdtId	int	NO	PRI	NULL	
Qty	int	YES		NULL	

Table: Product

PdtId	Pname	Price	Qtyinstock
101	pencil	5	10
102	pen	3	10

Table: Product

saleId	Deliveryaddress
1	home123
2	home345

SQL Query to create database and table:

- Create Database

- CREATE DATABASE stores;
- USE stores;

- Create Table: Product

- CREATE TABLE Product(PdtId INT PRIMARY KEY, Pname VARCHAR(20), Price DOUBLE(3,2),Qtyinstock INT);

- Create Table: Sale

- CREATE TABLE Sale(saleId INT PRIMARY KEY, Deliveryaddress VARCHAR(50));

- Create Table: Saleitem

- CREATE TABLE Saleitem(saleId INT, PdtId INT, Qty INT,FOREIGN KEY (saleId) REFERENCES Sale(saleId), FOREIGN KEY (PdtId) REFERENCES Product(PdtId) ,PRIMARY KEY(saleId,PdtId));

- Inserting Data to Table: Product

- INSERT INTO Product (PdtId, Pname, Price, Qtyinstock) VALUES (101,"pencil", 5, 10), (102,"pen", 3, 10);

- Inserting Data to Table: Sale

- INSERT INTO Sale(saleId,Deliveryaddress) VALUES(001,"home123"),(002,"home345");
-

- Trigger updateAvailabeQuantity

```
CREATE TRIGGER updateAvailabeQuantity

AFTER INSERT ON Saleitem

FOR EACH ROW

UPDATE Product SET Qtyinstock=Product.Qtyinstock-new.Qty WHERE
PdtId=new.PdtId;
```

- Inserting Data to Table: Saleitem

1. INSERT INTO Saleitem VALUES (001,102,8);
2. INSERT INTO Saleitem VALUES (002,101,3);
3. INSERT INTO Saleitem VALUES (002,102,1)

Product Table after inserting 1st row in Saleitem

PdtId	Pname	Price	Qtyinstock
101	pencil	5	10
102	pen	3	2

Product Table after inserting 2nd row in Saleitem

PdtId	Pname	Price	Qtyinstock
101	pencil	5	7
102	pen	3	2

Product Table after inserting 3rd row in Saleitem

PdtId	Pname	Price	Qtyinstock
101	pencil	5	7
102	pen	3	1

Table: Saleitem

saleId	PdtId	Qty
1	102	8
2	101	3
2	102	1

Result: -

Triggers and queries are executed and output is verified.

EXERCISE 7

Date: 09/04/2024

MongoDB

Create a database named **college** and then create a collection named **studlist.** Insert values to the collection.

1) Display name (both fname and lname) and mark of all female students in MCA.
2) Display the details of student who secured highest mark in the course MCA.
3) Display all male students who scored A+ grade.
4) Display the names of top three students in Mechanical department.
5) Display the details of female students [fname, lname, grade, mark, contact] who achieved a mark more than 90.
6) Display the details of students who secured mark, more than 80 but less than 90.
7) Display the details of students whose name starts with 'V'.
8) Display all students from Kollam.
9) Display all students who does not belong to neither Kollam nor Thiruvananthapuram.
10) Display all female students who belong to either Kollam or Thiruvananthapuram.

1) Name and marks of all female students in MCA.

```
Name: Athira Krishnan
Mark:  80

Name: Divya Vijayan
Mark:  70

Name: Renuka Vijayan
Mark:  82

Name: Remya V
Mark:  85

Name: Remya Sugunan
Mark:  72

Name: Vidhya Sugunan
Mark:  79

Name: Soorya S
Mark:  79

Name: Amritha S
Mark:  99

Name: Soorya P
Mark:  74
```

2) Student with highest mark in course MCA.

```
_id:  20
name:  {'fname': 'Amritha', 'lname': 'S'}
address:  {'house_name': 'Arya Bhavan', 'city': 'Varkala'}
gender:  female
course:  MCA
mark:  99
grade:  A+
phone:  {'type': 'mobile', 'no': 9445365787}
```

3) Male students with A+ grade.

```
Vimal Vinayan
Vimal Bose
Arun S
```

MongoDB QUERIES: -

- Create database and collection:

```
import pymongo
conn=pymongo.MongoClient("mongodb://localhost:27017/")
db=conn['college']
col=db['studlist']
```

- Insert values to the collection:

```
import json
with open("data.json") as file:
    data=json.load(file)
db.studlist.insert_many(data)
```

1) Display name (both fname and lname) and mark of all female students in MCA.

```
x=db.studlist.find({"gender":"female","course":"MCA"},{"name":1,"mark":1
})
for i in x:
    print("\nName: "+i['name']['fname']+" "+i['name']['lname']+"\nMark:
         ",i['mark'])
```

2) Display the details of student who secured highest mark in the course MCA.

```
x=db.studlist.find({"course":"MCA"}).sort("mark",-1).limit(1)
for i in x:
    for j in i.keys():
        print(j+": ",i[j])
```

