1. Consider the following schema:

Suppliers (sid, sname, address)

Parts (pid, pname, color)

Catalog (sid, pid, cost)

Write the relational algebraic queries for the following:

i)Find the sids of suppliers who supply some red or green part

select

s.\*

from Suppliers S, parts P,catalog C

where s.sid=c.sid and p.pid=c.pid

and p.color in('Red','Green');

select

unique(c.sid)

from parts P,catalog C

where p.pid=c.pid

and p.color in('Red','Green');

ii) Find the sids of suppliers who supply every red or green part

Query a: Find the number of red parts

select

Count(\*)

From parts

Where color=’Red’;

Query b: Find the number of red parts supplied by each supplier

select

Sid, count(\*)

From parts p, catalog c

Where p.pid=c.pid

And color=’Red’

Group by sid;

Select

sid   
From part p, catalog c

where p.pid=c.pid

and color=’Red’   
Group by sid   
Having count(\*)=(select  
 Count(pid)  
 From parts   
 Where color ='red')

Select

sid   
From part p, catalog c

where p.pid=c.pid

and color=’Red’   
Group by sid   
Having count(\*)=(select  
 Count(pid)  
 From parts   
 Where color ='red')  
Union   
Select   
Sid   
From catalog c ,parts p  
P. PID=c. Pid   
And p. Colour='green';

iii) Find the pids of parts supplied by at least two different suppliers.

Select  
PID   
From catalog   
Group by pid  
Having count(\*) >=2;

1. Consider the following schemas:

Sailors (sid, sname, rating, age)

Reserves (sid, bid, day)

Boats (bid, bname, color)

Write the following queries in relational algebra, tuple relational Calculus and

domain relational calculus:

a) Find the name of sailors who have reserved boat 103.

b) Find the names and ages of sailors with a rating above 7.

c) Find the names of sailors who have reserved a red boat.

d) Find the sname, bid, and day for each reservation.

e) Find the name of sailors who have reserved at least one boat.

1. Consider the SAILOR DATABASE

Sailors (sid:string, sname:string, rating:integer, age:real)

Boats (bid:integer, bname:string, color:string)

Reserves (sid:integer, bid:integer, day:date)

Based on the above schema, write the corresponding SQL queries for the following?

1. Find the colors of boats reserved by Lubber.

SELECT

Unique(B.color )

FROM Sailors S, Reserves R, Boats B

WHERE S.sid=R.sid AND R.bid=B.bid

AND S.sname= ‘Lubber’ ;

1. Find the names of sailors who have reserved at least one boat.

SELECT

Unique(S.sid, S.sname)

FROM Sailors S, Reserves R

WHERE S.sid=R.sid;

1. Find the names of sailors who have reserved a red or green boat.

Select  
S.sname  
From Sailors s,boats b, Reserves r  
Where s.sid=r.sid and [b.bid](http://b.bid/)=[r.bid](http://r.bid/" \o "http://r.bid/" \t "_blank)  
and b.color in ('Red','Green');

1. Find the names of the sailors who have reserved both a Red boat and a Green boat.

select  
S.sname  
From Sailors s, Boats b, Reserves r  
Where s.sid=r.sid and [b.bid](http://b.bid/)=[r.bid](http://r.bid/" \o "http://r.bid/" \t "_blank)  
And b.color='Red'  
Intersect  
Select  
S.sname  
From Sailors s, Boats b, Reserves r  
Where s.sid=r.sid and [b.bid](http://b.bid/)=[r.bid](http://r.bid/" \o "http://r.bid/" \t "_blank)  
and b.color='Green';

1. Find names of sailors who have reserved all boats.

Query a: Find the total number of boats

select

Count(\*)

From boats;

Query b: Find the number of boats reserved by each sailor

select

Sid, count(\*)

From reserves

Group by sid;

Query c:

Query b

Having count(\*)=(query a);

Select

Sid

From reserves

Group by sid

Having count(\*) = (select

Count(\*)

From parts);

Query d: find the names of sailors obtained in query c

select

sname

From sailors

Where sid in (Select

Sid

From reserves

Group by sid

Having count(\*) = (select

Count(\*)

From parts));

1. Consider the Bank Management System.

Account (account\_number, branch\_name, balance)

Branch (branch\_name, branch\_city, assets)

Customer (customer\_name, customer\_street, customer\_city)

Loan (loan\_number, branch\_name, amount)

Depositor (customer\_name, account\_number)

Borrower (customer\_name, loan\_number)

Based on the above schema, write the corresponding SQL queries for the

following?

