VISVESVARAYA TECHNOLOGICAL UNIVERSITY

“JnanaSangama”, Belgaum -590014, Karnataka.

LAB REPORT
on

Database Management Systems (23CS3PCDBM)

Submitted by

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in partial fulfillment for the award of the degree of
BACHELOR OF ENGINEERING
in
COMPUTER SCIENCE AND ENGINEERING

B.M.S. COLLEGE OF ENGINEERING
(Autonomous Institution under VTU)
BENGALURU-560019
Sep-2024 to Jan-2025

B. M. S. College of Engineering,

Bull Temple Road, Bangalore 560019

(Affiliated To Visvesvaraya Technological University, Belgaum)

Department of Computer Science and Engineering

CERTIFICATE

This is to certify that the Lab work entitled "Database Management Systems (23CS3PCDBM)" carried out by **Chadive Muralidhar Reddy (1BM23CS072),** who is bonafide student of **B. M. S. College of Engineering.** It is in partial fulfillment for the award of **Bachelor of Engineering in Computer Science and Engineering** of the Visvesvaraya Technological University, Belgaum during the year 2024-2025. The Lab report has been approved as it satisfies the academic requirements in respect of a Database Management Systems (23CS3PCDBM) work prescribed for the said degree.

Kayarvizhy N Professor Department of CSE, BMSCE	Dr. Kavitha Sooda Professor & HOD Department of CSE, BMSCE

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Insurance Database

Question

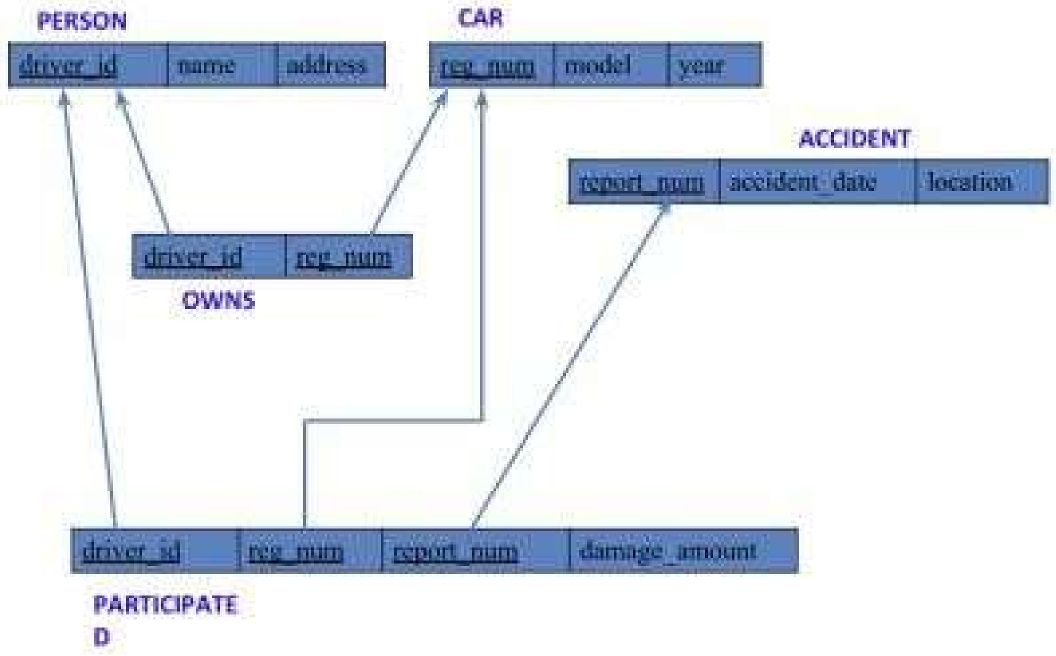
(Week 1)

- PERSON (driver_id: String, name: String, address: String)
- CAR (reg_num: String, model: String, year: int)
- ACCIDENT (report_num: int, accident_date: date, location: String)
- OWNS (driver_id: String, reg_num: String)
- PARTICIPATED (driver_id: String,reg_num: String, report_num: int, damage_amount: int)
- Create the above tables by properly specifying the primary keys and the foreign keys. -

Enter at least five tuples for each relation

- Display Accident date and location
- Update the damage amount to 25000 for the car with a specific reg_num (example 'K A053408') for which the accident report number was 12.
- Add a new accident to the database.
- To Do
- Display Accident date and location
- Display driver id who did accident with damage amount greater than or equal to Rs.25000

Schema Diagram



Create Database

create database insurance_147;

use insurance_147;

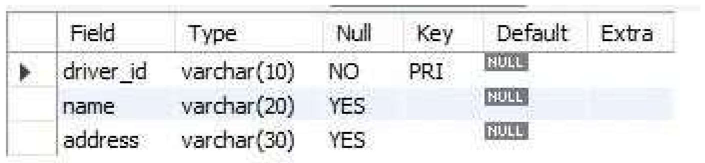
Create Table

```
create table person
(driver_id varchar(10),
name varchar(20),
address varchar(30),
PRIMARY KEY(driver_id));

create table car
(reg_num varchar(10),
model varchar(10),
year int,
PRIMARY KEY(reg_num));
```

```
create table accident
(report_num int,
accident_date date,
location varchar(20),
PRIMARY KEY(report_num));

create table owns
(driver_id varchar(10),
reg_num varchar(10),
PRIMARY KEY(driver_id,reg_num),
FOREIGN KEY(driver_id) references
person(driver_id), FOREIGN KEY(reg_num) references
car(reg_num) );

create table participated
(driver_id varchar(10),
reg_num varchar(10),
report_num int,
damage_amount int,
PRIMARY KEY(driver_id,reg_num,report_num), FOREIGN
KEY(driver_id) references person(driver_id), FOREIGN
KEY(reg_num) references car(reg_num), FOREIGN
KEY(report_num) references accident(report_num) );
```

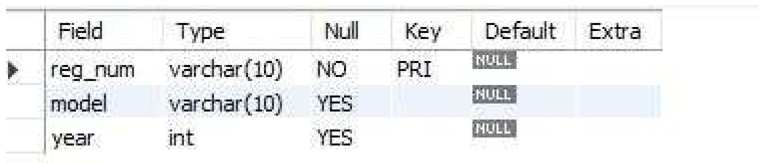
Structure of the table

desc person;



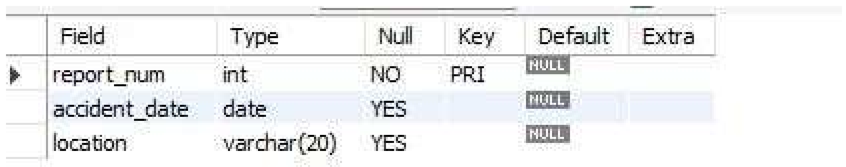
Field	Type	Null	Key	Default	Extra
driver_id	varchar(10)	NO	PRI	NULL	
name	varchar(20)	YES		NULL	
address	varchar(30)	YES		NULL	

desc car;



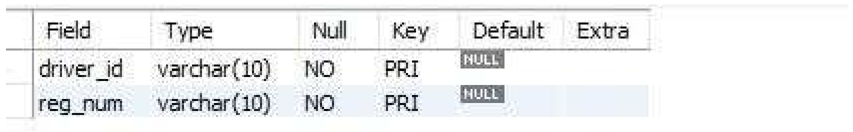
Field	Type	Null	Key	Default	Extra
reg_num	varchar(10)	NO	PRI	NULL	
model	varchar(10)	YES		NULL	
year	int	YES		NULL	

desc accident;



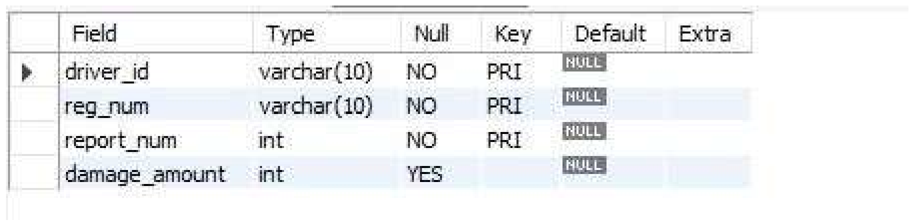
Field	Type	Null	Key	Default	Extra
report_num	int	NO	PRI	NULL	
accident_date	date	YES		NULL	
location	varchar(20)	YES		NULL	

desc owns;



Field	Type	Null	Key	Default	Extra
driver_id	varchar(10)	NO	PRI	NULL	
reg_num	varchar(10)	NO	PRI	NULL	

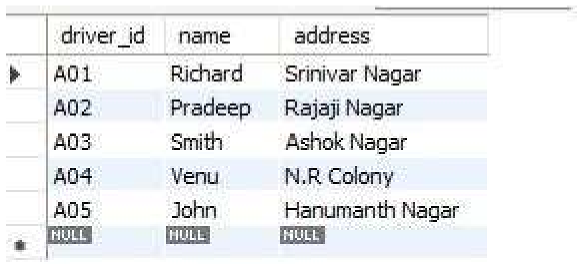
desc participated;



Field	Type	Null	Key	Default	Extra
driver_id	varchar(10)	NO	PRI	NULL	
reg_num	varchar(10)	NO	PRI	NULL	
report_num	int	NO	PRI	NULL	
damage_amount	int	YES		NULL	

Inserting Values to the table

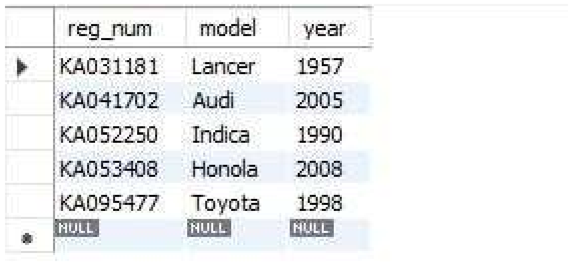
```
insert into person values('A01','Richard','Srinivar Nagar');
insert into person values('A02','Pradeep','Rajaji Nagar');
insert into person values('A03','Smith','Ashok Nagar');
insert into person values('A04','Venu','N.R Colony');
insert into person
values('A05','John','HanumanthNagar');
select * from person;
```



driver_id	name	address
A01	Richard	Srinivar Nagar
A02	Pradeep	Rajaji Nagar
A03	Smith	Ashok Nagar
A04	Venu	N.R Colony
A05	John	Hanumanth Nagar
NULL	NULL	NULL

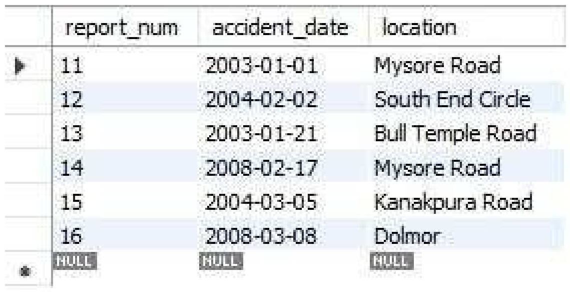
```
insert into car values('KA052250','Indica',1990);
insert into car values('KA031181','Lancer',1957);
insert into car values('KA095477','Toyota',1998);
insert into car values('KA053408','Honola',2008);
insert into car values('KA041702','Audi',2005);
```

select * from car;



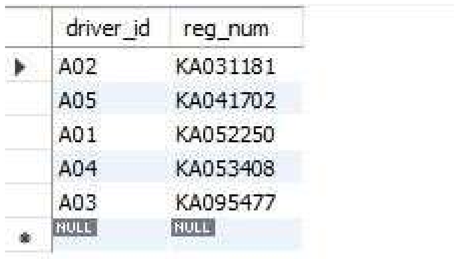
reg_num	model	year
KA031181	Lancer	1957
KA041702	Audi	2005
KA052250	Indica	1990
KA053408	Honola	2008
KA095477	Toyota	1998
NULL	NULL	NULL

insert into accident values(11,'2003-01-01','Mysore Road');
insert into accident values(12,'2004-02-02','South End Circle');
insert into accident values(13,'2003-01-21','Bull Temple
Road’);
insert into accident values(14,'2008-02-17','Mysore Road');
insert into accident values(15,'2004-03-05','Kanakpura Road');
select * from accident;



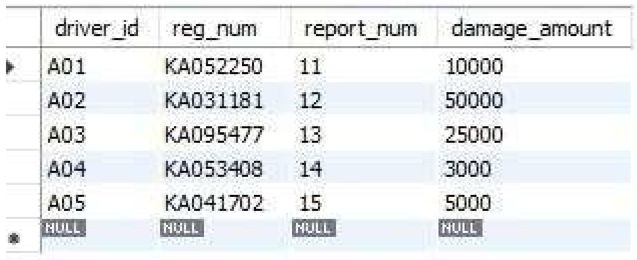
report_num	accident_date	location
11	2003-01-01	Mysore Road
12	2004-02-02	South End Circle
13	2003-01-21	Bull Temple Road
14	2008-02-17	Mysore Road
15	2004-03-05	Kanakpura Road
16	2008-03-08	Dolmor
NULL	NULL	NULL

insert into owns values('A01','KA052250');
insert into owns values('A02','KA031181');
insert into owns values('A03','KA095477');
insert into owns values('A04','KA053408');
insert into owns values('A05','KA041702');
select * from owns;



driver_id	reg_num
A02	KA031181
A05	KA041702
A01	KA052250
A04	KA053408
A03	KA095477
NULL	NULL

```
insert into participated values('A01','KA052250',11,10000);
insert into participated values('A02','KA031181',12,50000);
insert into participated values('A03','KA095477',13,25000);
insert into participated values('A04','KA053408',14,3000);
insert into participated values('A05','KA041702',15,5000);
select * from participated;
```

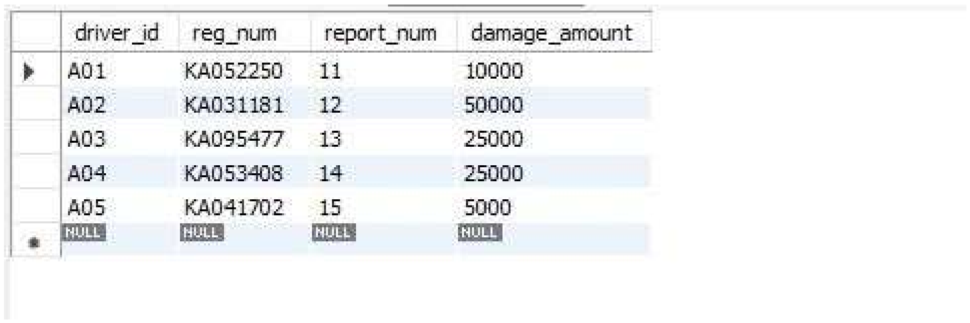


driver_id	reg_num	report_num	damage_amount
A01	KA052250	11	10000
A02	KA031181	12	50000
A03	KA095477	13	25000
A04	KA053408	14	3000
A05	KA041702	15	5000
NULL	NULL	NULL	NULL

Queries:

Update the damage amount to 25000 for the car with a specific reg-num (example 'KA053408') for which the accident report number was 14.

