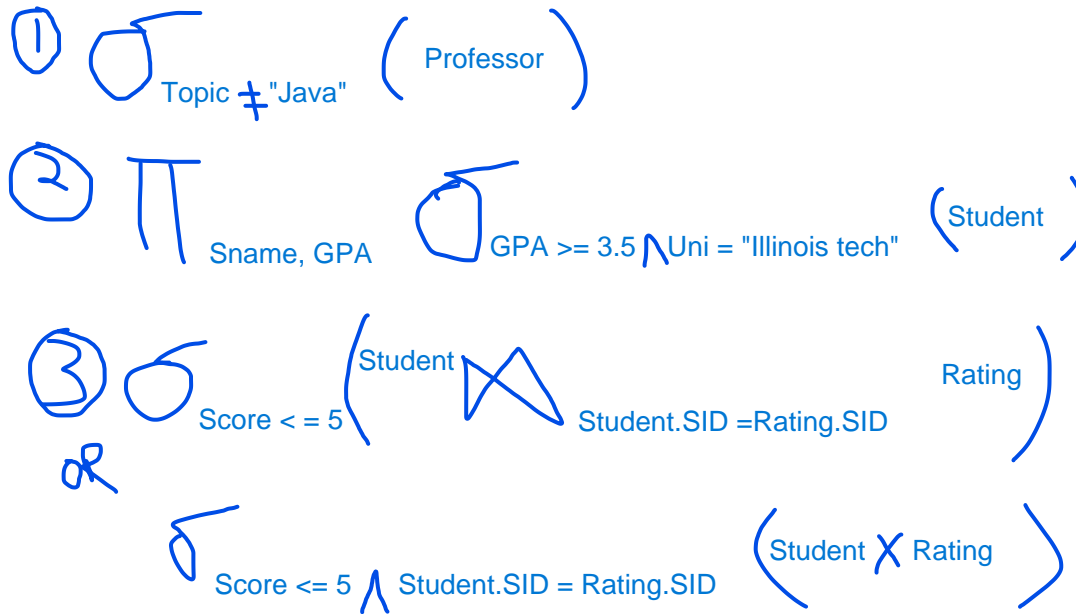


Solutions: CS425 Midterm Summer 2023 Exam

Relational Algebra



SQL Queries

```
-- cs425 mid-term Summer 2023
-- QUESTION 1 SOLUTION

-- create the database
CREATE DATABASE RateMyProfDB;

-- choose the database to use
USE RateMyProfDB;

-- Professor table
CREATE TABLE Professor(
  PID int auto_increment,
  Pname varchar(25) not null,
  Papers int,
  Topic varchar(25),
  primary key (PID)
);

-- Student table
CREATE TABLE Student(
  SID int,
  Sname varchar(25) not null,
  Uni varchar(25) not null,
```

```

GPA double,
primary key (SID)
);

-- Rating table
CREATE TABLE Rating(
SID int,
PID int,
Score int not null,
Attended int not null,
primary key (SID,PID),
foreign key(SID) references Student(SID) ON DELETE CASCADE,
foreign key(PID) references Professor(PID) ON UPDATE CASCADE,
Check (Score between 0 and 10)
);

-- QUESTION 2 SOLUTION
SELECT Sname
FROM Student
WHERE Uni NOT IN ("illinois tech", "UChi");
-- OR
SELECT Sname
FROM Student
WHERE Uni <> "illinois tech" and Uni <> "UChi";
-- OR
select Sname from student where Sname not in
(select Sname from student where uni='illinois tech' or uni = 'UChi');

-- QUESTION 3 SOLUTION
select p.pname, avg(r.score)
from Rating r , professor p
where r.pid = p.pid
group by pid
having count(*)<=1;

-- OR

select pname, avg(score), from Rating natural join
professor group by pid having count(*)>1;

-- QUESTION 4 SOLUTION
SELECT p.Pname, r.Score, s.Sname
FROM Professor p, Rating r, Student s
WHERE p.pid = r.pid and s.sid = r.sid;

```

```

-- OR
SELECT p.Pname, r.Score, s.Sname
FROM Professor p
JOIN Rating r ON p.pid = r.pid
JOIN Student s ON r.sid = s.sid;

-- OR
SELECT Pname, Score, Sname
FROM Professor
natural JOIN Rating
natural JOIN Student;

-- QUESTION 5 SOLUTION
Update Professor
SET Papers = Papers + 1
WHERE Pname IN ("Steven", "Joy");

-- OR

Update Professor
SET Papers = Papers + 1
WHERE Pname = "Steven" OR Pname = "Joy";

-- OR
update professor
set papers =(
case
when pname = "Steven" or Pname ="Joy" then Papers + 1
else papers + 0
end);

-- QUESTION 6 SOLUTION
SELECT distinct p.Pname
FROM Professor p, Rating r
WHERE p.pid=r.pid AND
Score < SOME (SELECT Score FROM Rating where PID=111);

-- OR
SELECT distinct p.Pname
FROM Professor p, Rating r
WHERE p.pid=r.pid AND
Score < SOME (SELECT min(Score) FROM Rating where PID=111);

```

```
-- QUESTION 7 SOLUTION
```

```
INSERT INTO Professor (Pname, Papers, Topic)
VALUES ("George", 40, "Networks"),
("Ethan", 10, "Python"),
("Markus", 15, "ICT4D");
```

```
-- QUESTION 8a SOLUTION
```

```
SELECT row_num, first_name, last_name, salary,
NTILE(3) OVER (ORDER BY salary) as 'Bucket',
ROUND(ROUND(PERCENT_RANK() OVER (ORDER BY salary),2) *100,2) as 'PercentRank(%)',
ROUND(CUME_DIST() OVER (ORDER BY Salary),2) as 'Cummulative Distribution'
FROM Employee;
```