1. For all customers who have a loan from the bank, find their names, loan numbers and loan amount.

Select

Customer\_name, L.loan\_number, amount

From Loan L, Borrower B

Where L.loan\_number=B.loan\_number;

1. Find the customer names, loan numbers, and loan amounts, for all loans at the Perryridge branch.

Select  
Customer\_name, a. Loan\_number, a. Loan\_amount  
From borrower b, loan a  
Where b. Loan\_number =a. Loan\_number  
And a.Branch\_name='perrybridge';

1. Find the names of all branches that have assets greater than those of at-least one branch located in Brooklyn.

select

branch\_name  
from branch  
where assests > (select

min(assests)

from branch

where brach\_name='Brooklyn');

1. Find the average account balance of those branches where the account balance is greater than Rs. 1200.

Solution 1: Find the average balance of all branches with account balance > 1200

select

Branch\_name, avg(balance)

From account

Where balance>1200

Group by branch\_name;

Solution 2:

Query a: Find the branches which maintain minimum account balance as 1200

Select

Branch\_name

From account

Group by branch\_name

Having min(balance)>=1200;

Query b: Find the average account balance for the branches obtained in query a

Select

Branch\_name, avg(balance)

From account

Where branch\_name in (query a)

Group by branch\_name;

Select

Branch\_name, avg(balance)

From account

Where branch\_name in (Select

Branch\_name

From account

Group by branch\_name

Having min(balance)>=1200)

Group by branch\_name;

1. Find the maximum across all branches of the total balance at each branch.

select

Max(Sum(balance))

From account

Group by branch\_name;

select  
max(total\_balance)  
from (select  
 sum(balance) total\_balance  
 from account  
 group by branch\_name);

1. Consider the Bank Management System.

account(account\_number, branch\_name, balance)

branch (branch\_name, branch\_city, assets)

customer (customer\_name customer\_street, customer\_city)

loan (loan\_number, branch\_name, amount)

depositor((customer\_name, account\_number)

borrower(customer\_name, loan\_number)

Answer the following queries using relational algebra operators.

1. List all branch names and their assests

select

Branch\_name, assets

From branch;

1. List all accounts of Brooklyn branch

select

Account\_number

From account

Where branch\_name=’Brooklyn’;

1. List all loans with amount > 1000.

select

Loan\_number

From loan

Where amount > 1000;

1. List all accounts of Perryridge branch with balance < 1000.

select

Account\_number

From account

Where branch\_name=’Perryridge’ and balance < 1000;

1. List Numbers of accounts with balances between 700 and 900

select

Count(\*)

From account

Where balance >700 and balance <900;

1. Consider following relations and write SQL queries for given statements.

Assume suitable constrains.

Instructor(ID, Name, Dept\_name , Salary)

Teaches(ID, Course\_id, Sec\_id, Semester(even/odd),Year)

1. Find the average salary of the instructors in computer department.

Select  
Avg(salary)  
From instructors  
Where dept\_name='Computer';

1. Find the number of instructors in each department who teach a course in even semester of 2016.

select

Dept\_name, count(\*)

From instructor t1, teaches t2

Where t1.id=t2.id

And semester=’Even’ and Year=’2016’

Group by dept\_name;

1. Find the names of instructor with salary amounts between 30000 and 50000.

select

name

From instructor

Where salary >= 30000 and 50000;

Where salary between 30000 and 50000;

1. Consider the following schemas:

Sailors (sid, sname, rating, age)

Reserves (sid, bid, day)

Boats (bid, bname, color)

Write the following queries in relational algebra, tuple relational Calculus and

domain relational calculus:

1. Find the name of sailors who have reserved boat 103.

Select

sname ,s.sid

from sailors s,reserves r,boats b

where s.sid=r.sid and b.bid=r.bid

and b.bid=103;

select

s.name

from Sailors s,Reserves r

where s.sid=r.sid

and r.bid=103 ;