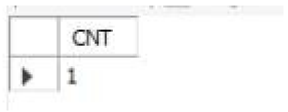
UPDATE participated set damage_amount=25000
WHERE reg_num='KA053408' AND report_num=14;
select * from participated;



driver_id	reg_num	report_num	damage_amount
A01	KA052250	11	10000
A02	KA031181	12	50000
A03	KA095477	13	25000
A04	KA053408	14	25000
A05	KA041702	15	5000
NULL	NULL	NULL	NULL

Find the total number of people who owned cars that were involved in accidents in 2008.

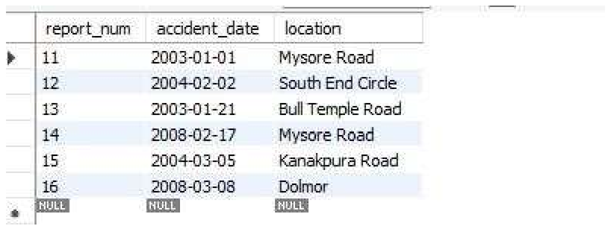
select count(distinct driver_id) CNT
from participated a, accident b
where a.report_num=b.report_num and b.accident_date like ‘2008%’;



CNT
1

Add new accident to the database

INSERT into accident
values(16,'2008-03-08','Dolmor'); select * FROM
accident;



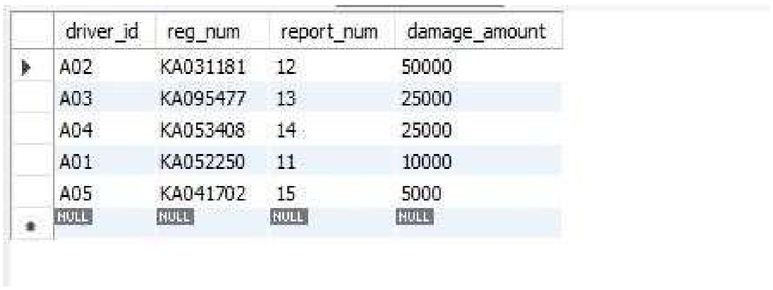
report_num	accident_date	location
11	2003-01-01	Mysore Road
12	2004-02-02	South End Circle
13	2003-01-21	Bull Temple Road
14	2008-02-17	Mysore Road
15	2004-03-05	Kanakpura Road
16	2008-03-08	Dolmor
NULL	NULL	NULL

(Week 2)

More Queries on Insurance Database:

List all the entire participated relation in descending order of damage_amount

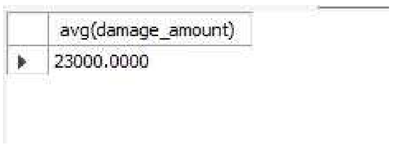
```
select * FROM participated ORDER BY damage_amount desc;
```



driver_id	reg_num	report_num	damage_amount
A02	KA031181	12	50000
A03	KA095477	13	25000
A04	KA053408	14	25000
A01	KA052250	11	10000
A05	KA041702	15	5000
NULL	NULL	NULL	NULL

Find average damage_amount

```
select avg(damage_amount) from participated;
```



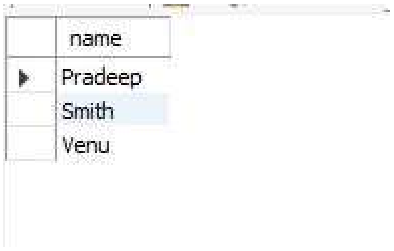
avg(damage_amount)
23000.0000

Delete the tuple whose damage_amount is below average amount damage_amount

```
delete from participated
where  damage_amount
(
select avg_damage
from(select avg(damage_amount) as
avg_damage from participated) as avg_table
);
set sql_safe_updates=0;
```

List the name of drivers whose damage is greater than the avg damage_amount

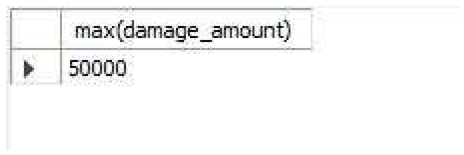
```
select name FROM person a, participated b
 WHERE a.driver_id=b.driver_id AND
damage_amount>(select avg(damage_amount) from participated);
```



name
Pradeep
Smith
Venu

Find the maximum damage_amount

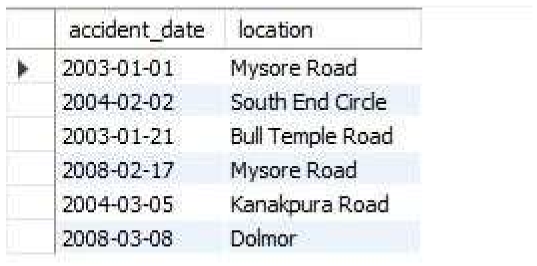
select max(damage_amount) from participated;



max(damage_amount)
50000

Display accident date and location

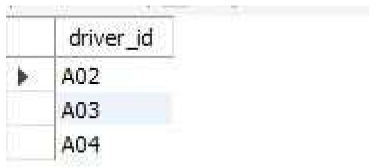
select accident_date,location from accident;



accident_date	location
2003-01-01	Mysore Road
2004-02-02	South End Circle
2003-01-21	Bull Temple Road
2008-02-17	Mysore Road
2004-03-05	Kanakpura Road
2008-03-08	Dolmor

Display driver_id who did accident with damage_amount>=25000

select driver_id from participated where damage_amount>=25000;



driver_id
A02
A03
A04

Bank Database

Question

(Week 3)

- Branch (branch-name: String, branch-city: String, assets: real)

- BankAccount(accno: int, branch-name: String, balance: real)

- BankCustomer (customer-name: String, customer-street: String, customer-city: String)

  - Depositer(customer-name: String, accno: int)

- LOAN (loan-number: int, branch-name: String, amount: real)

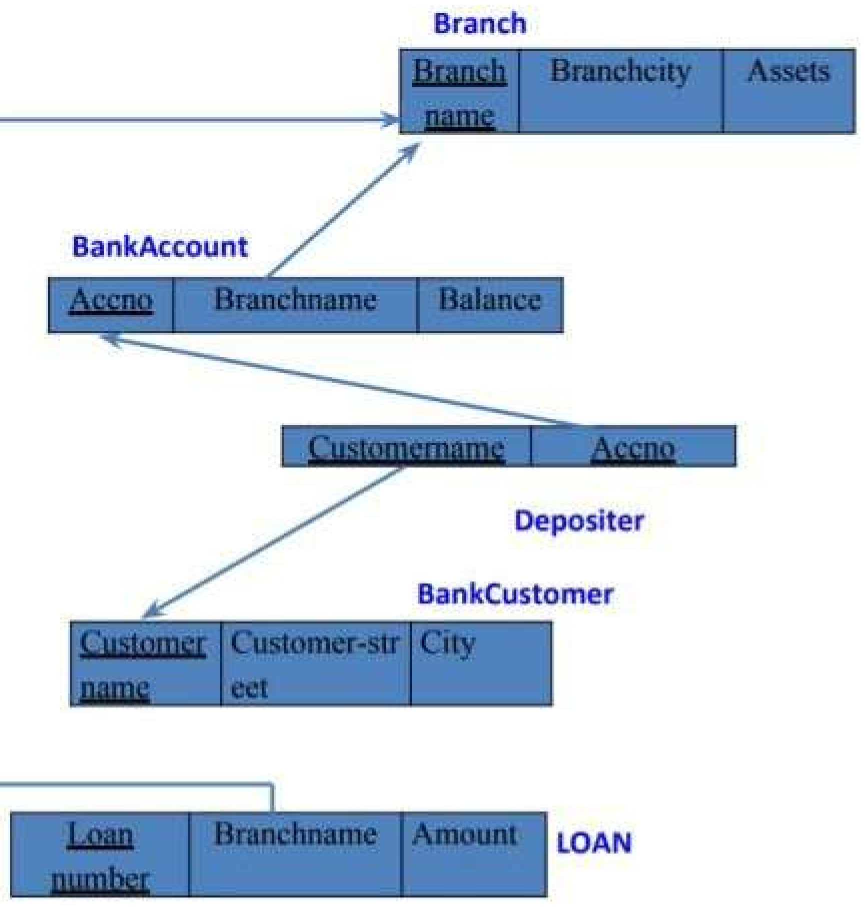
- Create the above tables by properly specifying the primary keys and the foreign keys. - Enter at least five tuples for each relation.

- Display the branch name and assets from all branches in lakhs of rupees and rename the assets column to 'assets in lakhs'.

- Find all the customers who have at least two accounts at the same branch (ex. SBI_ResidencyRoad).

- Create a view which gives each branch the sum of the amount of all the loans at the branch.

Schema Diagram



Create Database

create database BankDatabase_147;

use BankDatabase_147;

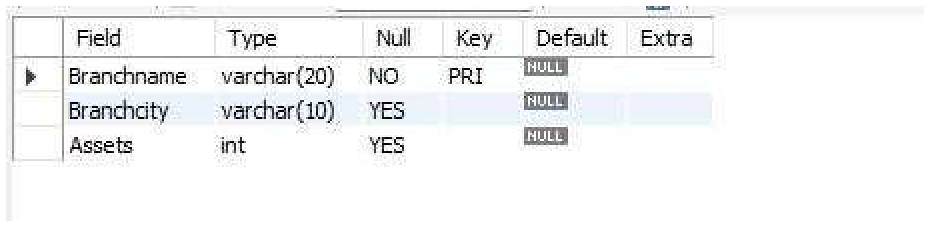
Create Table

```
create table Branch
(
Branchname varchar(20),
Branchcity varchar(10),
Assets int,
PRIMARY KEY (Branchname)
);
```

```
create table BankAccount
(
Accno int,
Branchname varchar(20),
Balance int,
PRIMARY KEY (Accno,Branchname),
FOREIGN KEY(Branchname) references Branch(Branchname)
);

create table BankCustomer
(
Customername varchar(10),
Customerstreet varchar(20),
Customercity varchar(10),
PRIMARY KEY(Customername)
);

create table Depositor
(
Customername varchar(10),
Accno int,
PRIMARY KEY (Customername,Accno),
FOREIGN KEY(Customername) references
BankCustomer(Customername), FOREIGN KEY(Accno) references
BankAccount(Accno) );

create table Loan
(
Loannumber int,
Branchname varchar(20),
Amount int,
PRIMARY KEY (Loannumber,Branchname),
FOREIGN KEY(Branchname) references Branch(Branchname)
);
```

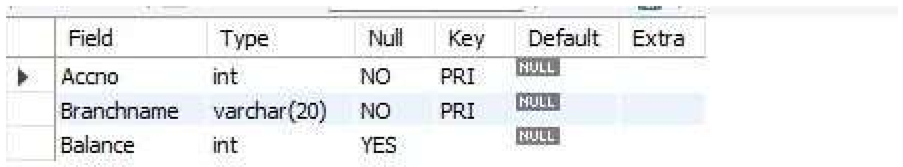
Structure of the table

desc Branch;



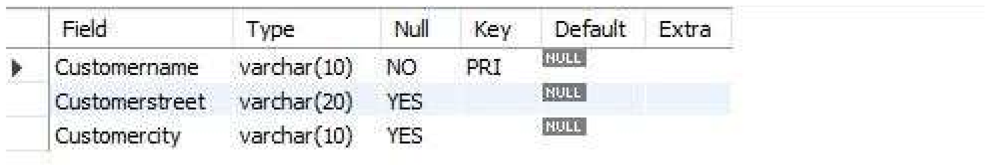
```
   Field        Type          Null   Key   Default   Extra
▶  Branchname   varchar(20)   NO     PRI   NULL
   Branchcity   varchar(10)   YES          NULL
   Assets       int           YES          NULL
```

desc BankAccount;



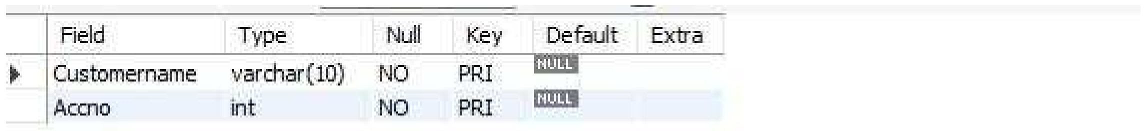
Field	Type	Null	Key	Default	Extra
Accno	int	NO	PRI	NULL	
Branchname	varchar(20)	NO	PRI	NULL	
Balance	int	YES		NULL	

desc BankCustomer;



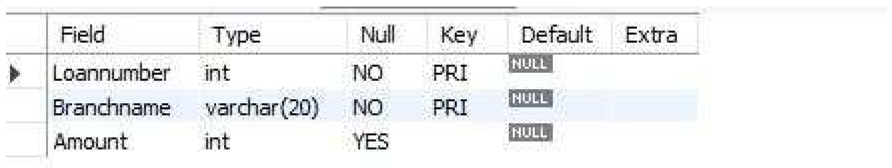
Field	Type	Null	Key	Default	Extra
Customername	varchar(10)	NO	PRI	NULL	
Customerstreet	varchar(20)	YES		NULL	
Customercity	varchar(10)	YES		NULL	

desc Depositor;



