

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

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B. M. S. College of Engineering,
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CERTIFICATE

This is to certify that the Lab work entitled “Database Management Systems (23CS3PCDBM)” carried out by **NAGARJUN (1BM24CS178)**, 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 2022. 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.

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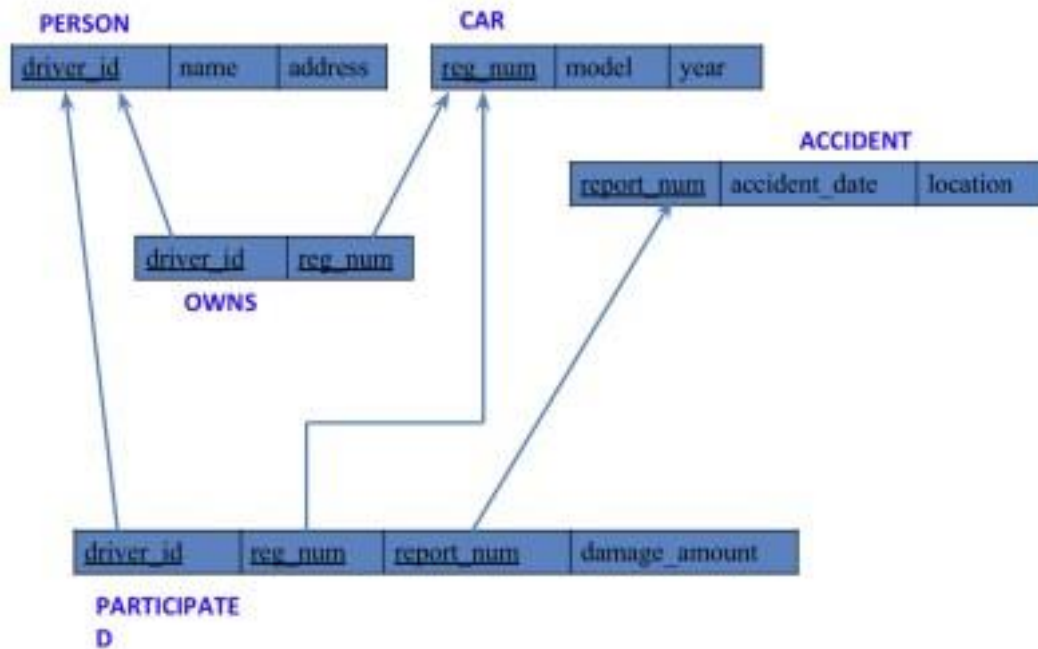
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Insurance Database

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;
```

```
use insurance; 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 accident;

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

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
owns;

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

Inserting Values to the table

insert into person values('A01','Richard','Srinivas 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','Hanumanth nagar');

select
* from person;

	driver_id	name	address
▶	A01	Richard	Srinivas 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','Honda',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	Honda	2008
	KA095477	Toyota	1998
•	NULL	NULL	NULL

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

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


```

insert into accident values(11,'2003-01-01','Mysore road');
insert into accident values(12,'2004-02-02','south end'); 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,'2004-03-15','kanakapura road'); select *
from accident;

```

	report_num	accident_date	location
▶	11	2003-01-01	Mysore road
	12	2004-02-02	south end
	13	2003-01-21	Bull temple road
	14	2008-02-17	Mysore road
	15	2004-03-15	kanakapura road
●	NULL	NULL	NULL

```

insert into participated values('A01','KA052250',11,10000);
insert into participated values('A02','KA053408',12,50000);
insert into participated values('A03','KA031181',13,25000);
insert into participated values('A04','KA095477',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	KA053408	12	50000
	A03	KA031181	13	25000
	A04	KA095477	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 12.**

```

update participated set damage_amount=25000 where reg_num='KA053408' and report_num=12;

```

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

- **Add a new accident to the database.**

insert into accident values(16,'2008-03-08',"Domlur");

select * from accident;

	report_num	accident_date	location
▶	11	2003-01-01	Mysore road
	12	2004-02-02	south end
	13	2003-01-21	Bull temple road
	14	2008-02-17	Mysore road
	15	2004-03-15	kanakapura road
	16	2008-03-08	Domlur
✱	NULL	NULL	NULL

TO DO

- **Display Accident date and location.** select accident_date,location from accident;

	accident_date	location
▶	2003-01-01	Mysore road
	2004-02-02	south end
	2003-01-21	Bull temple road
	2008-02-17	Mysore road
	2004-03-15	kanakapura road

- **Display driver id who did accident with damage amount greater than or equal to Rs.25000.**

	driver_id
▶	A02
	A03

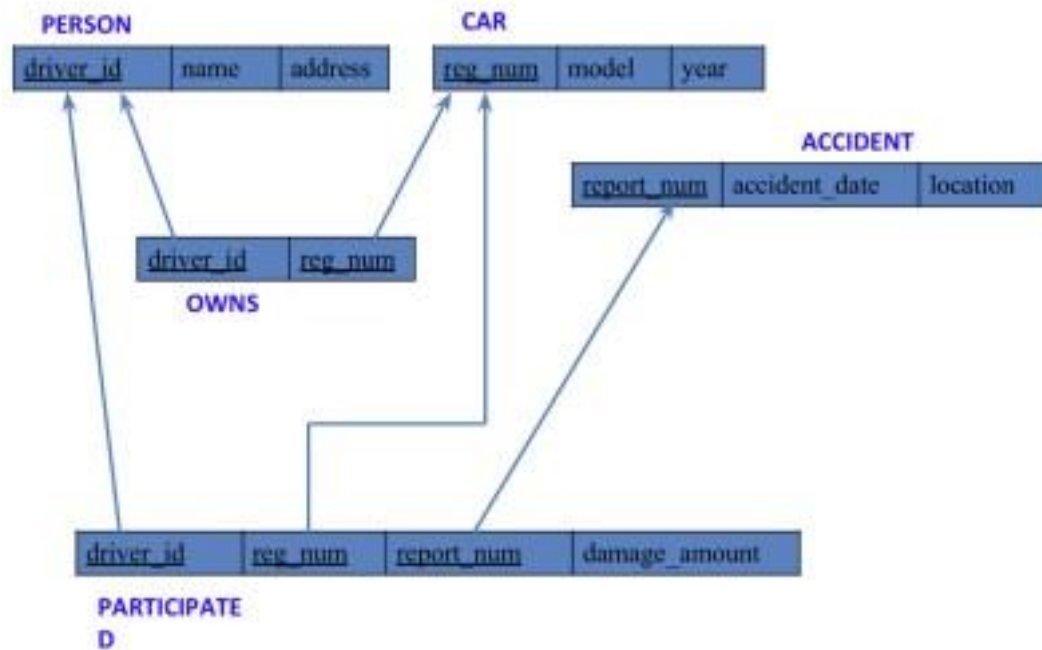
More Queries on Insurance Database

Question (Week 2)

- 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)
- LIST THE ENTIRE PARTICIPATED RELATION IN THE DESCENDING ORDER OF DAMAGE AMOUNT.

- FIND THE AVERAGE DAMAGE AMOUNT.
- LIST THE NAME OF DRIVERS WHOSE DAMAGE IS GREATER THAN THE AVERAGE DAMAGE AMOUNT.
- FIND MAXIMUM DAMAGE AMOUNT.

Schema Diagram



Queries

- LIST THE ENTIRE PARTICIPATED RELATION IN THE DESCENDING ORDER OF DAMAGE AMOUNT.