1. Find the names and ages of sailors with a rating above 7.

select

sname, age

from Sailors

where rating > 7 ;

1. Find the names of sailors who have reserved a red boat.

select

sname ,s.sid

from sailors s,reserves r,boats b

where s.sid=r.sid and b.bid=r.bid

and color='red';

Select   
Sname   
From sailors   
Where sid in (select   
 Sid   
 From reserves   
 Where bid in (select   
 Bid   
 From boats   
 Where color ='red'));

1. Find the sname, bid, and day for each reservation.

select

sname, bid, day

from sailors s,reserves r

where s.sid=r.sid

order by day;

1. Find the name of sailors who have reserved at least one boat.

Select   
Sname   
From sailors   
Where sid in (select   
 Sid   
 From reserves);

select

unique(s.sid, sname)

from sailors s,reserves r

where s.sid=r.sid;

1. Consider the following schema:

Suppliers (sid, sname, address)

Parts (pid, pname, color)

Catalog (sid, pid, cost)

Write the relational algebraic queries for the following:

i)Find the sids of suppliers who supply some red or green part

ii) Find the sids of suppliers who supply every red or green part

iii) Find the pids of parts supplied by at least two different suppliers.

1. Consider the following database schema to write queries in SQL

Sailor(sid, sname, age, rating)

Boats(bid, bname, bcolor)

Reserves(sid, bid, day)

1. Find the sailors who have reserved a red boat
2. Find the names of the sailors who have reserved at least two boats

Select   
Sname   
From sailors   
Where sid in (select   
 Sid   
 From reserves   
 Group by sid   
 Having count(\*)>=2);

Select  
s.sid  
From sailors s,reserves r  
Where s.sid=r.sid  
Group by r.sid  
Having count(\*)>=2;

1. Find the colors of the boats reserved by ‘Mohan’.

select  
distinct(B.color)  
from Sailors s, Reserves r, boats B   
where s .sid=r .sid And b. Bid =s. Bid   
And s.Sname='mohan';

select

unique(color)

from boats

where bid in(select

bid

from reserves

where sid in(select

sid

from saliors

where sname='Mohan'));

1. Consider the following relation schema:

Sailors(sid: integer, sname: string, rating: integer, age: real)

Boat(bid: integer, bname: string, color: string)

Reserves(sid: integer, bid: integer, day: date)

Write the following queries in SQL.

1. Find the average age of the sailor who are eligible for voting for each rating level that has at least two sailors.

select

Rating, avg(age)

From sailors

Where age >=18

Group by rating

Having count(\*)>=2;

1. Find the name of sailors who have reserved both red and a green boat.

select

s.sid, sname

From sailors s, boat b, reserves r

Where s.sid=r.sid and b.bid=r.bid

And color=’Red’

INTERSECT

select

s.sid, sname

From sailors s, boat b, reserves r

Where s.sid=r.sid and b.bid=r.bid

And color=’Green’;

1. Find the sailor\_id of sailors who have reserved a red boat

select

s.sid

From sailors s, boat b, reserves r

Where s.sid=r.sid and b.bid=r.bid

And color=’Red’;

1. Consider the following database.

Employee (employee-name, street, city)

Works (employee-name, company-name, salary)

Company (company-name, city)

Manager (employee-name, manager-name)

Give an expression in the relational algebra, the tuple relational calculus, and the

domain relational calculus, for the following queries.

1. Find the names of all employees who work for “XYZ” bank.

select

Employee-name

From employee e, works w

Where e.employee-name=w.employee-name

And company-name=’XYZ’;

1. Find the street, city of the employee working under manager “Krishna”.

select

Street, city

From employee e, manager m

Where e.employee-name=m.employee-name

And manager-name=’Krishna’;

1. For the following relational database write the expressions in SQL.

Branch (branch name, Branchcity, Assets)

Customer (customername, customerstreet, customercity)

Loan (Branchname, loan number, Amount)

Borrower (customername, loan number)

Account (Branchname, Account number, balance)

Depositor (customername, Account number)

1. Find the names of all branches in Loan Schema?

select

branchname

From loan;