Field	Type	Null	Key	Default	Extra
Customername	varchar(10)	NO	PRI	NULL	
Accno	int	NO	PRI	NULL	

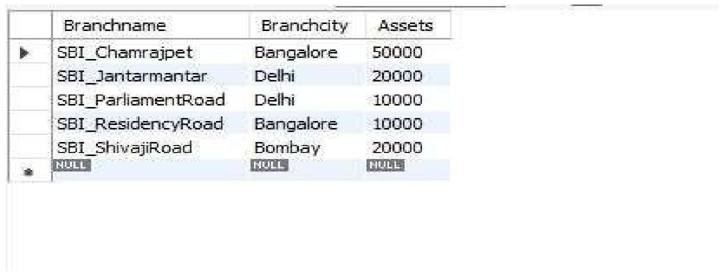
desc Loan;



Field	Type	Null	Key	Default	Extra
Loannumber	int	NO	PRI	NULL	
Branchname	varchar(20)	NO	PRI	NULL	
Amount	int	YES		NULL	

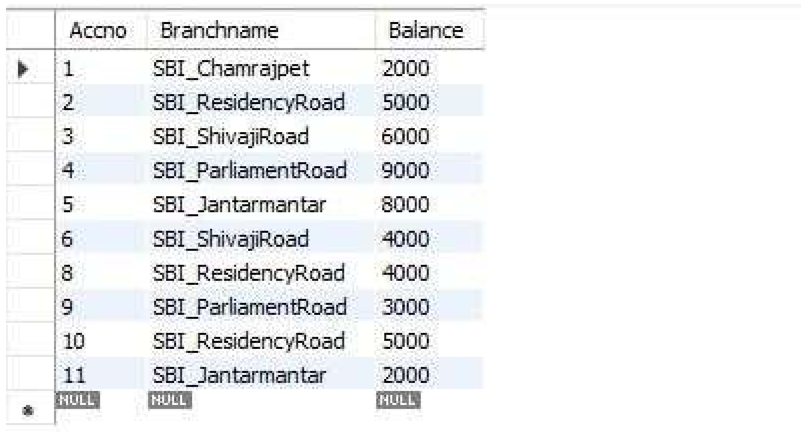
Inserting Values to the table

insert into Branch values('SBI_Chamrajpet','Bangalore',50000); insert into Branch values('SBI_ResidencyRoad','Bangalore',10000); insert into Branch values('SBI_ShivajiRoad','Bombay',20000); insert into Branch values('SBI_ParliamentRoad','Delhi',10000); insert into Branch values('SBI_Jantarmantar','Delhi',20000); select * from Branch;



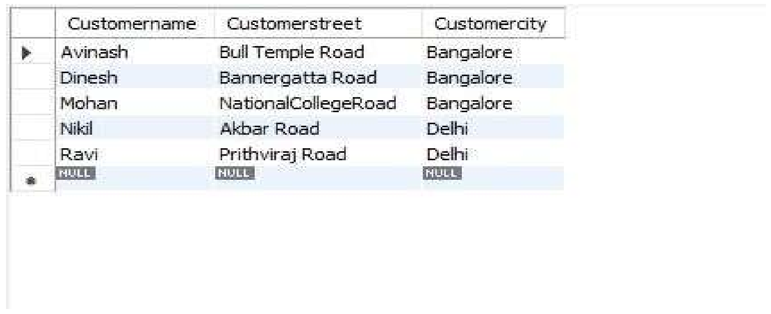
Branchname	Branchcity	Assets
SBI_Chamrajpet	Bangalore	50000
SBI_Jantarmantar	Delhi	20000
SBI_ParliamentRoad	Delhi	10000
SBI_ResidencyRoad	Bangalore	10000
SBI_ShivajiRoad	Bombay	20000
NULL	NULL	NULL

```
insert into BankAccount values(1,'SBI_Chamrajpet',2000);
insert into BankAccount values(2,'SBI_ResidencyRoad',5000);
insert into BankAccount values(3,'SBI_ShivajiRoad',6000);
insert into BankAccount values(4,'SBI_ParliamentRoad',9000);
insert into BankAccount values(5,'SBI_Jantarmantar',8000);
insert into BankAccount values(6,'SBI_ShivajiRoad',4000);
insert into BankAccount values(8,'SBI_ResidencyRoad',4000);
insert into BankAccount values(9,'SBI_ParliamentRoad',3000);
insert into BankAccount values(10,'SBI_ResidencyRoad',5000);
insert into BankAccount values(11,'SBI_Jantarmantar',2000);
select * from BankAccount;
```



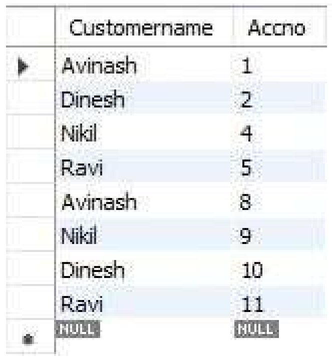
Accno	Branchname	Balance
1	SBI_Chamrajpet	2000
2	SBI_ResidencyRoad	5000
3	SBI_ShivajiRoad	6000
4	SBI_ParliamentRoad	9000
5	SBI_Jantarmantar	8000
6	SBI_ShivajiRoad	4000
8	SBI_ResidencyRoad	4000
9	SBI_ParliamentRoad	3000
10	SBI_ResidencyRoad	5000
11	SBI_Jantarmantar	2000
NULL	NULL	NULL

```
insert into BankCustomer values('Avinash','BullTempleRoad ‘,'Bangalore');
insert into BankCustomer values(‘Dinesh','BannergattaRoad','Bangalore');
insert into BankCustomer values('Mohan','NationalCollegeRoad','Bangalore');
insert into BankCustomer values('Nikil','AkbarRoad','Delhi');
insert into BankCustomer values('Ravi','PrithvirajRoad','Delhi');
select * from BankCustomer;
```



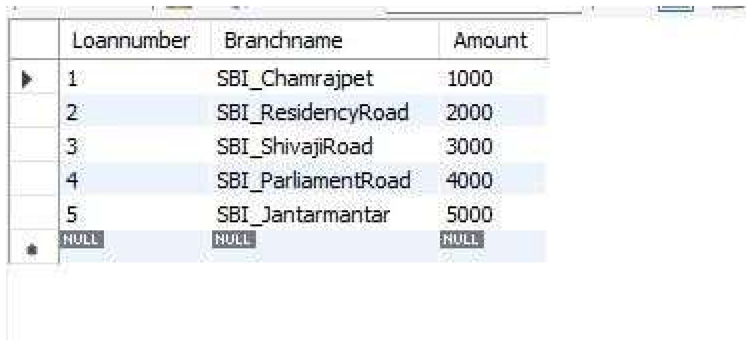
Customername	Customerstreet	Customercity
Avinash	Bull Temple Road	Bangalore
Dinesh	Bannergatta Road	Bangalore
Mohan	NationalCollegeRoad	Bangalore
Nikil	Akbar Road	Delhi
Ravi	Prithviraj Road	Delhi
NULL	NULL	NULL

```
insert into Depositor value('Avinash',1);
insert into Depositor value('Dinesh',2);
insert into Depositor value('Nikil',4);
insert into Depositor value('Ravi',5);
insert into Depositor value('Avinash',8);
insert into Depositor value('Nikil',9);
insert into Depositor value('Dinesh',10);
insert into Depositor value('Ravi',11);
select * from Depositor;
```



Customername	Accno
Avinash	1
Dinesh	2
Nikil	4
Ravi	5
Avinash	8
Nikil	9
Dinesh	10
Ravi	11
NULL	NULL

```
insert into Loan values(1,'SBI_Chamrajpet',1000);
insert into Loan values(2,'SBI_ResidencyRoad',2000);
insert into Loan values(3,'SBI_ShivajiRoad',3000);
insert into Loan values(4,'SBI_ParliamentRoad',4000);
insert into Loan values(5,'SBI_Jantarmantar',5000);
select * from Loan;
```

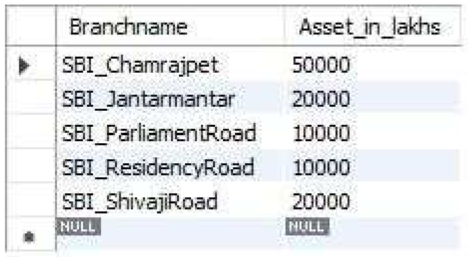


Loannumber	Branchname	Amount
1	SBI_Chamrajpet	1000
2	SBI_ResidencyRoad	2000
3	SBI_ShivajiRoad	3000
4	SBI_ParliamentRoad	4000
5	SBI_Jantarmantar	5000
NULL	NULL	NULL

Queries:

Display the branch name and assets from all branches in lakhs of rupees and rename the assets column to 'assets in lakhs'.

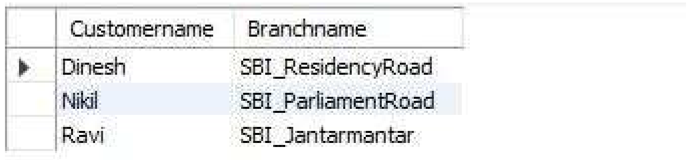
select Branchname, Assets as Asset_in_lakhs from Branch;



	Branchname	Asset_in_lakhs
▶	SBI_Chamrajpet	50000
	SBI_Jantarmantar	20000
	SBI_ParliamentRoad	10000
	SBI_ResidencyRoad	10000
	SBI_ShivajiRoad	20000
*	NULL	NULL

Find all the customers who have at least two accounts at the same branch (ex. SBI_ResidencyRoad).

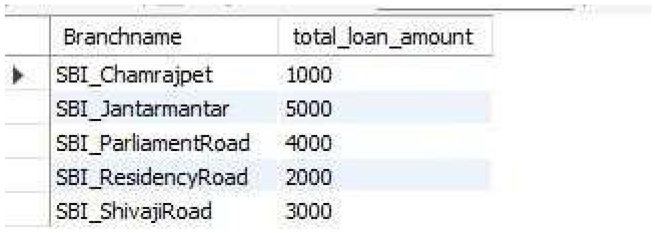
select Customername , Branchname from Depositor D, BankAccount B
where D.Accno=B.Accno group by Customername,Branchname having count(B.Accno)>=2;



	Customername	Branchname
▶	Dinesh	SBI_ResidencyRoad
	Nikil	SBI_ParliamentRoad
	Ravi	SBI_Jantarmantar

Create a view which gives each branch the sum of the amount of all the Loans at the Branch.

Create view Branch_Loan_Sum as select Branchname, sum(Amount) as total_loan_amount from Loan group by Branchname;

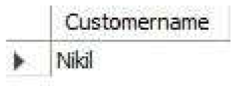


	Branchname	total_loan_amount
▶	SBI_Chamrajpet	1000
	SBI_Jantarmantar	5000
	SBI_ParliamentRoad	4000
	SBI_ResidencyRoad	2000
	SBI_ShivajiRoad	3000

More Queries on Bank Database:

Find all the customers who have an account at all the branches located in a specific city (Ex. Delhi).

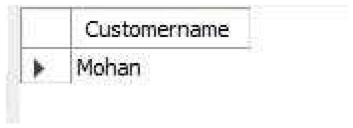
SELECT DISTINCT d.Customername FROM Depositor D JOIN BankAccount BA
ON D.Accno=BA.Accno JOIN Branch b on BA.Branchname=b.Branchname
WHERE b.Branchcity='Delhi' GROUP BY d.Customername
HAVING COUNT(DISTINCT BA.Branchname)=(SELECT COUNT(B2.Branchname) FROM Branch
B2 WHERE B2.Branchcity='Delhi');



```
Customername
Nikil
```

Find all customers who have a loan at the bank but do not have an account.

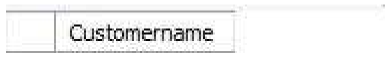
SELECT DISTINCT B.Customername FROM Borrower B LEFT JOIN Depositor d
On B.Customername=d.Customername WHERE d.Customername IS NULL;



```
Customername
Mohan
```

Find all customers who have both an account and a loan at the Bangalore branch.

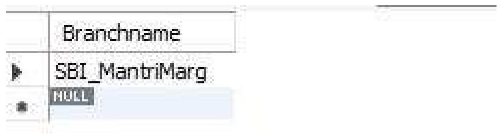
SELECT DISTINCT d.Customername FROM Depositor D JOIN BankAccount BA
ON D.Accno=BA.Accno JOIN Loan l on BA.Branchname=l.Branchname WHERE
BA.Branchname='Bangalore' AND l.Branchname='Bangalore';



```
Customername
```

Find the names of all branches that have greater assets than all branches located in Bangalore.

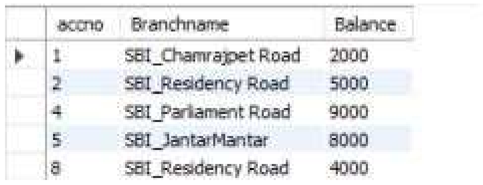
SELECT B.Branchname FROM Branch b
where b.Assets>(SELECT MAX(b.Assets) FROM Branch B WHERE B.Branchcity='Bangalore');



```
Branchname
SBI_MantriMarg
NULL
```

Demonstrate how you delete all account tuples at every branch located in a specific city (Ex. Bombay).