```
SELECT * FROM participated ORDER BY damage_amount DESC;
```

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

- FIND THE AVERAGE DAMAGE AMOUNT.

```
SELECT AVG(damage_amount) FROM participated;
```

	AVG(damage_amount)
▶	13600.0000

- **LIST THE NAME OF DRIVERS WHOSE DAMAGE IS GREATER THAN THE AVERAGE 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

- **FIND MAXIMUM DAMAGE AMOUNT.**

SELECT MAX(damage_amount) FROM participated;

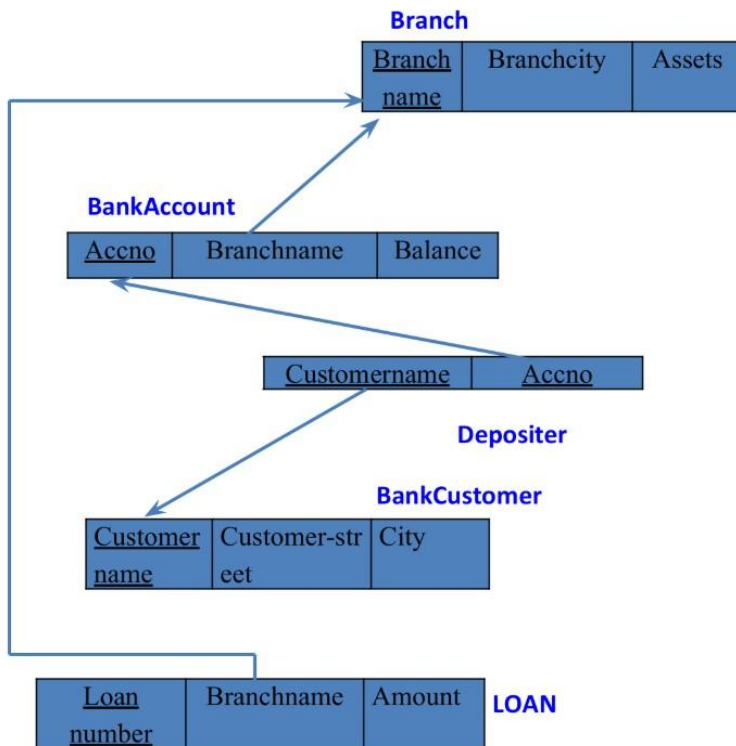
	MAX(damage_amount)
▶	25000

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 bank;  
use bank;
```

Create table

```
create table branch  
(  
  branch_name varchar(25),  
  branch_city varchar(15),  
  assets int,  
  primary key(branch_name)  
);  
create table bankAccount  
(
```

```

accno int, branch_name varchar(25), balance int, primary
key(accno), foreign key(branch_name) references
branch(branch_name)
);
create table bankCustomer
(
customer_name varchar(10),
customer_street varchar(25),
customer_city varchar(15),
primary key(customer_name)
);

```

```

create table depositer
(
customer_name varchar(10), accno int, foreign key(customer_name)
references bankCustomer(customer_name), foreign key(accno)
references bankAccount(accno)
);
create table loan
(
loan_number int, branch_name varchar(25), amount int,
primary key(loan_number), foreign key(branch_name)
references branch(branch_name)
);

```

Structure of the table

desc branch;

	Field	Type	Null	Key	Default	Extra
▶	branch_name	varchar(25)	NO	PRI	NULL	
	branch_city	varchar(15)	YES		NULL	
	assets	int	YES		NULL	

desc bankAccount;

	Field	Type	Null	Key	Default	Extra
▶	accno	int	NO	PRI	NULL	
	branch_name	varchar(25)	YES	MUL	NULL	
	balance	int	YES		NULL	

desc bankCustomer;

	Field	Type	Null	Key	Default	Extra
▶	customer_name	varchar(10)	NO	PRI	NULL	
	customer_street	varchar(25)	YES		NULL	
	customer_city	varchar(15)	YES		NULL	

desc depositer;

	Field	Type	Null	Key	Default	Extra
▶	customer_name	varchar(10)	YES	MUL	NULL	
	accno	int	YES	MUL	NULL	

desc loan;

	Field	Type	Null	Key	Default	Extra
▶	loan_number	int	NO	PRI	NULL	
	branch_name	varchar(25)	YES	MUL	NULL	
	amount	int	YES		NULL	

Inserting Values to the table

```
insert into branch values('SBI_chamrajpet','Bangalore',5000);
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;
```


	branch_name	branch_city	assets
▶	SBI_chamrajpet	Bangalore	5000
	SBI_jantarmentar	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_jantarmentar',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_jantarmentar',2000); select * from bankAccount;

	accno	branch_name	balance
▶	1	SBI_chamrajpet	2000
	2	SBI_residencyRoad	5000
	3	SBI_shivajiRoad	6000
	4	SBI_parliamentRoad	9000
	5	SBI_jantarmentar	8000
	6	SBI_shivajiRoad	4000
	8	SBI_residencyRoad	4000
	9	SBI_parliamentRoad	3000
	10	SBI_residencyRoad	5000
	11	SBI_jantarmentar	2000
★	NULL	NULL	NULL

insert into bankCustomer values('avinash','BullTempleRoad','Bangalore'); insert into bankCustomer values('dinesh','BannerghattaRoad','Bangalore'); insert into bankCustomer values('mohan','nationalCollegeRoad','Bangalore'); insert into

bankCustomer values('nikil','AkbarRoad','Delhi'); insert into bankCustomer values('ravi','prativirajRoad','Delhi'); select * from bankCustomer;

	customer_name	customer_street	customer_city
▶	avinash	BullTempleRoad	Bangalore
	dinesh	BannergattaRoad	Bangalore
	mohan	nationalCollegeRoad	Bangalore
	nikil	AkbarRoad	Delhi
	ravi	prativirajRoad	Delhi
★	NULL	NULL	NULL

insert into depositer values('avinash',1); insert into depositer values('dinesh',2); insert into depositer values('nikil',4); insert into depositer values('ravi',5); insert into depositer values('avinash',8); insert into depositer values('nikil',9); insert into depositer values('dinesh',10); insert into depositer values('nikil',11); select * from depositer;

	customer_name	accno
▶	avinash	1
	dinesh	2
	nikil	4
	ravi	5
	avinash	8
	nikil	9
	dinesh	10
	nikil	11

