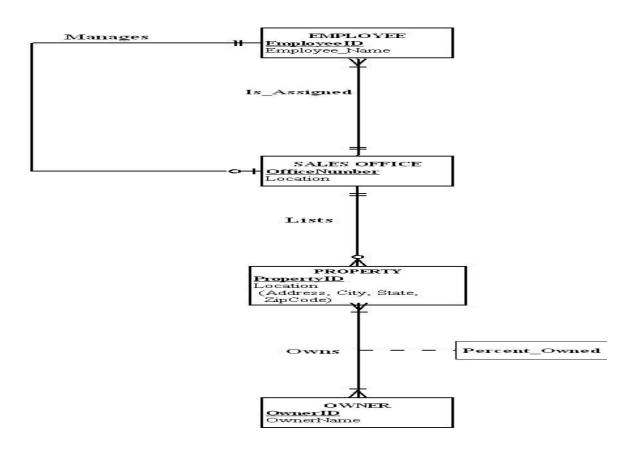
Solution Final CSC 380 S1 2018-2019

Question 1: 10pts



Question 2: 10 pts A		
B1	C1	R1
	1	
	A1	
	•	
<u>C1</u>	1	U1
	·	
<u>B1</u>	2	<u>C1</u>
	<u>C1</u>	<u>C1</u>

Question 3: 8 pts

1. List all the course names that professor 'Smith' taught in Fall of 2007.

$$\pi_{crsname}(\sigma_{profname='Smith'}(Professor) \sigma_{semester='f2007'}(Taught) Course)$$

2. Return those professors who have taught 'csc6710' but never 'csc7710'.

$$\pi_{ssn}(\sigma_{crscode=\text{`csc}6710\text{'}}(Taught)) - \pi_{ssn}(\sigma_{crscode=\text{`csc}7710\text{'}}(Taught))$$

3. Return those professors who have taught both 'csc6710' and 'csc7710'.

$$\pi_{ssn}(\sigma_{crscode=`csc6710`}(Taught)) \cap \pi_{ssn}(\sigma_{crscode=`csc7710`}(Taught))$$

4. Return those courses that have been taught by all professors.

$$\pi_{\rm crscode, ssn}({\rm Taught})/\pi_{\rm ssn}({\rm Professor})$$

Question 4: 8 pts

Given relational schema:

Sailors (sid, sname, rating, age)

Reservation (sid, bid, date)

Boats (bid, bname, color)

1. For each rating find the age of the youngest sailor with age ≥ 18

SELECT S.rating, MIN (S.age)

FROM Sailors S

WHERE S.age >= 18

GROUP BY S.rating

2. Find sid's of sailors who've reserved both a red and a green boat:

SELECT R.sid

FROM Boats B, Reserves R

WHERE R.bid=B.bid

AND B.color='red'

AND R.sid IN (SELECT R2.sid

FROM Boats B2, Reserves R2

WHERE R2.bid=B2.bid

AND B2.color='green')

3. Find the number of reservations for each red boat.

SELECT B.bid, COUNT(*)AS scount

FROM Boats B, Reserves R

WHERE R.bid=B.bid

AND B.color='red' GROUP BY B.bid

4. Find sailors whose rating is greater than every sailor called "Ali". Use ALL.

SELECT sid
FROM Sailors
WHERE rating > ALL (SELECT rating
FROM Sailors
WHERE sname='Ali')

Question 5: 4 pts

First Normal Form

- Assume the **key** is <u>Name</u>, <u>Project</u>, <u>Task</u>.
- Is EMPLOYEE in 1NF?

No composite or Multivalue attributes.

Second Normal Form

- List all of the functional dependencies for EMPLOYEE.
- Are all of the non-key attributes dependant on all of the key?
- Split into two relations EMPLOYEE_PROJECT_TASK and EMPLOYEE_OFFICE_PHONE. EMPLOYEE_PROJECT_TASK (<u>Name</u>, <u>Project</u>, <u>Task</u>)
- EMPLOYEE_OFFICE_PHONE (Name, Office, Floor, Phone)

Third Normal Form

- Assume each office has exactly one phone number.
- Are there any transitive dependencies?
- Where are the modification anomalies in EMPLOYEE OFFICE PHONE?
- Split EMPLOYEE_OFFICE_PHONE.

EMPLOYEE_PROJECT_TASK (Name, Project, Task)

EMPLOYEE_OFFICE (Name, Office, Floor)

EMPLOYEE_PHONE (Office, Phone)