1. Find all customers having loan, account or both at bank?

Select

Customername

From borrower

Union

Select

Customername

From depositor;

1. Display customernames in alphabetical order who have a loan at the Newyork

branch?

select

customername

from borrower b,loan l

where b.loannumber=l.loannumber

and branchname='Newyork'

order by customername;

1. Find set of all customer names who have an account at the bank?

Select

Customername

From depositor;

1. Using the following relational database, give the expressions in SQL.

Branch(branch name, branch city, assets),

customer (customer name, customer street, customer city),

Loan (branch name, loan number, amount),

Borrower (customer name, Loan number),

Account (branch name, account number, balance),

Depositor (Customer name, account number)

i. find the names of all customers whose street address include

substring ’Main’

select

customername

from customer

where customer street like '%Main%';

ii. Find average balance for each customer who lives in Harrison and

having at least three accounts?

select

avg(a.balance), d.customername

from depositor d, account a , customer c

where a.accountnumber=d.accountnumber

and d.customername=c.customername

and customer street ='Harrison'

group by d.customername

having count(\*)>=3;

iii. Find the customers from all branches who have maximum loan or

deposit in that branch.

select  
Cname  
from loan l,borrower b  
where l.loannumber=b.loannumber  
and amount=(select  
 max(amount)  
 from loan)

UNION

select  
cname  
from account a,depositor d  
where a.accoutnumber=d.accountnumber  
and balance=(select  
 max(balance)  
 from account);

select   
Customer name   
from borrower b ,loan l  
where b.loannumber=l.loannumber   
Group by b.branchname   
Having b.amout=(select  
Max(amout)  
From loan  
Group by branchname

Union

Select   
Customername  
From deposit;

select

customername

From borrower b, loan l, (select

branchname, max(amount) ma

from loan

group by branchname) t

where b.loannumber=l.loannumber and t.branchname-l.branchname

union

select

customername

from deposit;

iv. Find all customers who have a loan at Newyork bank and whose

name is neither smith nor jones

select

Customer name

from borrower b ,loan l

where b.loannumber=l.loannumber   
And l.branchname='newyork'  
And customer name not in ('jones','smith');

v. Find all the customers who reside outside Newyork and having both

Loan and Deposit at Newyork branch.

Customer (customername, customerstreet, customercity)

Loan (Branchname, loan number, Amount)

Borrower (customername, loan number)

Account (Branchname, Account number, balance)

Depositor (customername, Account number)

select

c.customername

From customer c, loan l, borrower b, account a, depositor d

Where l.loannumer=b.loannumber

And a.accountnumber=d.accountnumber

And c.customername=b.customername

And c.customername=d.customername

And c.customercity !=’NewYork’

And l.branchname=’NewYork’ and a.branchname=’NewYork’;

1. Write the relational algebra, the tuple relational calculus expressions for the following relational database queries?

Sailor (sailor id, Boat id, sailorname, rating, age)

Reserves (Sailor id, Boat id, Day)

Boat (boat id, Boatname, color)

1. Find the sailorname, age of the youngest sailor?

Select

sailorname, age

from sailor

where age=(select

min(age)

from sailor);

1. Find the sailorname, color of the boat reserved of those sailors whose age is more than 35

select

sailorname, color

from sailor s, boat b

where s.boat id=b.boat id

and s.age >35;

1. Find the Number of reservations for each red boat on a particular day?

select   
bid,day,Count(bid)  
From reserves r,boats b   
Where r bid=[b.bid](http://b.bid" \o "http://b.bid" \t "_blank)  
B.color =red  
Group by bid,day;

1. Find the average age of sailor for each rating level

select

rating , avg(age)

from sailor

group by rating;

1. Using the relational schema:

STUDENT (Stname, Stnum, Totalmarks, Average, Year, Semester)

HOSTEL (Stnum, Roomnum)

Represent the following queries in SQL.