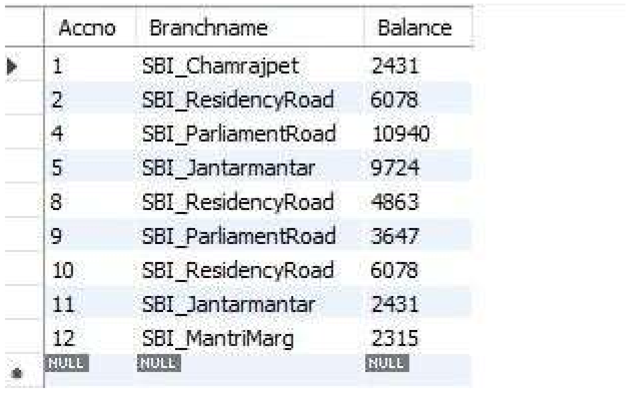
DELETE FROM BankAccount WHERE Branchname IN
(SELECT Branchname FROM Branch WHERE
Branchcity='Bombay'); select * from BankAccount;



accno	Branchname	Balance
1	SBI_Chamrajpet Road	2000
2	SBI_Residency Road	5000
4	SBI_Parliament Road	9000
5	SBI_JantarMantar	8000
8	SBI_Residency Road	4000

Update the Balance of all accounts by 5%.

UPDATE BankAccount SET Balance=Balance*1.05;
select * from BankAccount;



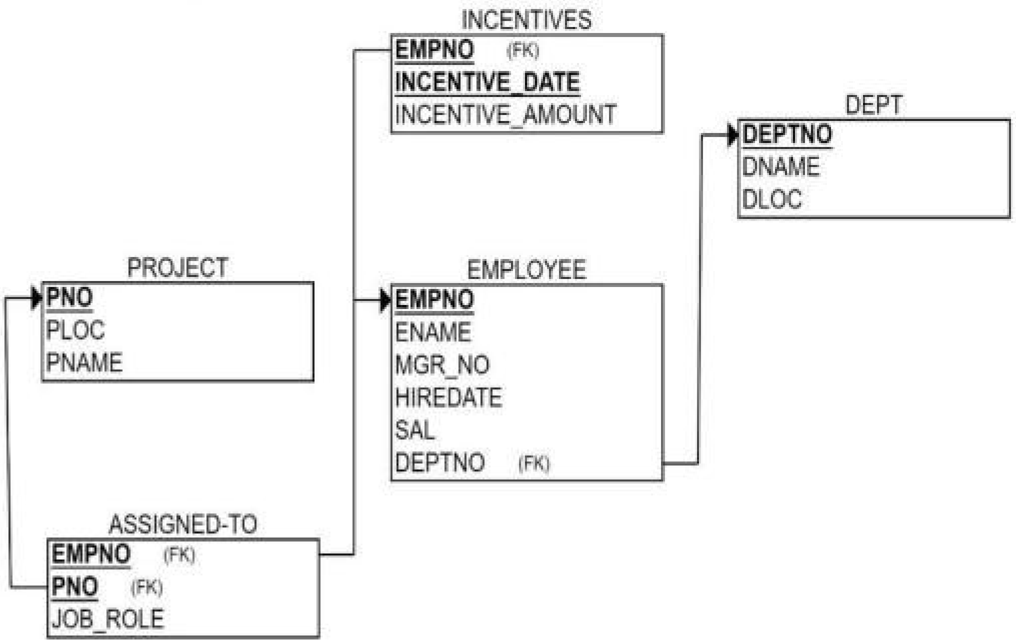
Accno	Branchname	Balance
1	SBI_Chamrajpet	2431
2	SBI_ResidencyRoad	6078
4	SBI_ParliamentRoad	10940
5	SBI_Jantarmantar	9724
8	SBI_ResidencyRoad	4863
9	SBI_ParliamentRoad	3647
10	SBI_ResidencyRoad	6078
11	SBI_Jantarmantar	2431
12	SBI_MantriMarg	2315
NULL	NULL	NULL

Employee Database

Question
(Week 5)

1. Using Scheme diagram, Create tables by properly specifying the primary keys and the foreign keys.
2. Enter greater than five tuples for each table.
3. Retrieve the employee numbers of all employees who work on project located in Bengaluru, Hyderabad, or Mysuru
4. Get Employee ID's of those employees who didn't receive incentives
5. Write a SQL query to find the employees name, number, dept, job_role, department location and project location who are working for a project location same as his/her department location.

Schema Diagram



Create Database

```
create database employee_Database_147;
use employee_Database_147;
```

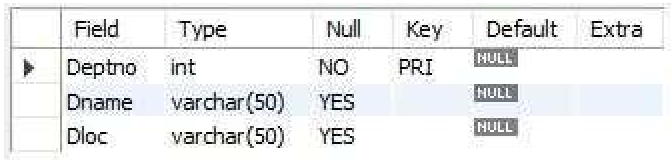
Create Table

```
create table Dept(
Deptno int,
Dname varchar(50),
Dloc varchar(50),
primary key (Deptno));

create table Project(
Pno int,
Pname varchar(50),
Ploc varchar(50),
PRIMARY KEY(Pno));

create table Employee(
Empno int,
Ename varchar(50),
Mgrno int,
Hiredate date,
Sal int,
Deptno int,
primary key (Empno, Deptno),
foreign key(Deptno) REFERENCES Dept(Deptno));

create table Incentive(
Empno int,
Incentivedate date,
Incentiveamount int,
primary key(Incentivedate, Empno),
foreign key (Empno) REFERENCES Employee(Empno));

create table AssignedTo(
Empno int,
Pno int,
Jobrole varchar(50),
primary key(Empno, Pno),
```

foreign key(Empno) references Employee(Empno),
foreign key(Pno) references Project(Pno));

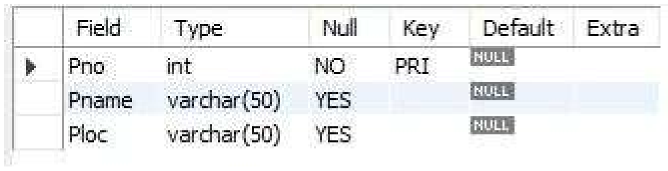
Structure of the table

desc Dept;



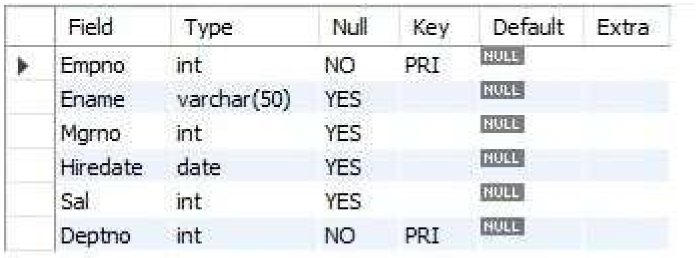
	Field	Type	Null	Key	Default	Extra
▶	Deptno	int	NO	PRI	NULL	
	Dname	varchar(50)	YES		NULL	
	Dloc	varchar(50)	YES		NULL	

desc Project;



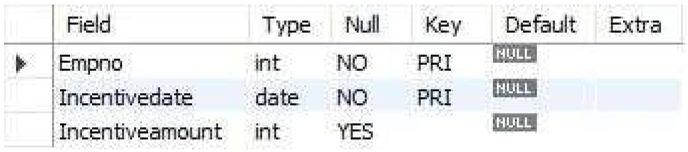
	Field	Type	Null	Key	Default	Extra
▶	Pno	int	NO	PRI	NULL	
	Pname	varchar(50)	YES		NULL	
	Ploc	varchar(50)	YES		NULL	

desc Employee;



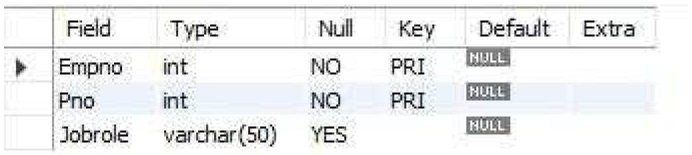
	Field	Type	Null	Key	Default	Extra
▶	Empno	int	NO	PRI	NULL	
	Ename	varchar(50)	YES		NULL	
	Mgrno	int	YES		NULL	
	Hiredate	date	YES		NULL	
	Sal	int	YES		NULL	
	Deptno	int	NO	PRI	NULL	

desc Incentive;



	Field	Type	Null	Key	Default	Extra
▶	Empno	int	NO	PRI	NULL	
	Incentivedate	date	NO	PRI	NULL	
	Incentiveamount	int	YES		NULL	

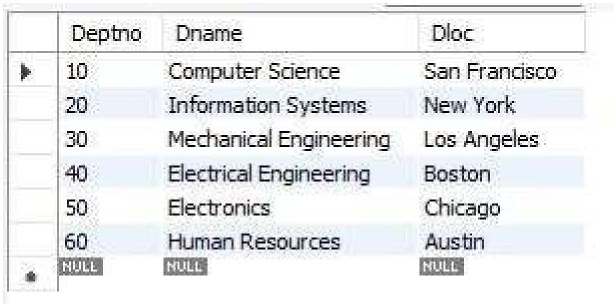
desc AssignedTo;



	Field	Type	Null	Key	Default	Extra
▶	Empno	int	NO	PRI	NULL	
	Pno	int	NO	PRI	NULL	
	Jobrole	varchar(50)	YES		NULL	

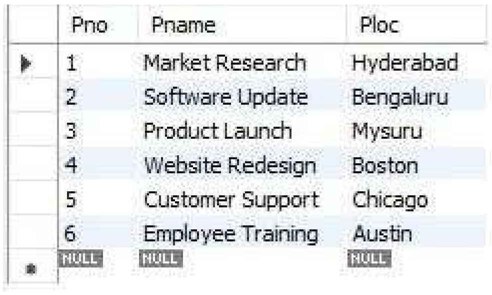
Inserting Values to the table

```
insert into Dept values(10, 'Computer Science', 'San Francisco');
insert into Dept values(20, 'Information Systems', 'New York');
insert into Dept values(30, 'Mechanical Engineering', ‘Los
Angeles');
insert into Dept values(40, 'Electrical Engineering', 'Boston');
insert into Dept values(50, 'Electronics', 'Chicago');
insert into Dept values(60, 'Human Resources',‘Austin');
 select * from Dept;
```



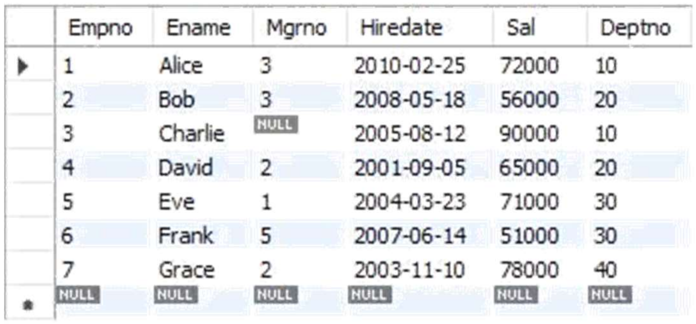
Deptno	Dname	Dloc
10	Computer Science	San Francisco
20	Information Systems	New York
30	Mechanical Engineering	Los Angeles
40	Electrical Engineering	Boston
50	Electronics	Chicago
60	Human Resources	Austin
NULL	NULL	NULL

```
insert into Project values (1, 'Market Research','Hyderabad');
insert into Project values (2, 'Software Update', 'Bengaluru');
insert into Project values (3, 'Product Launch', 'Mysuru');
insert into Project values (4, 'Website Redesign', 'Boston');
insert into Project values (5, 'Customer Support', 'Chicago');
insert into Project values (6, 'Employee Training', 'Austin');
select * from Project;
```



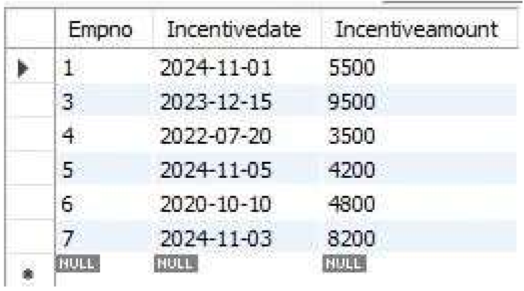
Pno	Pname	Ploc
1	Market Research	Hyderabad
2	Software Update	Bengaluru
3	Product Launch	Mysuru
4	Website Redesign	Boston
5	Customer Support	Chicago
6	Employee Training	Austin
NULL	NULL	NULL

```
insert into Employee values(1, 'Alice', 3, '2010-02-25', 72000, 10);
insert into Employee values(2, 'Bob', 3, '2008-05-18', 56000, 20);
insert into Employee values(3, 'Charlie', NULL, '2005-08-12', 90000,10);
insert into Employee values(4, 'David', 2, '2001-09-05', 65000, 20);
insert into Employee values(5, 'Eve', 1, '2004-03-23', 71000, 30);
insert into Employee values(6, 'Frank', 5, '2007-06-14', 51000,30);
insert into Employee values(7, 'Grace', 2, '2003-11-10', 78000,40);
select * from Employee;
```



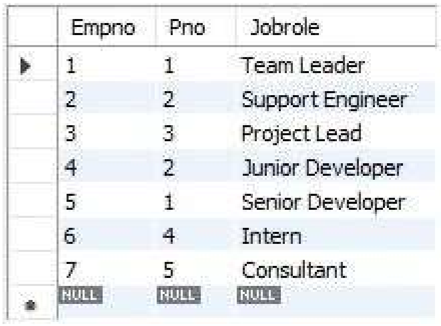
	Empno	Ename	Mgrno	Hiredate	Sal	Deptno
▶	1	Alice	3	2010-02-25	72000	10
	2	Bob	3	2008-05-18	56000	20
	3	Charlie	NULL	2005-08-12	90000	10
	4	David	2	2001-09-05	65000	20
	5	Eve	1	2004-03-23	71000	30
	6	Frank	5	2007-06-14	51000	30
	7	Grace	2	2003-11-10	78000	40
*	NULL	NULL	NULL	NULL	NULL	NULL

```
insert into Incentive values(1, '2024-11-01', 5500);
insert into Incentive values(3, '2023-12-15', 9500);
insert into Incentive values(4, '2022-07-20', 3500);
insert into Incentive values(5, '2024-11-05', 4200);
insert into Incentive values(6, '2020-10-10', 4800);
insert into Incentive values(7, '2024-11-03', 8200);
select * from Incentive order by Empno asc;
```



	Empno	Incentivedate	Incentiveamount
▶	1	2024-11-01	5500
	3	2023-12-15	9500
	4	2022-07-20	3500
	5	2024-11-05	4200
	6	2020-10-10	4800
	7	2024-11-03	8200
*	NULL	NULL	NULL

```
insert into AssignedTo values(1, 1, 'Team Leader');
insert into AssignedTo values(2, 2, 'Support Engineer');
insert into AssignedTo values(3, 3, 'Project Lead');
insert into AssignedTo values(4, 2, 'Junior Developer');
insert into AssignedTo values(5, 1, 'Senior Developer');
insert into AssignedTo values(6, 4, 'Intern');
insert into AssignedTo values(7, 5, 'Consultant');
select * from AssignedTo;
```

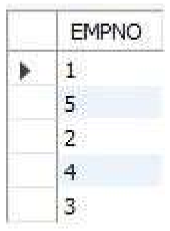


	Empno	Pno	Jobrole
▶	1	1	Team Leader
	2	2	Support Engineer
	3	3	Project Lead
	4	2	Junior Developer
	5	1	Senior Developer
	6	4	Intern
	7	5	Consultant
*	NULL	NULL	NULL

Queries :

Retrieve the employee numbers of all employees who work on project located in Bengaluru, Hyderabad, or Mysuru.