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_jantarmanatar',5000); select * from loan;

	loan_number	branch_name	amount
▶	1	SBI_chamrajpet	1000
	2	SBI_residencyRoad	2000
	3	SBI_shivajiRoad	3000
	4	SBI_parlimentRoad	4000
	5	SBI_jantarmentar	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'.

```
alter table branch rename column assets to assets_inlakhs;
select branch_name,assets_inlakhs from branch;
```

	branch_name	assets_inlakhs
▶	SBI_chamrajpet	5000
	SBI_jantarmentar	20000
	SBI_parlimentRoad	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 d.customer_name from depositor d, bankAccount b where
b.branch_name='SBI_residencyRoad' and d.accno=b.accno group by d.customer_name
having count(d.accno)>=2;
```

	customer_name
▶	dinesh

- **CREATE A VIEW WHICH GIVES EACH BRANCH THE SUM OF THE AMOUNT OF ALL THE LOANS AT THE BRANCH.** create view br

```
as select branch_name, sum(amount) from
loan group by branch_name; select * from
br;
```

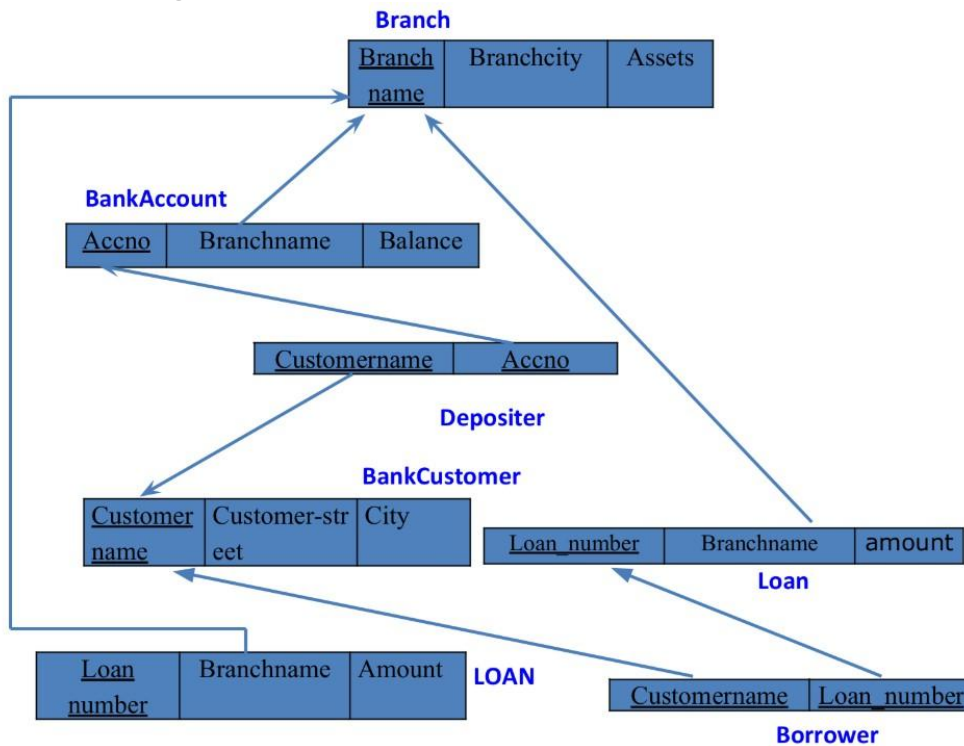
	branch_name	sum(amount)
▶	SBI_chamrajpet	1000
	SBI_jantarmantar	5000
	SBI_parliamentRoad	4000
	SBI_residencyRoad	2000
	SBI_shivajiRoad	3000

More Queries on Bank Database

Question (Week 4)

- 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)
- Borrower (customer-name: String, loan-number: int)
- Find all the customers who have an account at all the branches located in a specific city (Ex. Delhi).
- Find all customers who have a loan at the bank but do not have an account.
- Find all customers who have both an account and a loan at the Bangalore branch
- Find the names of all branches that have greater assets than all branches located in Bangalore.
- Demonstrate how you delete all account tuples at every branch located in a specific city (Ex. Bombay).
- Update the Balance of all accounts by 5%

Schema Diagram



Create table

```
create table borrower
```

```
(
    customer_name varchar(10), loan_number int, foreign
    key(customer_name) references bankCustomer(customer_name),
    foreign key(loan_number) references loan(loan_number)
);
```

Structure of table desc

```
borrower;
```

	Field	Type	Null	Key	Default	Extra
►	customer_name	varchar(10)	YES	MUL	NULL	
	loan_number	int	YES	MUL	NULL	

Insert values to the table

```
insert into borrower values('Avinash',1);
insert into borrower values('Dinesh',2);
```

```

insert into borrower values('Mohan',3);
insert into borrower values('Nikil',4);
insert into borrower values('Ravi',5);
select * from borrower;

```

Queries

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