1. Get the student details such as name and total marks of 2nd year 2nd semester Students

Select

stname,totalmarks

from student

where year=2 and semester=2;

1. Obtain the room number allotted to “Kumar”

select

roomnum

from STUDENT s, HOSTEL h

where s.stnum=h.stnum and s.stname='Kumar';

1. Obtain the names of students staying in room number 101 and secured more than 60% of marks.

select

stname

from student

where stnum in (select

stnum

from hostel

where roomnum=101 )

and average>60%;

1. Get the name and marks of students who are in the room number 101 in ascending order of name.

select

stname, Totalmarks

from student

where stnum in (select

stnum

from hostel

where roomnum=101 )

order by stname;

1. For the relational schema:

Emp(eid: integer, ename: string, age: integer, salary: real)

Works(eid: integer, did: integer, pcttime: integer)

Dept(did: integer, dname: string, budget: real, managerid: integer)

Answer the following:

i) Give an example of a foreign key constraint that involves the Dept relation. What are the

options for enforcing this constraint when a user attempts to delete a Dept tuple?

ii) Write the SQL statements required to create the preceding relations, including

appropriate versions of all primary and foreign key integrity constraints.

iii) Define the Dept relation in SQL so that every department is guaranteed to have a

manager.

iv) Write an SQL statement to add John Doe as an employee with eid = 101, age = 32 and salary = 15, 000.

1. Consider the following schema

Suppliers (sid:integer, sname:string, address:string)

Parts (pid: integer, pname:string, color:string)

Catalog (sid:integer, pid:integer, cost:real)

The catalog relation lists the prices charged for parts by suppliers. Write the following queries

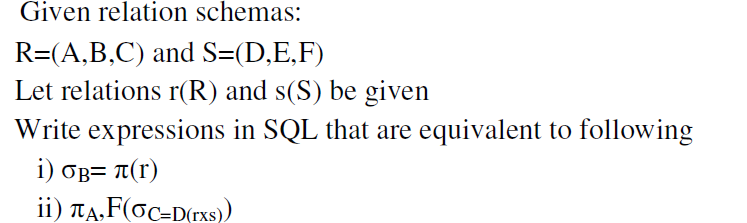
in relational algebra, Tuple relational calculus.

i) Find the sid of suppliers who supply same red part and same green part?

ii) Find the names of suppliers who supply same red part?

iii) Find the sid of suppliers who supply every part?

1. …..



1. Select \* from R where B=x;
2. Select A, F from R, S where C=D;
3. Using the following schema answer the following queries in Relational Algebra:

Suppliers (sid, sname, saddress)

Parts (pid, pname, color)

Catalog (sid, pid, cost)

1. List the the names of suppliers who supply blue part

select

sname

from suppliers s, Parts p, catalog c

where s.sid=c.sid and p.pid=c.pid

and color='blue';

1. List the supplier details who supply “Bolts” colored “Red”

Select   
Sname   
From supplier s ,parts p,catalog c  
Where s.sid=c Sid And c.pid=p.pid   
And p.pname =bolt   
And p.color =red;

1. List the supplier details and part details of those whose cost is less than $30.

select  
s.\*,p.\*  
from supplier s,parts p,catalog c  
where s.sid=c.sid and p.pid=c.pid  
and c.cost<30;

1. List the part details that are supplied by supplier whose name starts with “S”.

select

p.pid, pname

from suppliers s,parts p,catalog c

where s.sid=c.sid and p.pid=c.pid

and s.sname like 'S%';

select

\*

from parts

where pid in (select

pid

from catalog

where sid in (select

sid

from suppliers

where sname='s%'));

1. Using the following schema answer the following queries in SQL:

Suppliers(sid, sname, saddress)

Parts(pid, pname, color)

Catalog(sid, pid, cost)

i) List the the names of suppliers who supply blue part

ii) List the supplier details who supply “Bolts” colored “Red”

iii)List the supplier details and part details of those whose cost is less than $30.

iv)List the part details that are supplied by supplier whose name starts with “B”

1. List the parts that are supplied by supplier “HMT” whose cost is more than 5000.

select  
p.\*  
from supplier s,parts p,catalog c  
where s.sid=c.sid and p.pid=c.pid  
and s.sname='HMT'  
and c.cost>5000;

1. Using the following schema write the queries using Relational Algebra, Relational Calculus:

Sailors(sailor-id, sailor-name, sailor-rating, sailor-age)

Boats(boat-id, boat-name, boat-color)