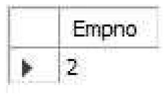
```
SELECT a.EMPNO FROM AssignedTo a
JOIN Project p ON a.Pno = p.Pno
WHERE p.Ploc IN ('Bengaluru', 'Hyderabad', 'Mysuru');
```



EMPNO
1
5
2
4
3

Get Employee ID's of those employees who didn't receive incentives.

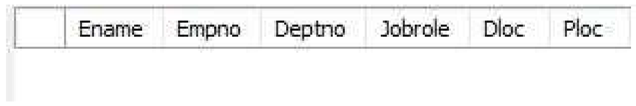
```
select Empno from Employee e where Empno Not in(select Empno from Incentive );
```



Empno
2

Write a SQL query to find the employees name, number, dept, job_role, department location and project location who are working for a project location same as his/her department location.

```
SELECT e.Ename, e.Empno, d.Deptno, a.Jobrole, d.Dloc,
p.Ploc FROM Employee e, Dept d, Project p, Assignedto a
WHERE e.Deptno = d.Deptno AND e.Empno = a.Empno AND a.Pno = p.Pno AND d.Dloc = p.Ploc;
```

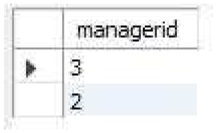


Ename	Empno	Deptno	Jobrole	Dloc	Ploc

(Week 6)
More Queries on Employee Database:

List the name of the managers with the maximum employees.

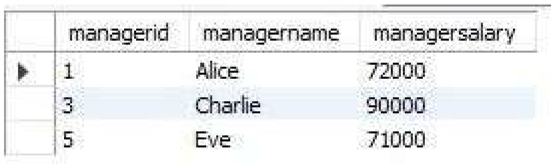
select e.Mgrno as managerid from Employee e join Employee m on e.Mgrno = m.Empno group by e.Mgrno having count(e.Empno) = (select max(employeecount) from (select count(Empno) as employeecount from Employee where Mgrno is not null group by Mgrno) as managercounts);



managerid
3
2

Display those managers name whose salary is more than average salary of his employee.

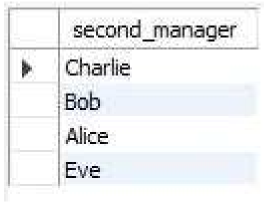
select m.Empno as managerid,m.Ename as managername,m.Sal as managersalary from Employee m where m.Sal >(select avg(e.Sal) from Employee e where e.Mgrno = m.Empno);



managerid	managername	managersalary
1	Alice	72000
3	Charlie	90000
5	Eve	71000

Find the name of the second top level managers of each department.

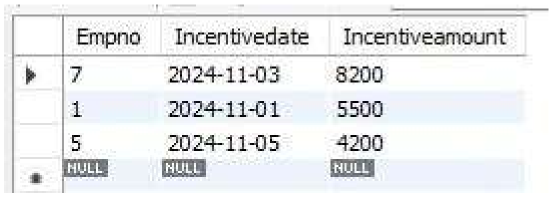
select distinct e1.Ename as second_manager from Employee e1 where e1.Empno in (select distinct e2.Mgrno from Employee e2 where e2.Mgrno is not null);



second_manager
Charlie
Bob
Alice
Eve

Find the employee details who got second maximum incentive in November 2024.

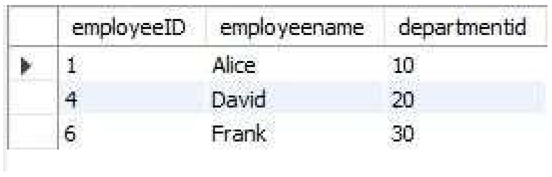
select Empno,Incentivedate,Incentiveamount from Incentive where Incentivedate between '2024-11-01' and '2024-11-05' order by Incentiveamount desc ;



Empno	Incentivedate	Incentiveamount
7	2024-11-03	8200
1	2024-11-01	5500
5	2024-11-05	4200
NULL	NULL	NULL

Display those employees who are working in the same department where his manager is working.

select e.Empno as employeeID, e.Ename as employeename, e.Deptno as departmentid from Employee e Join Employee m on e.Mgrno = m.Empno where e.Deptno = m.Deptno;



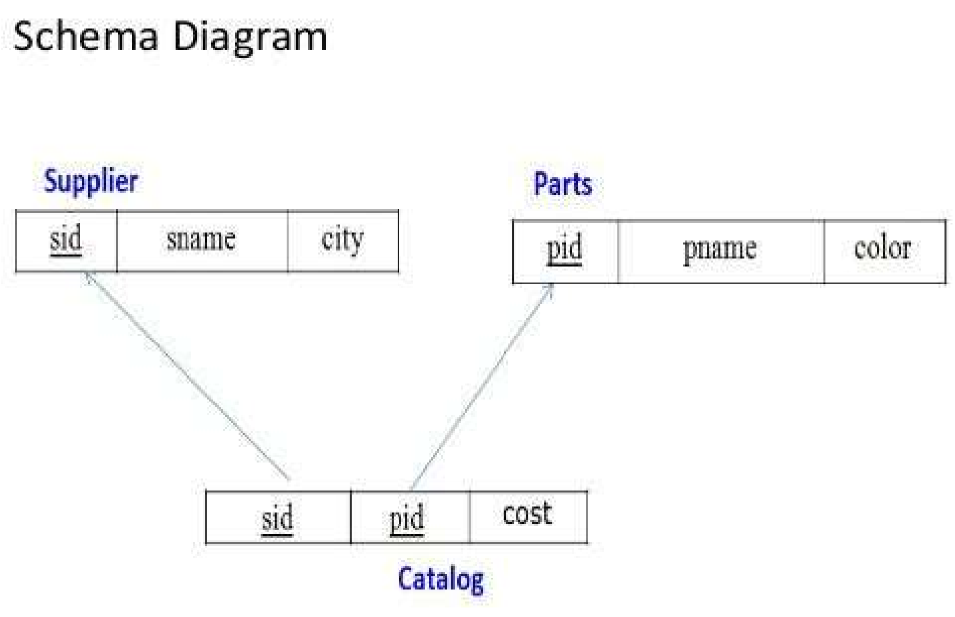
employeeID	employeename	departmentid
1	Alice	10
4	David	20
6	Frank	30

Supplier Database

Question
(Week 7)

1. Using Scheme diagram, Create tables by properly specifying the primary keys and the foreign keys.
2. Insert appropriate records in each table.
3. Find the pnames of parts for which there is some supplier.
4. Find the snames of suppliers who supply every part.
5. Find the snames of suppliers who supply every red part.
6. Find the pnames of parts supplied by Acme Widget Suppliers and by no one else.
7. Find the sids of suppliers who charge more for some part than the average cost of that part (averaged over all the suppliers who supply that part).
8. For each part, find the sname of the supplier who charges the most for that part.

Schema Diagram



Create Database

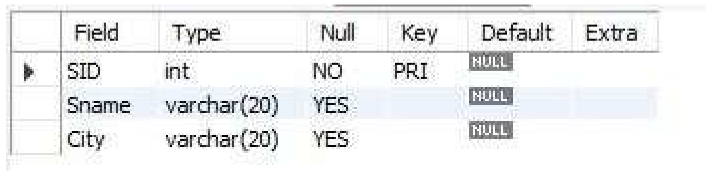
```
create database supplier_database_147;

use supplier_database_147;
```

Create Table

```
create table Supplier
(
SID int,
Sname varchar(20),
City varchar(20),
PRIMARY KEY(SID));

create table Parts
(
PID int,
Pname varchar(20),
Color varchar(20),
PRIMARY KEY(PID));

create table Catalog
(
SID  int,
PID  int,
Cost int,
PRIMARY KEY(SID,PID),
FOREIGN KEY(SID) references Supplier(SID),
FOREIGN KEY(PID) references Parts(PID)
ON DELETE CASCADE ON UPDATE CASCADE);
```

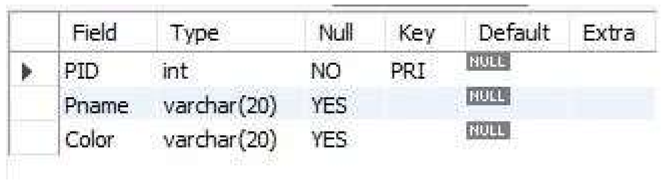
Structure of the table

desc Supplier;



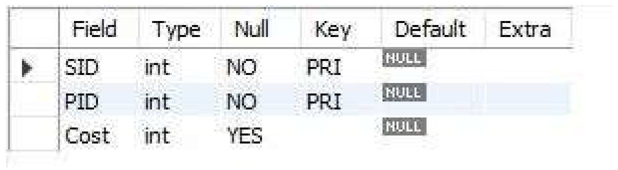
	Field	Type	Null	Key	Default	Extra
▶	SID	int	NO	PRI	NULL	
	Sname	varchar(20)	YES		NULL	
	City	varchar(20)	YES		NULL	

desc Parts;



	Field	Type	Null	Key	Default	Extra
▶	PID	int	NO	PRI	NULL	
	Pname	varchar(20)	YES		NULL	
	Color	varchar(20)	YES		NULL	

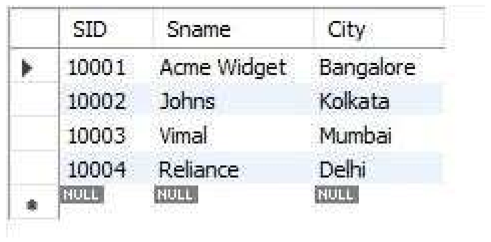
desc Catalog;



	Field	Type	Null	Key	Default	Extra
▶	SID	int	NO	PRI	NULL	
	PID	int	NO	PRI	NULL	
	Cost	int	YES		NULL	

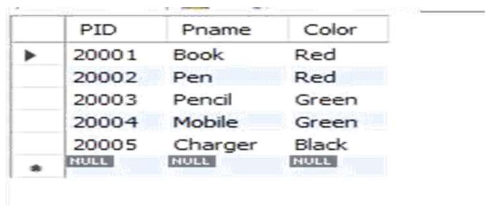
Inserting Values to the table

insert into Supplier values(10001,'Acme Widget','Bangalore');
insert into Supplier values(10002,'Johns','Kolkata'); insert into
Supplier values(10003,'Vimal','Mumbai');
insert into Supplier values(10004,'Reliance','Delhi');
select * from Supplier;



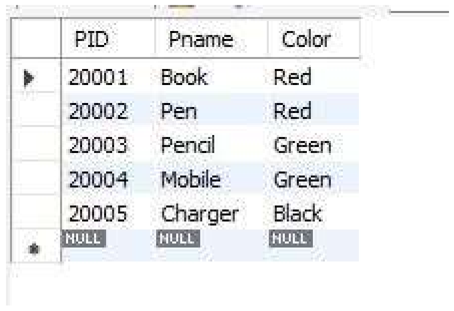
	SID	Sname	City
▶	10001	Acme Widget	Bangalore
	10002	Johns	Kolkata
	10003	Vimal	Mumbai
	10004	Reliance	Delhi
*	NULL	NULL	NULL

insert into Parts values(20001,'Book','Red');
insert into Parts values(20002,'Pen','Red');
insert into Parts values(20003,'Pencil','Green');
insert into Parts values(20004,'Mobile','Green');
insert into Parts values(20005,'Charger','Black');
select * from Parts;



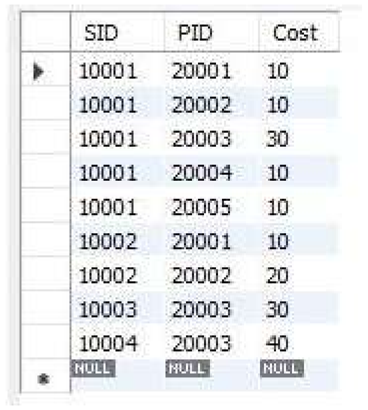
PID	Pname	Color
20001	Book	Red
20002	Pen	Red
20003	Pencil	Green
20004	Mobile	Green
20005	Charger	Black
NULL	NULL	NULL

insert into Parts values(20001,'Book','Red');
insert into Parts values(20002,'Pen','Red');
insert into Parts values(20003,'Pencil','Green');
insert into Parts values(20004,'Mobile','Green');
insert into Parts values(20005,'Charger','Black');
select * from Parts;



PID	Pname	Color
20001	Book	Red
20002	Pen	Red
20003	Pencil	Green
20004	Mobile	Green
20005	Charger	Black
NULL	NULL	NULL

insert into Catalog values(10001,20001,10);
insert into Catalog values(10001,20002,10);
insert into Catalog values(10001,20003,30);
insert into Catalog values(10001,20004,10);
insert into Catalog values(10001,20005,10);
insert into Catalog values(10002,20001,10);
insert into Catalog values(10002,20002,20);
insert into Catalog values(10003,20003,30);
insert into Catalog values(10004,20003,40);
select * from Catalog;

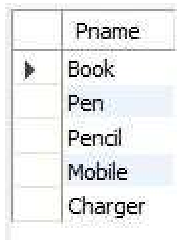


SID	PID	Cost
10001	20001	10
10001	20002	10
10001	20003	30
10001	20004	10
10001	20005	10
10002	20001	10
10002	20002	20
10003	20003	30
10004	20003	40
NULL	NULL	NULL

Queries :

Find the pnames of parts for which there is some supplier.