```

select distinct d.customer_name from depositer d, bankAccount ba, branch b where
d.accno=ba.accno and ba.branch_name=b.branch_name and b.branch_city='delhi' group
by d.customer_name having count(b.branch_name)>1;

```

	customer_name
▶	Nikil

- Find all customers who have a loan at the bank but do not have an account. select b.customer_name from borrower b where b.loan_number not in (select d.accno from depositer d where b.loan_number=d.accno);

	customer_name
▶	Mohan

- Find all customers who have both an account and a loan at the Bangalore branch. select b.customer_name from borrower b where b.loan_number in (select d.accno from depositer d, bankAccount ba, branch b where b.loan_number=d.accno and d.accno=ba.accno and ba.branch_name=b.branch_name and b.branch_city='Bangalore');

	customer_name
▶	Avinash
	Dinesh

- Find the names of all branches that have greater assets than all branches located in Bangalore. select branch_name from branch where assets_inlakhs>all(select assets_inlakhs from branch where branch_city='Bangalore');

	branch_name
▶	SBI_jantarmanatar
	SBI_MantriMarg
	SBI_shivajiRoad
✱	NULL

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

delete from bankAccount ba

where ba.branch_name=(select b.branch_name from branch b where branch_city='Bombay');

select * from bankAccount;

	accno	branch_name	balance
▶	1	SBI_chamrajpet	2000
	2	SBI_residencyRoad	5000
	4	SBI_parliamentRoad	9000
	5	SBI_jantarmanatar	8000
	8	SBI_residencyRoad	4000
	9	SBI_parliamentRoad	3000
	10	SBI_residencyRoad	5000
	11	SBI_jantarmanatar	2000
	12	SBI_MantriMarg	2000
✱	NULL	NULL	NULL

- **Update the Balance of all accounts by 5%** update bankAccount set
balance=balance+((5*balance)/100); select * from bankAccount;

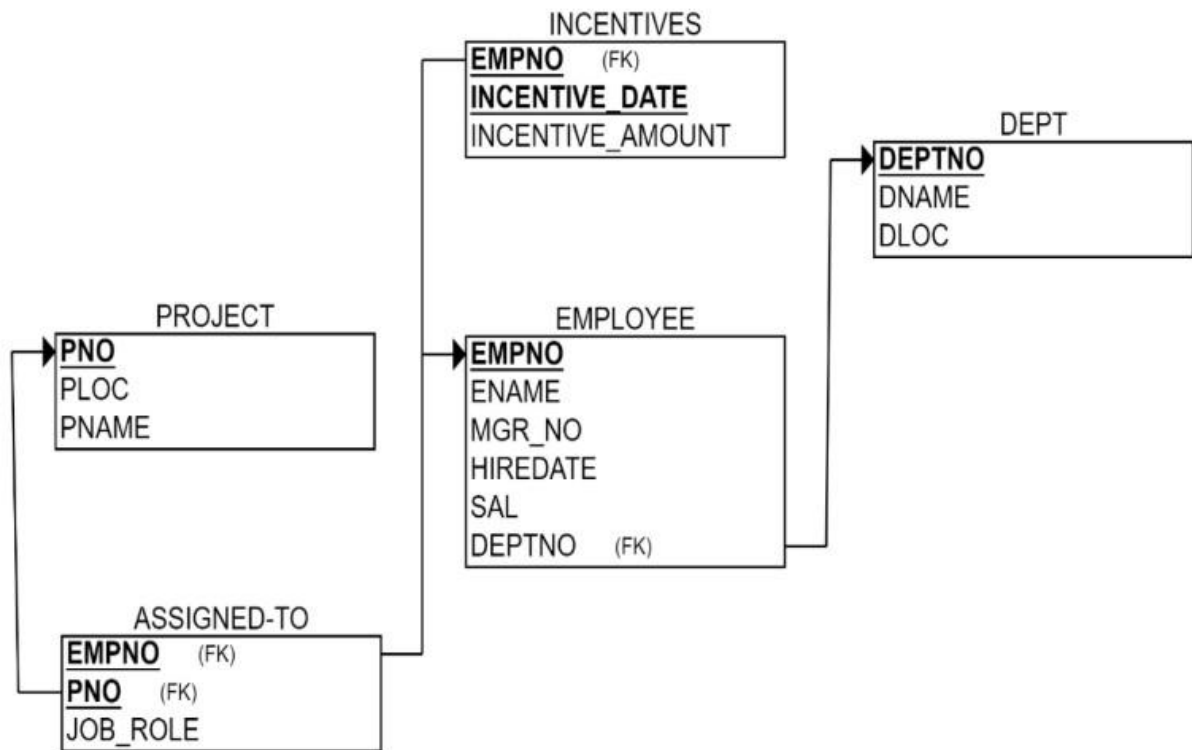
	accno	name	balance
▶	1	SBI_Chamrajpet	2100
	2	SBI_Residency road	5250
	3	SBI_Shivaji road	6300 6300
	4	SBI_Parliament road	9450
	5	SBI_Jantarmantra	8400
	6	SBI_Shivaji road	4200
	8	SBI_Residency road	4200
	9	SBI_Parliament road	3150
	10	SBI_Residency road	5250
	11	SBI_Jantarmantra	2100
	12	SBI_MantriMarg	2100
★	NULL	NULL	NULL

Employee Database

Question (Week 5)

- Using Scheme diagram, Create tables by properly specifying the primary keys and the foreign keys.
- Enter greater than five tuples for each table.
- Retrieve the employee numbers of all employees who work on project located in Bengaluru, Hyderabad, or Mysuru
- Get Employee ID's of those employees who didn't receive incentives
- 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; use
Employee;
```

Create table

```
create table dept
(
deptno int, dname
varchar(20), dloc
varchar(20),
primary key(deptno)
);
create table employee
(
empno int, ename varchar(20), mgr_no int,
hiredate varchar(20), sal int, deptno int,
```

```

primary key(empno,deptno), foreign
key(deptno) references dept(deptno)
);
create table incentives
(
empno int, incentives_date
varchar(20), amount int, primary
key(empno,incentives_date),
foreign key(empno) references employee(empno)
);
create table project
(
pno int, ploc
varchar(20), pname
varchar(20),
primary key(pno)
);
create table assignedto
(
empno int, pno int, job_role varchar(20), 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(20)	YES		NULL	
	dloc	varchar(20)	YES		NULL	

desc employee;

	Field	Type	Null	Key	Default	Extra
►	empno	int	NO	PRI	NULL	
	ename	varchar(20)	YES		NULL	
	mgr_no	int	YES		NULL	
	hiredate	varchar(20)	YES		NULL	
	sal	int	YES		NULL	
	deptno	int	NO	PRI	NULL	

desc incentives;

	Field	Type	Null	Key	Default	Extra
▶	empno	int	NO	PRI	NULL	
	incentives_date	varchar(20)	NO	PRI	NULL	
	amount	int	YES		NULL	

desc project;

	Field	Type	Null	Key	Default	Extra
▶	pno	int	NO	PRI	NULL	
	ploc	varchar(20)	YES		NULL	
	pname	varchar(20)	YES		NULL	

desc assignedto;

	Field	Type	Null	Key	Default	Extra
▶	empno	int	NO	PRI	NULL	
	pno	int	NO	PRI	NULL	
	job_role	varchar(20)	YES		NULL	

Insert values to the tables

```

insert into dept
values(1,'HR','new_delhi'); insert into dept
values(2,'IT','bangalore'); insert into dept
values(3,'Finance','mysuru');
insert into dept values(4,'development','hyderabad');
insert into dept values(5,'marketing','new_delhi'); select
* from dept;

```

	deptno	dname	dloc
▶	1	HR	new_delhi
	2	IT	bangalore
	3	Finance	mysuru
	4	development	hyderabad
	5	marketing	new_delhi
✱	NULL	NULL	NULL