Reserves (sailor-id, boat-id, booked\_date)

1. List all the boat details whose color is “Red”

select

\*

from boats

where boats-color="Red";

1. List the Sailor details whose have not booked a boat on “10/10/2009”

select

s.\*

from sailors s, reserves r  
where s.sid=r.sid and

booked\_date not like '10/10/2009’;

select

\*

from sailors

where sailor-id NOT IN (select

sailor-id

from reserves

where booked\_date like ‘10/10/2009’);

1. List the Sailor details who are aged more than 50.

select

\*

from sailors  
where sailor-age>50;

1. List the Sailors who booked Red boat on “10/10/2009”

select

sname

from Sailors s,boats b,Reserves r

where s.sid=r.sid and [b.bid](http://b.bid)=[r.bid](http://r.bid" \o "http://r.bid" \t "_blank)

and r.booked\_date like "10/10/2009"

and boat\_color='Red’;

1. List the sailor whose rating is “A” and booked a “Red” boat

select

sailor-name

from sailors

where sailor-sid in (select

sailor-sid

from reserves

where boat-id in (select

boat-id

from boats

where boat-color ="Red"))

and sailor-rating="A" ;

select

sailor-name   
from sailors s,reserves r,boats b  
where s.sailor-id=r.sailor-id and b.sailor-id=s.sailor-id  
and sailor-rating='A'  
and boat-color='Red';

1. Using the following schema represent the following queries using Tuple relational calculus :

PROJECT (Projectnum, Project Name, Project Type, Project Manager)

EMPLOYEE ( Empnum, Empname)

ASSIGNED\_TO (Projectnum, Empnum)

1. Find Employee details working on a project name starts with ‘L’

select

\*

from employee e, project p,assigned\_to a  
where e.enum=a.enum and a.projectnum=p.projectnum  
and project name like 'L%';

select

\*

from employee

where empnum in (select

empnum

from Assigned\_to

where projectnum in (select

projectnum

from project

where project name="L%"));

1. List all the employee details who are working under project manager “Clevee”

select

\*

from employee

where empnum in (select

empnum

from Assigned\_to

where projectnum in (select

projectnum

from project

where project manager="clevee"));

select

\*

from employee e, project p, assigned\_to a  
where e.enum=a.enum and a.projectnum=p.projectnum  
and project manager=’clevee’;

iii. List the employees who are still not assigned with any project.

iv. List the employees who are working in more than one project.

1. Write SQL expressions for the following relational databases.

employee (empno, empname, gender, dob, doj, empadd, emptelno, empsalary, empdept, bonus, dor)

i. Find empname from emp schema table who joins at the same date?

ii. Find empadd, empname who are working in the same department?

iii. Find the salary from emp schema who are earing more than 6000?

iv. Find how many records are in table emp schema?

v. Find empno, empname, empdept from emp schema where empsalary is b/n.

1. For the following relational database, give the expressions in SQL.

Sailor schema (sailor id, sailorname, rating, Age)

Reserves (sailor id, Boat)id, day)

Boat Schema(Boat id, boatname, color)

i. find the name and age of the oldest sailors?

ii. Count the No.of sailors?

Select

Count(sailor id)

From Sailor;

1. Count the No.of different sailors names?

select

count(distinct(sailor name))

from sailor;

1. Find the names who are younger than the oldest sailors with rating of 10?

select

sailorname

from sailor

where age<(select

max(age)

from sailor where rating=10)

and rating=10;

1. For the following relational database write the expressions in SQL. [6+10]

flight (flight no, from, to, distance, departs arrives, price)

Aircraft (Aid, Aircraftname, cruising range)

Certified (Emp cd, Aid)

Employee (Emp id, Empname, salary)

i. Find the names of pilot whose salary are individually less than price of the cheapest route from ?Los Angles? to Honolulu ?

ii. Print the enames of pilots who can operate planes with cursing range greater than 5000 miles, but r not certified on any boxing aircraft?

iii. Find the names of pilots certified for some Boeing aircraft?

iv. Find the aids of all aircraft that can be used on routes Los Angles to

Chicago?

v. Compute the difference b/n the average salary of a pilot and the average salary of all employees?