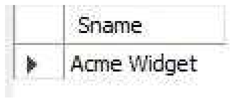
```
select distinct Pname from Parts where PID in(select PID from Catalog);
```



```
Pname
Book
Pen
Pencil
Mobile
Charger
```

Find the snames of suppliers who supply every part.

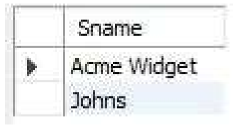
```
select Sname from Supplier where
SID NOT IN( select s.SID from Supplier s , Parts p
where p.PID NOT IN(select c.PID from Catalog c where c.SID=s.SID));
```



```
Sname
Acme Widget
```

Find the snames of suppliers who supply every red part.

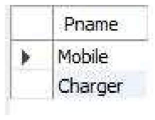
```
select Sname from Supplier where
SID NOT IN( select s.SID from Supplier s , Parts p
where p.Color='Red' and p.PID NOT IN(select c.PID from Catalog c where c.SID=s.SID));
```



```
Sname
Acme Widget
Johns
```

Find the pnames of parts supplied by Acme Widget Suppliers and by no one else.

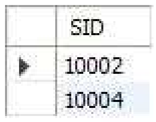
```
SELECT p.Pname FROM Parts p
JOIN Catalog c ON p.PID = c.PID
JOIN Supplier s ON c.SID = s.SID
WHERE s.Sname = 'Acme Widget'
AND NOT EXISTS (
   SELECT 1 FROM Catalog c1
   JOIN Supplier s1 ON c1.SID = s1.SID
   WHERE c1.PID = p.PID
   AND s1.Sname != 'Acme Widget'
);
```



```
Pname
Mobile
Charger
```

Find the sids of suppliers who charge more for some part than the average cost of that part (averaged over all the suppliers who supply that part).

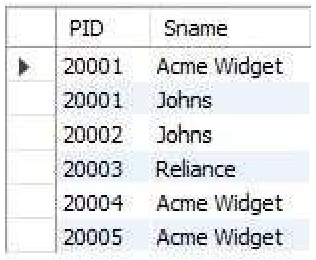
```
select distinct c.SID from Catalog c join
(select PID,avg(Cost) as Avg_Cost from Catalog group by PID)
avg_cost_table on c.PID=avg_Cost_table.PID
where c.Cost>avg_Cost_table.Avg_Cost;
```



SID
10002
10004

For each part, find the sname of the supplier who charges the most for that part.

```
select p.PID,s.Sname from Supplier s join Catalog c on
s.SID=c.SID join Parts p on c.PID=p.PID
where c.Cost=(select max(c2.Cost) from Catalog c2 where c2.PID=p.PID);
```



PID	Sname
20001	Acme Widget
20001	Johns
20002	Johns
20003	Reliance
20004	Acme Widget
20005	Acme Widget

NoSQL Student Database

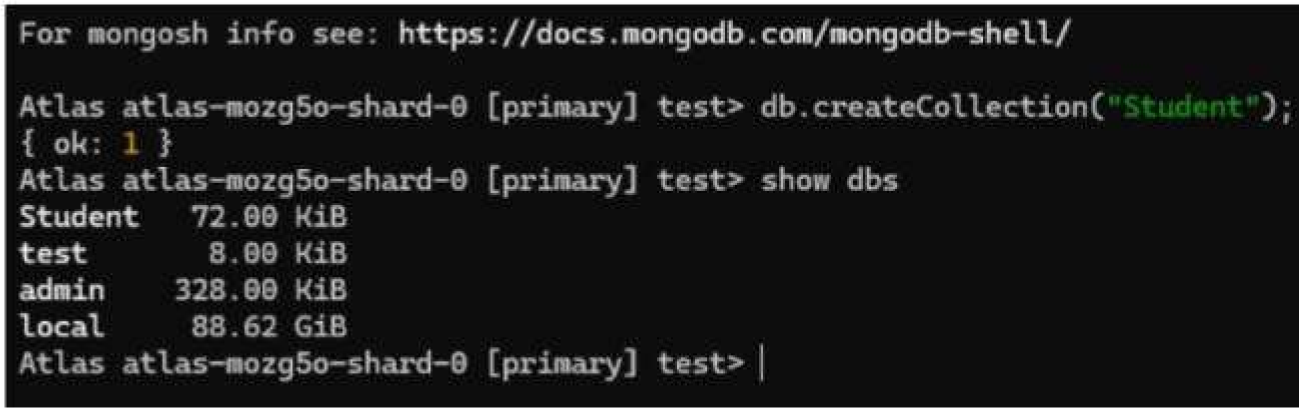
Question
(Week 8)

Perform the following DB operations using MongoDB:-
1. Create a database "Student" with the following attributes Rollno,Age, ContactNo, Email-Id.
2. Insert appropriate values
3. Write query to update Email-Id of a student with rollno 10.
4. Replace the student name from "ABC" to "FEM" of rollno 11.

Queries:

1. Create a database "Student" with the following attributes Rollno,Age, ContactNo, Email-Id.

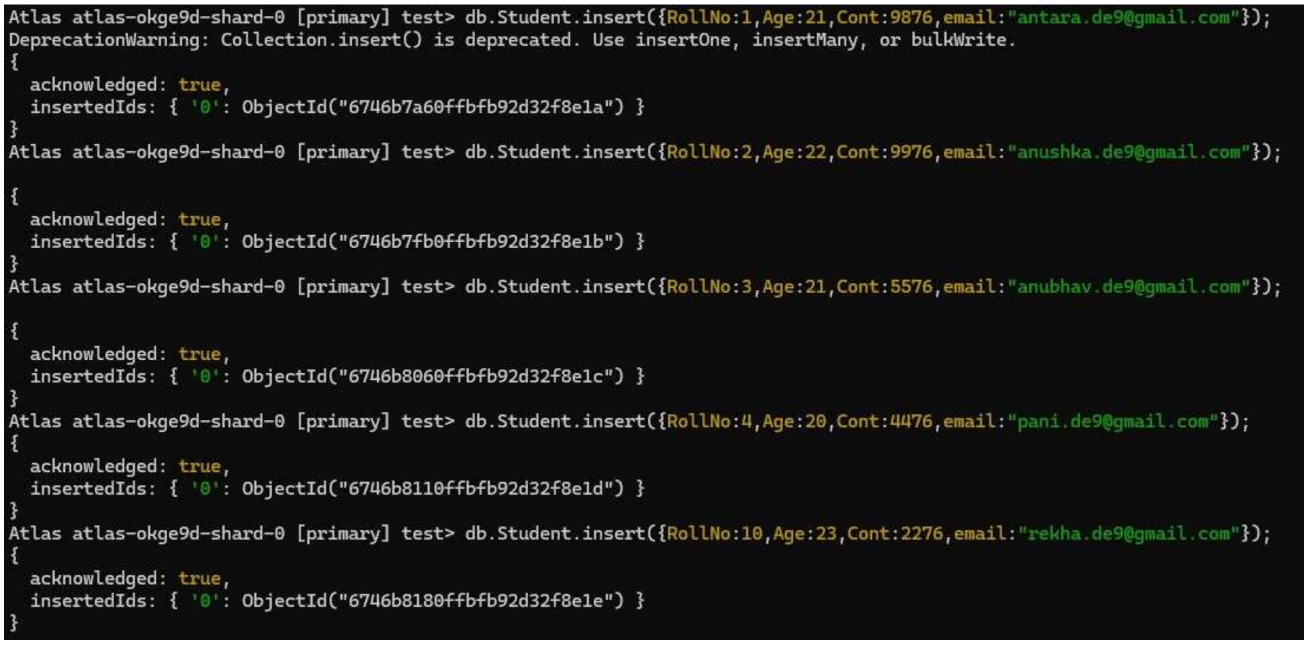
```
db.createCollection("Student");
```



```
For mongosh info see: https://docs.mongodb.com/mongodb-shell/

Atlas atlas-mozg5o-shard-0 [primary] test> db.createCollection("Student");
{ ok: 1 }
Atlas atlas-mozg5o-shard-0 [primary] test> show dbs
Student    72.00 KiB
test        8.00 KiB
admin     328.00 KiB
local      88.62 GiB
Atlas atlas-mozg5o-shard-0 [primary] test> |
```

2. **Insert appropriate values**

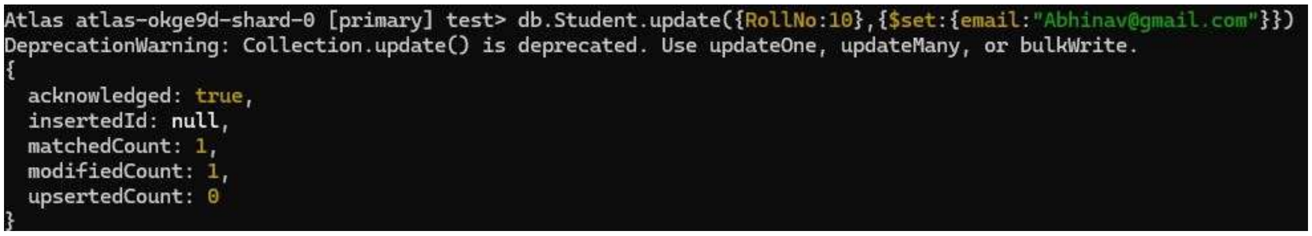
```
db.Student.insert({RollNo:1,Age:21,Cont:9876,email:"antara.de9@gmail.com"});
db.Student.insert({RollNo:2,Age:22,Cont:9976,email:"anushka.de9@gmail.com"});
db.Student.insert({RollNo:3,Age:21,Cont:5576,email:"anubhav.de9@gmail.com"});
db.Student.insert({RollNo:4,Age:20,Cont:4476,email:"pani.de9@gmail.com"});
db.Student.insert({RollNo:10,Age:23,Cont:2276,email:"rekha.de9@gmail.com"});
```



```
Atlas atlas-okge9d-shard-0 [primary] test> db.Student.insert({RollNo:1,Age:21,Cont:9876,email:"antara.de9@gmail.com"});
DeprecationWarning: Collection.insert() is deprecated. Use insertOne, insertMany, or bulkWrite.
{
  acknowledged: true,
  insertedIds: { '0': ObjectId("6746b7a60ffbfb92d32f8e1a") }
}
Atlas atlas-okge9d-shard-0 [primary] test> db.Student.insert({RollNo:2,Age:22,Cont:9976,email:"anushka.de9@gmail.com"});

{
  acknowledged: true,
  insertedIds: { '0': ObjectId("6746b7fb0ffbfb92d32f8e1b") }
}
Atlas atlas-okge9d-shard-0 [primary] test> db.Student.insert({RollNo:3,Age:21,Cont:5576,email:"anubhav.de9@gmail.com"});

{
  acknowledged: true,
  insertedIds: { '0': ObjectId("6746b8060ffbfb92d32f8e1c") }
}
Atlas atlas-okge9d-shard-0 [primary] test> db.Student.insert({RollNo:4,Age:20,Cont:4476,email:"pani.de9@gmail.com"});
{
  acknowledged: true,
  insertedIds: { '0': ObjectId("6746b8110ffbfb92d32f8e1d") }
}
Atlas atlas-okge9d-shard-0 [primary] test> db.Student.insert({RollNo:10,Age:23,Cont:2276,email:"rekha.de9@gmail.com"});
{
  acknowledged: true,
  insertedIds: { '0': ObjectId("6746b8180ffbfb92d32f8e1e") }
}
```

3.)Write query to update Email-Id of a student with rollno 10.