```

insert into employee values(101,'raj',100,"12/01/1999",100000,1); insert
into employee values(201,'adhi',200,"17/01/2020",50000,2); insert into

```

employee values(301,'priyam',100,"01/09/2004",30000,3); insert into
employee values(401,'asha',101,"03/08/2000",10000,4); insert into
employee values(501,'shailesh',101,"29/2/2008",90000,5); insert into
employee values(601,'likith',102,"29/2/2008",90000,1); select * from
employee;

	empno	ename	mgr_no	hiredate	sal	deptno
▶	101	raj	100	12/01/1999	100000	1
	201	adhi	200	17/01/2020	50000	2
	301	priyam	100	01/09/2004	30000	3
	401	asha	101	03/08/2000	10000	4
	501	shailesh	101	29/2/2008	90000	5
	601	likith	102	29/2/2008	90000	1
•	NULL	NULL	NULL	NULL	NULL	NULL

insert into incentives values(101,"12/03/2004",50000); insert into incentives
values(201,"17/03/2024",25000); insert into incentives values(301,"01/12/2019",15000);
insert into incentives values(401,"03/11/2019",5000); insert into incentives
values(501,"29/4/2019",45000); select * from incentives;

	empno	incentives_date	amount
▶	101	12/03/2004	50000
	201	17/03/2024	25000
	301	01/12/2019	15000
	401	03/11/2019	5000
	501	29/4/2019	45000
•	NULL	NULL	NULL

insert into project values(10,"new_delhi","chatbot");
insert into project values(40,"bangalore","ml model");
insert into project values(50,"mysuru","blockchain");
insert into project values(30,"hyderabad","stocks"); insert
into project values(80,"new_delhi","android app");
select * from project;

	pno	ploc	pname
▶	10	new_delhi	chatbot
	30	hyderabad	stocks
	40	bangalore	ml model
	50	mysuru	blockchain
	80	new_delhi	android app
*	NULL	NULL	NULL

```

insert into assignedto values(101,10,"devops");
insert into assignedto values(201,40,"sde");
insert into assignedto values(301,50,"manager");
insert into assignedto values(401,30,"jpa");
insert into assignedto values(501,80,"pa"); select
* from assignedto;

```

	empno	pno	job_role
▶	101	10	devops
	201	40	sde
	301	50	manager
	401	30	jpa
	501	80	pa
*	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,project p
where a.pno=p.pno and (ploc='bangalore' or ploc='hyderabad' or ploc='mysuru');

```

	empno
▶	401
	201
	301

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

```

select e.empno from employee e
where e.empno!=all(select i.empno from incentives i);

```

	empno
▶	601

- 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.empno,e.ename,d.dname,a.job_role,d.dloc,p.ploc
```

```
from employee e,dept d,assignedto a,project p
```

```
where e.deptno=d.deptno and e.empno=a.empno and a.pno=p.pno and d.dloc=p.ploc;
```

	empno	ename	dname	job_role	dloc	ploc
▶	101	raj	HR	devops	new_delhi	new_delhi
	201	adhi	IT	sde	bangalore	bangalore
	301	priyam	Finance	manager	mysuru	mysuru
	401	asha	development	jpa	hyderabad	hyderabad
	501	shailesh	marketing	pa	new_delhi	new_delhi

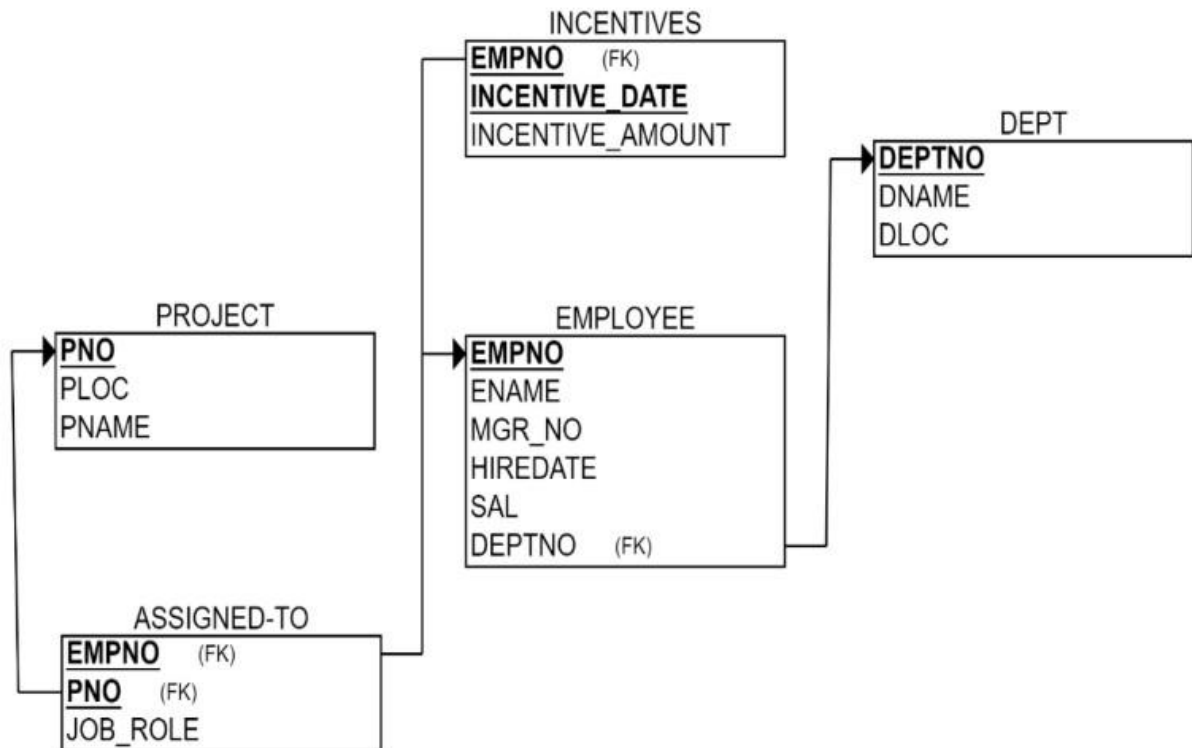
More Queries on Employee Database

Question

(Week 6)

- List the name of the managers with the maximum employees
- Display those managers' names of the manager whose salary is more than the average salary of his employee.
- Find the name of the second top level managers of each department.
- Find the employee details who got the second maximum incentive in January 2019.
- Display those employees who are working in the same department where his manager is working.

Schema Diagram



Queries

- **List the name of the managers with the maximum employees** select e.ename from employee e where e.empno in (select m.mgr_no from employee m group by m.mgr_no having count(*) = (select max(emp_count) from (select count(*) as emp_count from employee em group by em.mgr_no) as emp_count_subquery));

	ename
▶	raj

- **Display those managers' names of the manager whose salary is more than the average salary of his employee.** select e.ename from employee e where e.sal > (select avg(sub.sal) from employee sub where sub.mgr_no=e.empno);

	ename
▶	raj

- **Find the name of the second top level managers of each department.** select ename from employee where sal=(select max(sal) from employee where sal < (select max(sal) from employee));

	ename
▶	shailesh
	likith
	likith

- Find the employee details who got the second maximum incentive in January 2019.

select * from employee where empno=(select empno from incentives where amount=(select max(amount) from incentives where amount<=(select max(amount) from incentives)));

	empno	ename	mgr_no	hiredate	sal	deptno
▶	501	shailesh	101	29/2/2008	90000	5
*	NULL	NULL	NULL	NULL	NULL	NULL

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

select e.ename from employee e ,employee m where e.mgr_no=m.empno and e.deptno=m.deptno;

	ename
▶	likith

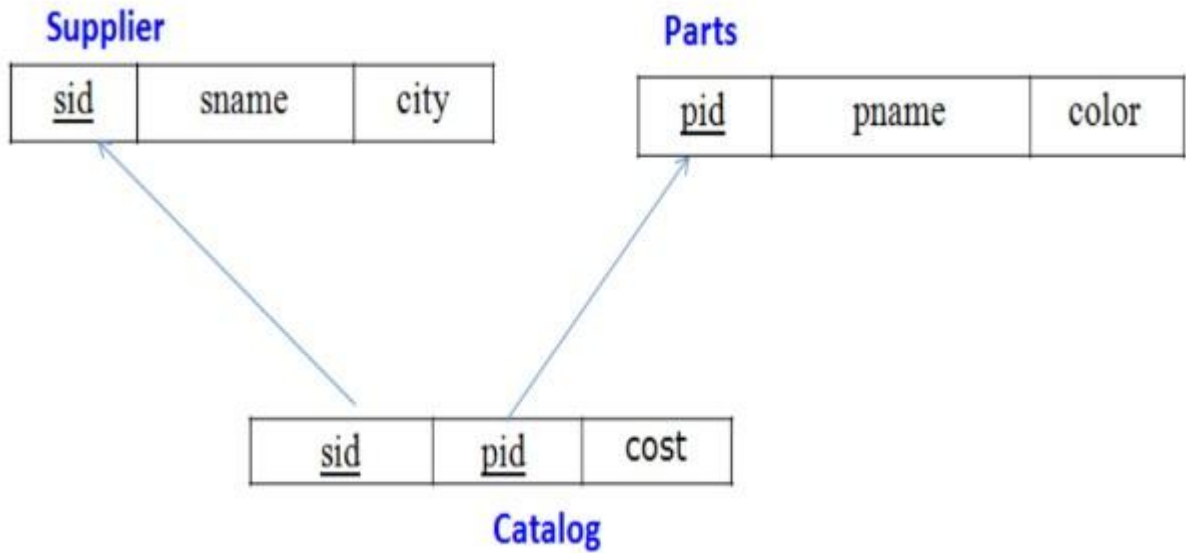
Supplier Database

Question (Week 7)

- Using Scheme diagram, Create tables by properly specifying the primary keys and the foreign keys.
- Insert appropriate records in each table.
- Find the pnames of parts for which there is some supplier.
- Find the snames of suppliers who supply every part.
- Find the snames of suppliers who supply every red part.
- Find the pnames of parts supplied by Acme Widget Suppliers and by no one else.
- 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).

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

Schema Diagram



Create database