3) Display all male students who scored A+ grade.

```
x=db.studlist.find({"grade":"A+","gender":"male"})
for i in x:
    print(i['name']['fname']+" "+i['name']['lname'])
```

4) Display the names of top three students in Mechanical department.

```
x=db.studlist.find({"course":"Mechanical"}).sort("mark",-
1).limit(3)
for i in x:
    print(i['name']['fname']+" "+i['name']['lname'])
```

4) Top 3 students in Mechanical Department.

```
Kavya Mohan
Vimal Vinayan
Yadu Kannan
```

5) Female students with marks more than 90.

```
Name: Kavya Mohan
Grade: A+
Marks:  95
Contact no:  9448399780

Name: Amritha S
Grade: A+
Marks:  99
Contact no:  9445365787
```

6) Students with marks in between 80 and 90.

```
Name: Vidhya S
Grade: A
Marks:  85
Contact no:  8146321420

Name: Yadu Kannan
Grade: A
Marks:  85
Contact no:  9446321780

Name: Renuka Vijayan
Grade: A
Marks:  82
Contact no:  04712547890

Name: Remya V
Grade: A
Marks:  85
```

7) Students with name starting with V.

```
Name: Varun Nair
Course: MCA
Grade: B+
Marks:  70
Contact no:  04712662690

Name: Vidhya S
Course: Civil
Grade: A
Marks:  85
Contact no:  8146321420

Name: Vivek Bose
Course: MCA
Grade: B
Marks:  60
Contact no:  04842663890

Name: Vimal Vinayan
Course: Mechanical
Grade: A+
Marks:  90
Contact no:  8185399780
...
```

8) Students from Kollam.

```
Athira Krishnan
Yadu Kannan
Kavya Mohan
Vimal Vinayan
Jabin S
Arya Satheesh
```

9) Students neither from Kollam nor Thiruvananthapuram

```
Name: Arya S
City: Varkala

Name: Vidhya S
City: Kadakkavoor

Name: Vivek Bose
City: Ernakulam

Name: Divya Vijayan
City: Varkala

Name: Vimal Bose
City: Ernakulam

Name: Vinod Paniker
City: Ernakulam

Name: Amritha S
City: Varkala

Name: Arun S
City: Attingal
```

5) Display the details of female students [fname, lname, grade, mark, contact] who achieved a mark more than 90.

```
x=db.studlist.find({"mark":{"$gt":90},"gender":"female"})
for i in x:
    print("\nName: "+i['name']['fname']+" "+i['name']['lname']+
          "\n Grade: "+i['grade']+"\nMarks: ",i['mark'],"\nContact
          no: ", i['phone']['no'])
```

6) Display the details of students who secured mark, more than 80 but less than 90.

```
x=db.studlist.find({"mark":{"$gt":80,"$lt":90}})
for i in x:
    print("\nName: "+i['name']['fname']+" "+i['name']['lname']+"\n
          Grade: "+i['grade']+"\nMarks: ",i['mark'],"\nContact no:
          ", i['phone']['no'])
```

7) Display the details of students whose name starts with 'V'.

```
x=db.studlist.find({"name.fname":{"$regex":"^V"}})
for i in x:
    print("\nName: "+i['name']['fname']+" "+i['name']['lname']+"\n
          Course: "+i['course']+"\nGrade: "+i['grade']+"\nMarks:
          ", i['mark'],"\nContact no: ",i['phone']['no'])
```

8) Display all students from Kollam.

```
x=db.studlist.find({"address.city":"Kollam"})
for i in x:
    print(i['name']['fname']+" "+i['name']['lname'])
```

9) Display all students who does not belong to neither Kollam nor Thiruvananthapuram.

```
x=db.studlist.find({"address.city":{"$nin":['Kollam',"Thiruvananthapuram"
]}})
for i in x:
    print("\nName: "+i['name']['fname']+" "+i['name']['lname']+"\nCity:
          "+ i["address"]["city"])
```

10) Female students from Kollam or Thiruvananthapuram.

```
Name: Athira Krishnan
City: Kollam

Name: Kavya Mohan
City: Kollam

Name: Renuka Vijayan
City: Thiruvananthapuram

Name: Remya V
City: Thiruvananthapuram

Name: Remya Sugunan
City: Thiruvananthapuram

Name: Vidhya Sugunan
City: Thiruvananthapuram

Name: Arya Satheesh
City: Kollam

Name: Soorya S
City: Thiruvananthapuram

Name: Soorya P
City: Thiruvananthapuram
```

10) Display all female students who belong to either Kollam or Thiruvananthapuram

```
x=db.studlist.find({"gender":"female","address.city":{"$in":['Koll
                  am','Thiruvananthapuram"]}})
for i in x:
    print("\nName: "+i['name']['fname']+" "+i['name']['lname']+
          "\nCity: "+i["address"]["city"])
```

Result: -

Queries are executed and output is verified.