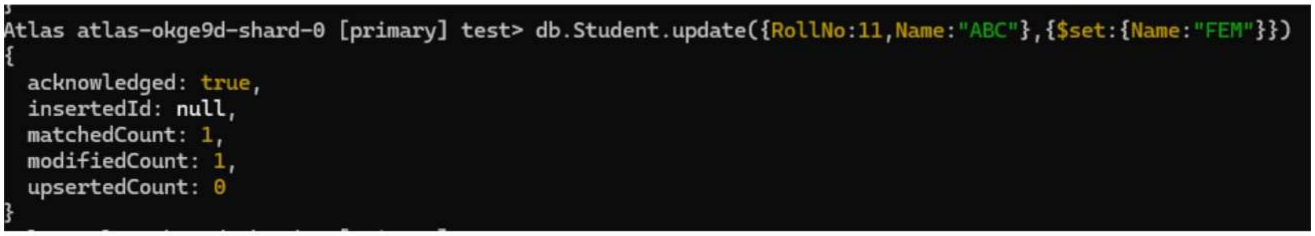
db.Student.update({RollNo:10},{$set:{email:"Abhinav@gmail.com"}})



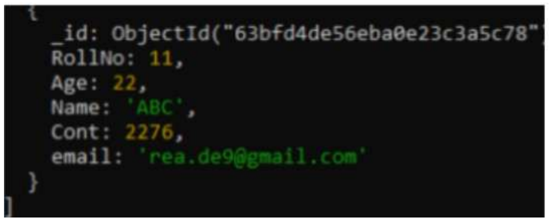
```
Atlas atlas-okge9d-shard-0 [primary] test> db.Student.update({RollNo:10},{$set:{email:"Abhinav@gmail.com"}})
DeprecationWarning: Collection.update() is deprecated. Use updateOne, updateMany, or bulkWrite.
{
  acknowledged: true,
  insertedId: null,
  matchedCount: 1,
  modifiedCount: 1,
  upsertedCount: 0
}
```

4. **Replace the student name from "ABC" to "FEM" of rollno 11.**

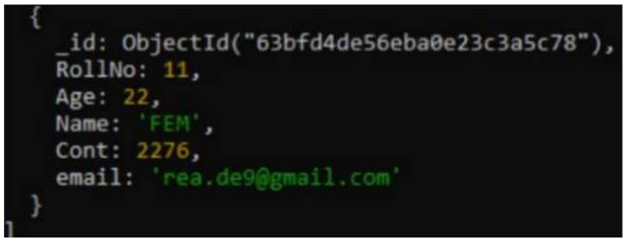
db.Student.insert({RollNo:11,Age:22,Name:"ABC",Cont:2276,email:"rea.de9@gmail.com"});
db.Student.update({RollNo:11,Name:"ABC"},{$set:{Name:"FEM"}})



```
Atlas atlas-okge9d-shard-0 [primary] test> db.Student.update({RollNo:11,Name:"ABC"},{$set:{Name:"FEM"}})
{
  acknowledged: true,
  insertedId: null,
  matchedCount: 1,
  modifiedCount: 1,
  upsertedCount: 0
}
```



```
  {
    _id: ObjectId("63bfd4de56eba0e23c3a5c78"
    RollNo: 11,
    Age: 22,
    Name: 'ABC',
    Cont: 2276,
    email: 'rea.de9@gmail.com'
  }
]
```



```
  {
    _id: ObjectId("63bfd4de56eba0e23c3a5c78"),
    RollNo: 11,
    Age: 22,
    Name: 'FEM',
    Cont: 2276,
    email: 'rea.de9@gmail.com'
  }
]
```

NoSQL Customer Database

Question
(Week 9)

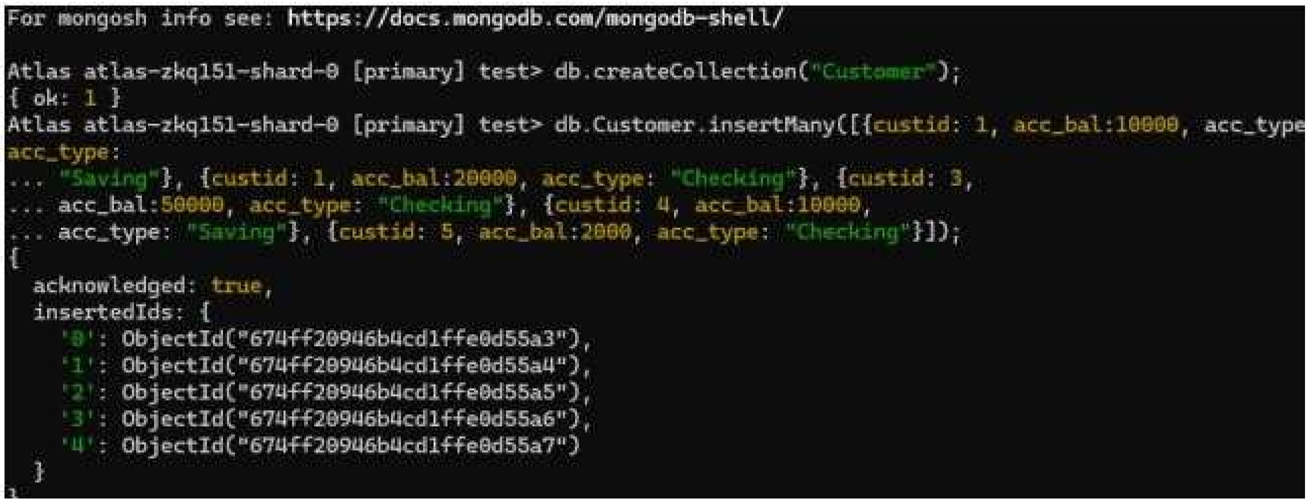
1. Create a collection by name Customers with the following attributes. Cust_id, Acc_Bal, Acc_Type
2. Insert at least 5 values into the table
3. Write a query to display those records whose total account balance is greater than 1200 of account type 'Z' for each customer_id.
4. Determine Minimum and Maximum account balance for each customer_id.
5. Export the created collection into local file system
6. Drop the table.
7. Import a given csv dataset from local file system into mongodb collection.

QUERIES

1. Create a collection by name Customers with the following attributes. Cust_id, Acc_Bal, Acc_Type.

db.createCollection("Customer");

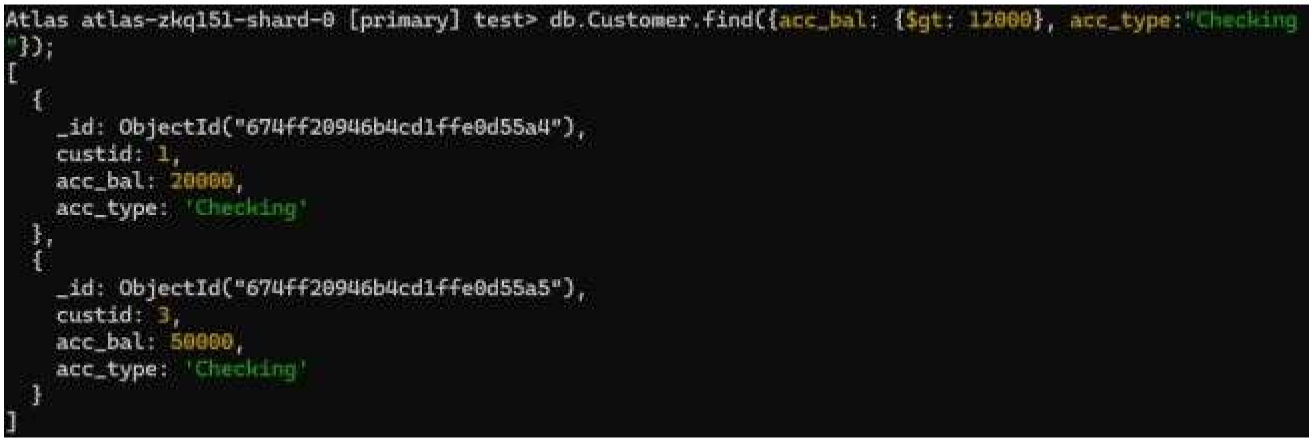
db.Customer.insertMany([{custid: 1, acc_bal:10000, acc_type: "Saving"}, {custid: 1, acc_bal:20000, acc_type: "Checking"}, {custid: 3, acc_bal:50000, acc_type: "Checking"}, {custid: 4, acc_bal:10000, acc_type: "Saving"}, {custid: 5, acc_bal:2000, acc_type: "Checking"}]);



```
For mongosh info see: https://docs.mongodb.com/mongodb-shell/

Atlas atlas-zkq151-shard-0 [primary] test> db.createCollection("Customer");
{ ok: 1 }
Atlas atlas-zkq151-shard-0 [primary] test> db.Customer.insertMany([{custid: 1, acc_bal:10000, acc_type
acc_type:
... "Saving"}, {custid: 1, acc_bal:20000, acc_type: "Checking"}, {custid: 3,
... acc_bal:50000, acc_type: "Checking"}, {custid: 4, acc_bal:10000,
... acc_type: "Saving"}, {custid: 5, acc_bal:2000, acc_type: "Checking"}]);
{
  acknowledged: true,
  insertedIds: {
    '0': ObjectId("674ff20946b4cd1ffe0d55a3"),
    '1': ObjectId("674ff20946b4cd1ffe0d55a4"),
    '2': ObjectId("674ff20946b4cd1ffe0d55a5"),
    '3': ObjectId("674ff20946b4cd1ffe0d55a6"),
    '4': ObjectId("674ff20946b4cd1ffe0d55a7")
  }
```

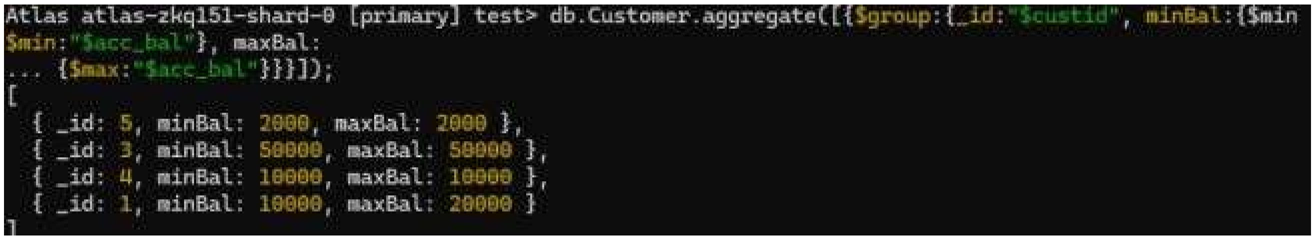
2. Write a query to display those records whose total account balance is greater than 12000 of account type 'Z' for each customer_id.

db.Customer.find({acc_bal: {$gt: 12000}, acc_type:"Checking"});



```
Atlas atlas-zkq151-shard-0 [primary] test> db.Customer.find({acc_bal: {$gt: 12000}, acc_type:"Checking
"});
[
  {
    _id: ObjectId("674ff20946b4cd1ffe0d55a4"),
    custid: 1,
    acc_bal: 20000,
    acc_type: 'Checking'
  },
  {
    _id: ObjectId("674ff20946b4cd1ffe0d55a5"),
    custid: 3,
    acc_bal: 50000,
    acc_type: 'Checking'
  }
]
```

3. Determine Minimum and Maximum account balance for each customer_id. db.Customer.aggregate([{$group:{_id:"$custid", minBal: {$min:"$acc_bal"}, maxBal: {$max:"$acc_bal"}}}]);

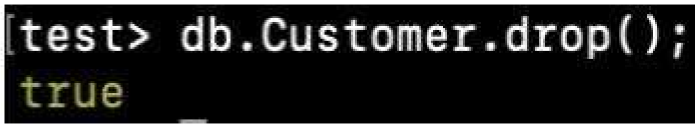


```
Atlas atlas-zkq151-shard-0 [primary] test> db.Customer.aggregate([{$group:{_id:"$custid", minBal:{$min
$min:"$acc_bal"}, maxBal:
... {$max:"$acc_bal"}}}]);
[
  { _id: 5, minBal: 2000, maxBal: 2000 },
  { _id: 3, minBal: 50000, maxBal: 50000 },
  { _id: 4, minBal: 10000, maxBal: 10000 },
  { _id: 1, minBal: 10000, maxBal: 20000 }
]
```

4. Export the created collection into local file system

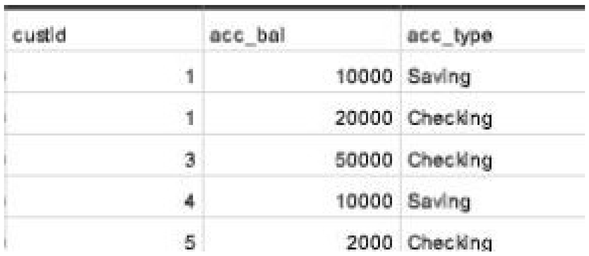
5. Drop the table

db.Customer.drop();



```
test> db.Customer.drop();
true
```

6. Import a given csv dataset from local file system into mongodb collection.



custid	acc_bal	acc_type
1	10000	Saving
1	20000	Checking
3	50000	Checking
4	10000	Saving
5	2000	Checking

NoSQL Restaurant Database

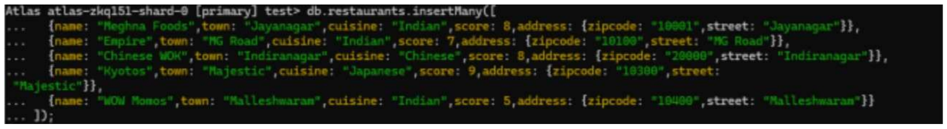
Question
(Week 10)

1. Write a MongoDB query to display all the documents in the collection restaurants.
2. Write a MongoDB query to arrange the name of the restaurants in descending along with all the columns.
3. Write a MongoDB query to find the restaurant Id, name, town and cuisine for those restaurants which achieved a score which is not more than 10.
4. Write a MongoDB query to find the average score for each restaurant.
5. Write a MongoDB query to find the name and address of the restaurants that have a zipcode that starts with '10'.