```
create database supplier_database; use
supplier_database;
```

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, foreign key(sid)
references supplier(sid),
```

foreign key(pid) references parts(pid));

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	YES	MUL	NULL	
	pid	int	YES	MUL	NULL	
	cost	int	YES		NULL	

Insert values to the tables

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 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

Queries

- Find the pnames of parts for which there is some supplier.
select distinct p.pname from parts p,catalog c where p.pid=c.pid;

	pname
▶	Book
	Pen
	Pencil
	Mobile
	Charger

- Find the snames of suppliers who supply every part.

```
select distinct s.sname from supplier s
where Not exists(select p.pid from parts p
where not exists(select c.sid from catalog c where c.sid=s.sid and p.pid=c.pid));
```

	sname
▶	Acme Widget

- **Find the snames of suppliers who supply every red part.**

```
select s.sname from supplier s where Not exists(select p.pid from parts p where
p.color='red' and Not exists(select c.sid from catalog c where c.sid=s.sid and
p.pid=c.pid));
```

	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,catalog c,supplier s where c.sid=s.sid and
p.pid=c.pid and s.sname='Acme Widget' and not exists( select * from catalog
c1,supplier s1 where c1.sid=s1.sid and p.pid=c1.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
where c.cost>(select avg(c1.cost) from catalog c1 where c1.pid=c.pid);
```

	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 parts p,catalog c,supplier s where c.sid=s.sid and p.pid=c.pid and c.cost=(select max(c1.cost) from catalog c1 where c1.pid=p.pid);

	pid	sname
▶	20001	Acme Widget
	20004	Acme Widget
	20005	Acme Widget
	20001	Johns
	20002	Johns
	20003	Reliance

NO SQL - Student Database

Question (Week 8)

Perform the following DB operations using MongoDB.

- Create a database “Student” with the following attributes Rollno, Age, ContactNo, Email-Id.
- Insert appropriate values
- Write a query to update the Email-Id of a student with rollno 10.
- Replace the student name from “ABC” to “FEM” of rollno 11.
- Export the created table into local file system

- Drop the table
- Import a given csv dataset from the local file system into mongodb collection. **Create database** db.createCollection("Student");

Create table & Inserting Values to the table

```
db.Student.insertMany([
  {rollno:1,age:21,cont:9876,email:"anthara.de9@gmail.com"},
  {rollno:2,age:22,cont:9976,email:"anushka.de9@gmail.com"},
  {rollno:3,age:21,cont:5576,email:"anubhav.de9@gmail.com"},
  {rollno:10,age:20,cont:2276,email:"rekha.de9@gmail.com"}]); db.student.find()
```

```
Atlas atlas-10jjz6-shard-0 [primary] test> db.student.find()
[
  {
    _id: ObjectId("6746b87366152224f4779211"),
    RollNo: 1,
    Age: 21,
    Const: 9876,
    email: 'anthara.de9@gmail.com'
  },
  {
    _id: ObjectId("6746b8ac66152224f4779212"),
    RollNo: 2,
    Age: 22,
    Const: 9976,
    email: 'anushka.de9@gmail.com'
  },
  {
    _id: ObjectId("6746b8d266152224f4779213"),
    RollNo: 3,
    Age: 21,
    Const: 5576,
    email: 'anubhav.de9@gmail.com'
  },
  {
    _id: ObjectId("6746b8f166152224f4779214"),
    RollNo: 10,
    Age: 20,
    Const: 2276,
    email: 'rekha.de9@gmail.com'
  }
]
```

Queries

- Write a query to update the Email-Id of a student with rollno 10.
db.Student.update({rollno:5},{ \$set: {email:"abhinav@gmail.com"} })