QUERIES

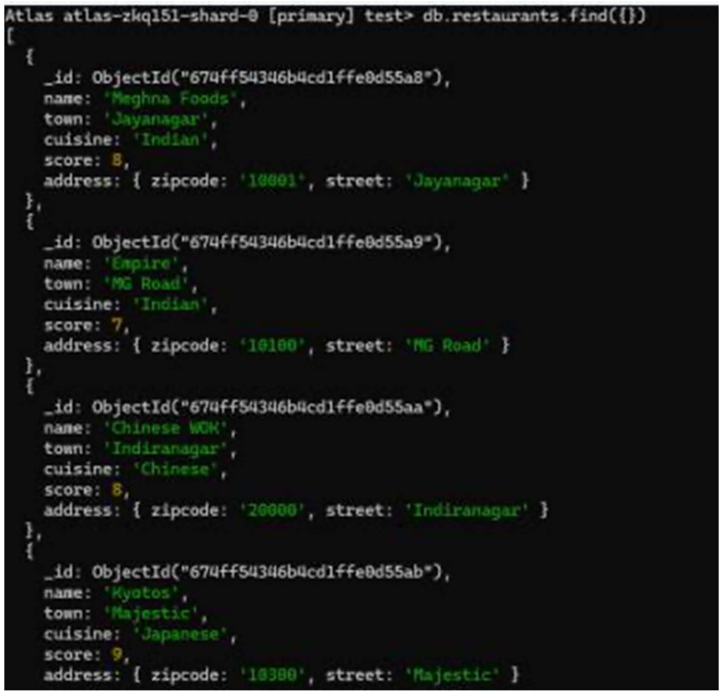
1.In MongoDB create a collection for "Restaurant" and insert atleast five records
db.createCollection("restaurants");

{ name: "Meghna Foods", town: "Jayanagar", cuisine: "Indian", score: 8, address: { zipcode: "10001", street: "Jayanagar"} },{ name: "Empire", town: "MG Road", cuisine: "Indian", score: 7, address: { zipcode: "10100", street: "MG Road" } },{ name: "Chinese WOK", town: "Indiranagar", cuisine: "Chinese", score: 12, address: { zipcode: "20000", street: "Indiranagar" } },{ name: "Kyotos", town: "Majestic", cuisine: "Japanese", score: 9, address: { zipcode: "10300", street: "Majestic" } },{ name: "WOW Momos", town: "Malleshwaram", cuisine: "Indian", score: 5, address: { zipcode: "10400", street: "Malleshwaram" }}])



```
Atlas atlas-zkq151-shard-0 [primary] test> db.restaurants.insertMany([
...    {name: "Meghna Foods",town: "Jayanagar",cuisine: "Indian",score: 8,address: {zipcode: "10001",street: "Jayanagar"}},
...    {name: "Empire",town: "MG Road",cuisine: "Indian",score: 7,address: {zipcode: "10100",street: "MG Road"}},
...    {name: "Chinese WOK",town: "Indiranagar",cuisine: "Chinese",score: 8,address: {zipcode: "20000",street: "Indiranagar"}},
...    {name: "Kyotos",town: "Majestic",cuisine: "Japanese",score: 9,address: {zipcode: "10300",street:
 "Majestic"}},
...    {name: "WOW Momos",town: "Malleshwaram",cuisine: "Indian",score: 5,address: {zipcode: "10400",street: "Malleshwaram"}}
... ]);
```

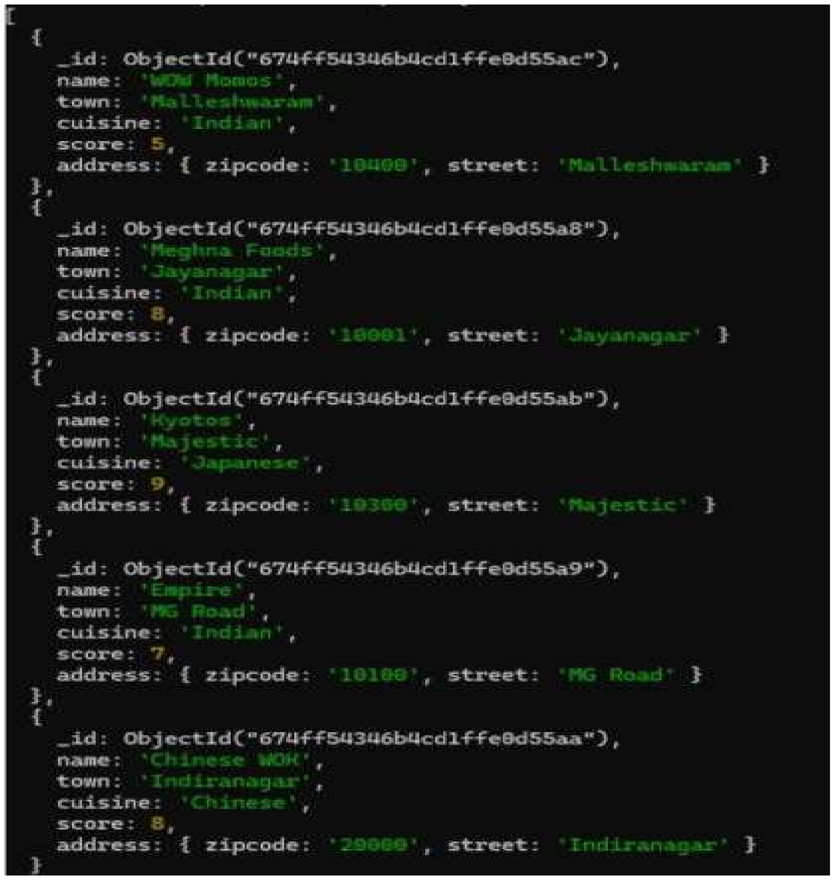
2. **Write a MongoDB query to display all the documents in the collection restaurants.** db.restaurants.find({})



```
Atlas atlas-zkq151-shard-0 [primary] test> db.restaurants.find({})
[
  {
    _id: ObjectId("674ff54346b4cd1ffe0d55a8"),
    name: 'Meghna Foods',
    town: 'Jayanagar',
    cuisine: 'Indian',
    score: 8,
    address: { zipcode: '10001', street: 'Jayanagar' }
  },
  {
    _id: ObjectId("674ff54346b4cd1ffe0d55a9"),
    name: 'Empire',
    town: 'MG Road',
    cuisine: 'Indian',
    score: 7,
    address: { zipcode: '10100', street: 'MG Road' }
  },
  {
    _id: ObjectId("674ff54346b4cd1ffe0d55aa"),
    name: 'Chinese WOK',
    town: 'Indiranagar',
    cuisine: 'Chinese',
    score: 8,
    address: { zipcode: '20000', street: 'Indiranagar' }
  },
  {
    _id: ObjectId("674ff54346b4cd1ffe0d55ab"),
    name: 'Kyotos',
    town: 'Majestic',
    cuisine: 'Japanese',
    score: 9,
    address: { zipcode: '10300', street: 'Majestic' }
```

3. Write a MongoDB query to arrange the name of the restaurants in descending along with all the columns.

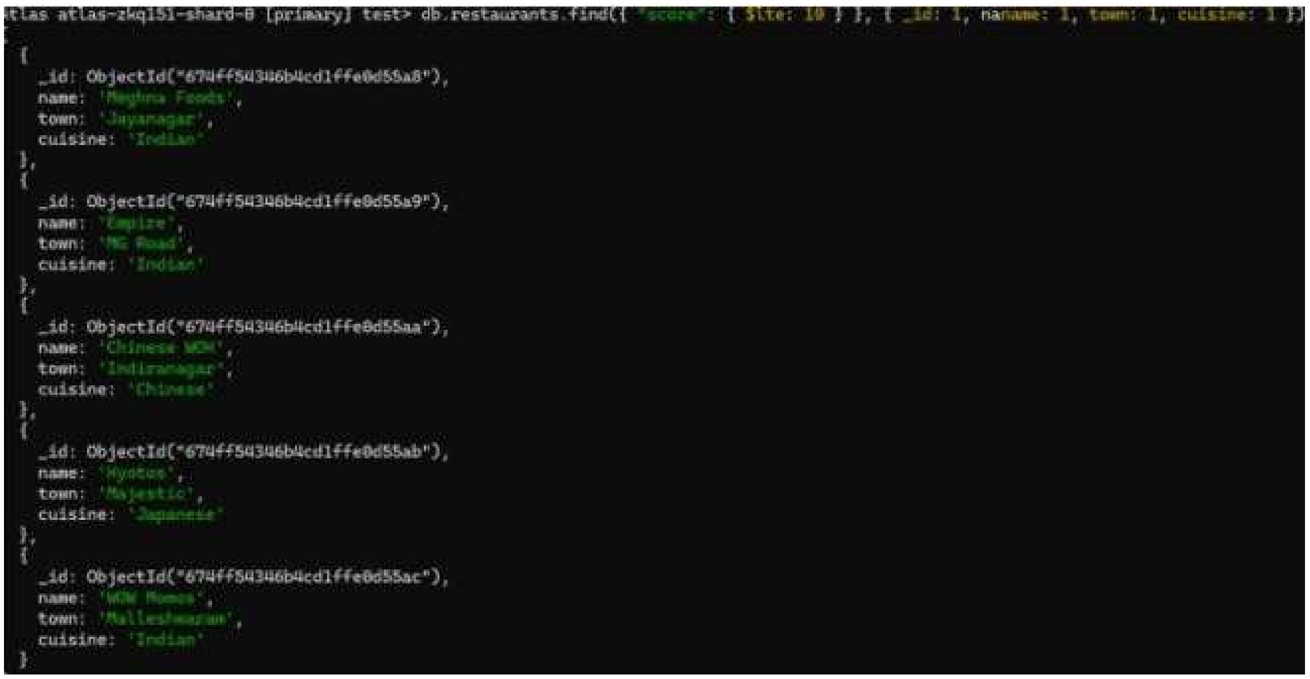
db.restaurants.find({}).sort({ name: -1 })



```
[
  {
    _id: ObjectId("674ff54346b4cd1ffe0d55ac"),
    name: 'WOW Momos',
    town: 'Malleshwaram',
    cuisine: 'Indian',
    score: 5,
    address: { zipcode: '10400', street: 'Malleshwaram' }
  },
  {
    _id: ObjectId("674ff54346b4cd1ffe0d55a8"),
    name: 'Meghna Foods',
    town: 'Jayanagar',
    cuisine: 'Indian',
    score: 8,
    address: { zipcode: '10001', street: 'Jayanagar' }
  },
  {
    _id: ObjectId("674ff54346b4cd1ffe0d55ab"),
    name: 'Kyotos',
    town: 'Majestic',
    cuisine: 'Japanese',
    score: 9,
    address: { zipcode: '10300', street: 'Majestic' }
  },
  {
    _id: ObjectId("674ff54346b4cd1ffe0d55a9"),
    name: 'Empire',
    town: 'MG Road',
    cuisine: 'Indian',
    score: 7,
    address: { zipcode: '10100', street: 'MG Road' }
  },
  {
    _id: ObjectId("674ff54346b4cd1ffe0d55aa"),
    name: 'Chinese WOK',
    town: 'Indiranagar',
    cuisine: 'Chinese',
    score: 8,
    address: { zipcode: '20000', street: 'Indiranagar' }
  }
```

4. Write a MongoDB query to find the restaurant Id, name, town and cuisine for those restaurants which achieved a score which is not more than 10.

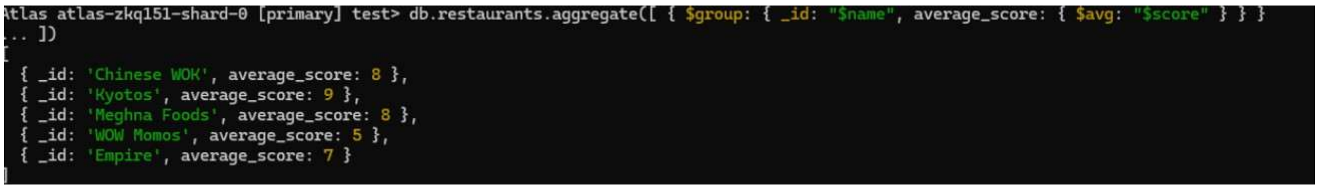
db.restaurants.find({ "score": { $lte: 10 } }, { _id: 1, name: 1, town: 1, cuisine: 1 })



```
tlas atlas-zkq151-shard-0 [primary] test> db.restaurants.find({ "score": { $lte: 10 } }, { _id: 1, naname: 1, town: 1, cuisine: 1 })
[
  {
    _id: ObjectId("674ff54346b4cd1ffe0d55a8"),
    name: 'Meghna Foods',
    town: 'Jayanagar',
    cuisine: 'Indian'
  },
  {
    _id: ObjectId("674ff54346b4cd1ffe0d55a9"),
    name: 'Empire',
    town: 'MG Road',
    cuisine: 'Indian'
  },
  {
    _id: ObjectId("674ff54346b4cd1ffe0d55aa"),
    name: 'Chinese WOK',
    town: 'Indiranagar',
    cuisine: 'Chinese'
  },
  {
    _id: ObjectId("674ff54346b4cd1ffe0d55ab"),
    name: 'Kyotos',
    town: 'Majestic',
    cuisine: 'Japanese'
  },
  {
    _id: ObjectId("674ff54346b4cd1ffe0d55ac"),
    name: 'WOW Momos',
    town: 'Malleshwaram',
    cuisine: 'Indian'
  }
```

5. Write a MongoDB query to find the average score for each restaurant.

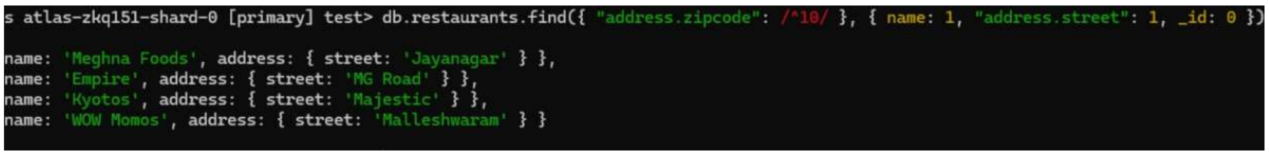
db.restaurants.aggregate([{ $group: { _id: "$name", average_score: { $avg: "$score" } } }])



```
tlas atlas-zkq151-shard-0 [primary] test> db.restaurants.aggregate([ { $group: { _id: "$name", average_score: { $avg: "$score" } } }
.. ])
[
  { _id: 'Chinese WOK', average_score: 8 },
  { _id: 'Kyotos', average_score: 9 },
  { _id: 'Meghna Foods', average_score: 8 },
  { _id: 'WOW Momos', average_score: 5 },
  { _id: 'Empire', average_score: 7 }
]
```

6. Write a MongoDB query to find the name and address of the restaurants that have a zipcode that starts with '10'.

db.restaurants.find({ "address.zipcode": /^10/ }, { name: 1, "address.street": 1, _id: 0 })



```
s atlas-zkq151-shard-0 [primary] test> db.restaurants.find({ "address.zipcode": /^10/ }, { name: 1, "address.street": 1, _id: 0 })

name: 'Meghna Foods', address: { street: 'Jayanagar' } },
name: 'Empire', address: { street: 'MG Road' } },
name: 'Kyotos', address: { street: 'Majestic' } },
name: 'WOW Momos', address: { street: 'Malleshwaram' } }
```