```

Atlas atlas-10jjz6-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
}
Atlas atlas-10jjz6-shard-0 [primary] test> db.student.find()
[
  {
    _id: ObjectId("6746b87366152224f4779211"),
    RollNo: 1,
    Age: 21,
    Const: 9876,
    email: 'antara.de9@gmail.com'
  },
  {
    _id: ObjectId("6746b8ac66152224f4779212"),
    RollNo: 2,
    Age: 22,
    Const: 9976,
    email: 'anushka.de9@gmail.com'
  },
  {
    _id: ObjectId("6746b8d266152224f4779213"),
    RollNo: 3,
    Age: 21,
    Const: 5576,
    email: 'anubhav.de9@gmail.com'
  },
  {
    _id: ObjectId("6746b8f166152224f4779214"),
    RollNo: 10,
    Age: 20,
    Const: 2276,
    email: 'Abhinav@gmail.com'
  }
]

```

- 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-10jjz6-shard-0 [primary] test> db.student.update({RollNo:11,Name:"ABC"},{$set:{Name:"FEM"}})
{
  acknowledged: true,
  insertedId: null,
  matchedCount: 1,
  modifiedCount: 1,
  upsertedCount: 0
}
Atlas atlas-10jjz6-shard-0 [primary] test> db.student.find()
[
  {
    _id: ObjectId("6746b87366152224f4779211"),
    RollNo: 1,
    Age: 21,
    Const: 9876,
    email: 'antara.de9@gmail.com'
  },
  {
    _id: ObjectId("6746b8ac66152224f4779212"),
    RollNo: 2,
    Age: 22,
    Const: 9976,
    email: 'anushka.de9@gmail.com'
  },
  {
    _id: ObjectId("6746b8d266152224f4779213"),
    RollNo: 3,
    Age: 21,
    Const: 5576,
    email: 'anubhav.de9@gmail.com'
  },
  {
    _id: ObjectId("6746b8f166152224f4779214"),
    RollNo: 10,
    Age: 20,
    Const: 2276,
    email: 'Abhinav@gmail.com'
  },
  {
    _id: ObjectId("6746ba1266152224f4779215"),
    RollNo: 11,
    Age: 22,
    Const: 2276,
    email: 'rea.de9@gmail.com',
    Name: 'FEM'
  }
]

```

NO SQL - Customer Database

Question (Week 9)

Perform the following DB operations using MongoDB.

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

Create database

```
db.createCollection("Customer"); Inserting
```

Values:

```
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"}]);
db.Customer.find();
```



```
Atlas atlas-10jjz6-shard-0 [primary] test> db.Customer.find()
[
  {
    _id: ObjectId("6751fde06a59c75535ff9949"),
    custid: 1,
    acc_bal: 10000,
    acc_type: 'Saving'
  },
  {
    _id: ObjectId("6751fde06a59c75535ff994a"),
    custid: 1,
    acc_bal: 20000,
    acc_type: 'Checking'
  },
  {
    _id: ObjectId("6751fde06a59c75535ff994b"),
    custid: 3,
    acc_bal: 50000,
    acc_type: 'Checking'
  },
  {
    _id: ObjectId("6751fde06a59c75535ff994c"),
    custid: 4,
    acc_bal: 10000,
    acc_type: 'Saving'
  },
  {
    _id: ObjectId("6751fde06a59c75535ff994d"),
    custid: 5,
    acc_bal: 2000,
    acc_type: 'Checking'
  }
]
```

Queries

- Write a query to display those records whose total account balance is greater than 1200 of account type 'Checking' for each customer_id. `db.Customer.find({acc_bal: {$gt: 12000}, acc_type:"Checking"})`;

```
test> db.Customer.find({acc_bal: {$gt: 12000}, acc_type:"Checking"});
[
  {
    _id: ObjectId('65e418fc5b3b1935aac1fe4c'),
    custid: 1,
    acc_bal: 20000,
    acc_type: 'Checking'
  },
  {
    _id: ObjectId('65e418fc5b3b1935aac1fe4d'),
    custid: 3,
    acc_bal: 50000,
    acc_type: 'Checking'
  }
]
```

- **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-10jjz6-shard-0 [primary] test> db.Customer.aggregate([{$group:{_id:"$custid", minBal:{$min:"$acc_bal"}, maxBal:{$max:"$acc_bal"}}}]);
... {$max:"$acc_bal"}}}]);
[
  {
    _id: 1, minBal: 10000, maxBal: 20000 },
    {
    _id: 4, minBal: 10000, maxBal: 10000 },
    {
    _id: 3, minBal: 50000, maxBal: 50000 },
    {
    _id: 5, minBal: 2000, maxBal: 2000 }
  ]
```

- **Export the created collection into the local file system.**

```
mongoexport mongodb+srv://msshailshcs23:@cluster0.wujqr.mongodb.net/test -
collection=Customer --out C:\Users\shail\OneDrive\Desktop\st.json
```

```
C:\Users\shail\Downloads\mongodb-database-tools-windows-x86_64-100.10.0\mongodb-database-tools-windows-x86_64-100.10.0\b
in>mongoexport mongodb+srv://msshailshcs23:@cluster0.wujqr.mongodb.net/test --collection=Student --out C:\Users\shail\O
neDrive\Desktop\st.json
Enter password for mongo user:

2024-12-14T21:56:18.781+0530    connected to: mongodb+srv://[**REDACTED**]@cluster0.wujqr.mongodb.net/test
2024-12-14T21:56:18.860+0530    exported 0 records

C:\Users\shail\Downloads\mongodb-database-tools-windows-x86_64-100.10.0\mongodb-database-tools-windows-x86_64-100.10.0\b
in>
```

- **Drop the table.** db.Customer.drop();
 - **Import a given csv dataset from the local file system into mongodb collection.**
- ```
mongoimport mongodb+srv://msshailshcs23:@cluster0.wujqr.mongodb.net/test -
collection=New_Customer --file C:\Users\shail\OneDrive\Desktop\st.json
```

```
C:\Users\shail\Downloads\mongodb-database-tools-windows-x86_64-100.10.0\mongodb-database-tools-windows-x86_64-100.10.0\b
in>mongoimport mongodb+srv://msshailshcs23:@cluster0.wujqr.mongodb.net/test --collection=New_Customer --file C:\Users\s
hail\OneDrive\Desktop\st.json
Enter password for mongo user:

2024-12-14T22:48:49.039+0530 connected to: mongodb+srv://[**REDACTED**]@cluster0.wujqr.mongodb.net/test
2024-12-14T22:48:49.149+0530 5 document(s) imported successfully. 0 document(s) failed to import.

C:\Users\shail\Downloads\mongodb-database-tools-windows-x86_64-100.10.0\mongodb-database-tools-windows-x86_64-100.10.0\b
in>S
```

## NO SQL - Restaurant Database

## Question (Week 10)

- Write a MongoDB query to display all the documents in the collection restaurants.
- Write a MongoDB query to arrange the name of the restaurants in descending order along with all the columns.
- 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.
- Write a MongoDB query to find the average score for each restaurant.
- Write a MongoDB query to find the name and address of the restaurants that have a zipcode that starts with '10'.

## Create database

`db.createCollection("Restaurant");` **Inserting**

### Values:

```
db.Restaurant.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: 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" } }])
```

## Queries

- **Write a MongoDB query to display all the documents in the collection restaurants.**  
`db.Restaurant.find();`

```

Atlas atlas-10jjz6-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: 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" } }])
{
 acknowledged: true,
 insertedIds: {
 '0': ObjectId("6751f5566a59c75535ff9944"),
 '1': ObjectId("6751f5566a59c75535ff9945"),
 '2': ObjectId("6751f5566a59c75535ff9946"),
 '3': ObjectId("6751f5566a59c75535ff9947"),
 '4': ObjectId("6751f5566a59c75535ff9948")
 }
}
Atlas atlas-10jjz6-shard-0 [primary] test> db.restaurants.find({})
[
 {
 _id: ObjectId("6751f5566a59c75535ff9944"),
 name: 'Meghna Foods',
 town: 'Jayanagar',
 cuisine: 'Indian',
 score: 8,
 address: { zipcode: '10001', street: 'Jayanagar' }
 },
 {
 _id: ObjectId("6751f5566a59c75535ff9945"),
 name: 'Empire',
 town: 'MG Road',
 cuisine: 'Indian',
 score: 7,
 address: { zipcode: '10100', street: 'MG Road' }
 },
 {
 _id: ObjectId("6751f5566a59c75535ff9946"),
 name: 'Chinese WOK',
 town: 'Indiranagar',
 cuisine: 'Chinese',
 score: 12,
 address: { zipcode: '20000', street: 'Indiranagar' }
 }
]

```

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

```
db.Restaurant.find().sort({ "name": -1 });
```

```

{
 _id: ObjectId("6751f5566a59c75535ff9947"),
 name: 'Kyotos',
 town: 'Majestic',
 cuisine: 'Japanese',
 score: 9,
 address: { zipcode: '10300', street: 'Majestic' }
},
{
 _id: ObjectId("6751f5566a59c75535ff9948"),
 name: 'WOW Momos',
 town: 'Malleshwaram',
 cuisine: 'Indian',
 score: 5,
 address: { zipcode: '10400', street: 'Malleshwaram' }
}
]
Atlas atlas-10jjz6-shard-0 [primary] test> db.restaurants.find({}).sort({ name: -1 })
[
 {
 _id: ObjectId("6751f5566a59c75535ff9948"),
 name: 'WOW Momos',
 town: 'Malleshwaram',
 cuisine: 'Indian',
 score: 5,
 address: { zipcode: '10400', street: 'Malleshwaram' }
 },
 {
 _id: ObjectId("6751f5566a59c75535ff9944"),
 name: 'Meghna Foods',
 town: 'Jayanagar',
 cuisine: 'Indian',
 score: 8,
 address: { zipcode: '10001', street: 'Jayanagar' }
 },
 {
 _id: ObjectId("6751f5566a59c75535ff9947"),
 name: 'Kyotos',
 town: 'Majestic',
 cuisine: 'Japanese',
 score: 9,
 address: { zipcode: '10300', street: 'Majestic' }
 }
]

```

- 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.Restaurant.find({ "grades.score": { $lte: 10 } }, { _id: 1, name: 1, town: 1, cuisine: 1,
restaurant_id: 1 });
```

```
name: 'Empire',
town: 'MG Road',
cuisine: 'Indian',
score: 7,
address: { zipcode: '10100', street: 'MG Road' }
},
{
 _id: ObjectId("6751f5566a59c75535ff9946"),
 name: 'Chinese WOK',
 town: 'Indiranagar',
 cuisine: 'Chinese',
 score: 12,
 address: { zipcode: '20000', street: 'Indiranagar' }
}
]
Atlas atlas-10jjz6-shard-0 [primary] test> db.restaurants.find({ "score": { $lte: 10 } }, { _id: 1, name: 1, town: 1, cuisine: 1 })
[
 {
 _id: ObjectId("6751f5566a59c75535ff9944"),
 name: 'Meghna Foods',
 town: 'Jayanagar',
 cuisine: 'Indian'
 },
 {
 _id: ObjectId("6751f5566a59c75535ff9945"),
 name: 'Empire',
 town: 'MG Road',
 cuisine: 'Indian'
 },
 {
 _id: ObjectId("6751f5566a59c75535ff9947"),
 name: 'Kyotos',
 town: 'Majestic',
 cuisine: 'Japanese'
 },
 {
 _id: ObjectId("6751f5566a59c75535ff9948"),
 name: 'WOW Momos',
 town: 'Malleshwaram',
 cuisine: 'Indian'
 }
]
```

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

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

```
Atlas atlas-10jjz6-shard-0 [primary] test> db.restaurants.aggregate([{ $group: { _id: "$name", average_score: { $avg: "$score" } } }
...])
[
 { _id: 'Meghna Foods', average_score: 8 },
 { _id: 'WOW Momos', average_score: 5 },
 { _id: 'Chinese WOK', average_score: 12 },
 { _id: 'Kyotos', average_score: 9 },
 { _id: 'Empire', average_score: 7 }
]
Atlas atlas-10jjz6-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' } }
]
```

- 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 })
```

```

Atlas atlas-10jjz6-shard-0 [primary] test> db.restaurants.aggregate([{ $group: { _id: "$name", average_score: { $avg: "$score" } } }
...])
[
 { _id: 'Meghna Foods', average_score: 8 },
 { _id: 'WOW Momos', average_score: 5 },
 { _id: 'Chinese WOK', average_score: 12 },
 { _id: 'Kyotos', average_score: 9 },
 { _id: 'Empire', average_score: 7 }
]
Atlas atlas-10jjz6-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' } }
]

```