

1. a) Relational Algebra: **(CS275)** Assn 4  

$$\pi_{\text{Frame}, \text{Lname}} \left( \pi_{\text{Frame}, \text{Lname}, \text{ssn}} \left( \sigma_{\text{Dno}=5} (\text{EMPLOYEE}) \right) \cap \pi_{\text{Frame}, \text{Lname}, \text{ssn}} \left( \sigma_{\text{pname}=\text{"productX"} \wedge \text{hours} > 10} (\text{EMPLOYEE WORKS\_ON}) \right) \right)$$

SQL: SELECT Frame, Lname  
 FROM (Employee E NATURAL JOIN Project P) NATURAL JOIN WORKS-ON W  
 WHERE E.Dno = 5 AND P.pname = "productX" AND hours > 10.

b)  $\pi_{\text{Frame}, \text{Lname}} \left( \sigma_{\text{dependent\_name}=\text{Frame}} (\text{EMPLOYEE} \bowtie_{\text{ssn}=essn} \text{DEPENDENT}) \right)$   
 SQL:

SELECT Frame, Lname  
 FROM EMPLOYEE NATURAL JOIN DEPENDENT  
 WHERE dependent\_name = Frame

c) Relational Algebra:

$\text{WONG\_SSN} \leftarrow \pi_{\text{ssn}} \left( \sigma_{\text{Frame}=\text{"Franklin"} \wedge \text{Lname}=\text{"Wong"}} (\text{EMPLOYEE}) \right)$   
 $\text{SUPERVISION} (\text{SSN1}, \text{SSN2}, \text{Frame}, \text{Lname}) \leftarrow \pi_{\text{ssn}, \text{super\_ssn}, \text{frame}, \text{lname}} (\text{EMPLOYEE})$

$\text{RESULT} (\text{Frame}, \text{Lname}) \leftarrow \pi_{\text{Frame}, \text{Lname}} (\text{SUPERVISION} \bowtie_{\text{ssn}=essn} \text{WONG\_SSN})$

SQL:

SELECT UNIQUE E.Frame Fname  
 FROM EMPLOYEE E,  
 WHERE E.super\_ssn = (SELECT E.ssn FROM EMPLOYEE E  
 WHERE E.Frame = "Franklin" AND E.lname = "Wong")



2. a) Relational:

$\pi_{Name} (\sigma_{major=CS \text{ AND } class=1} (STUDENT))$

SQL: SELECT S.Name

FROM STUDENT S

WHERE Class = 4 AND major = "CS"

b) Relational:

~~Relational:~~

$KING\_COURSES \leftarrow (\sigma_{instructor='king'} (SECTION))$

RESULT  $\leftarrow \pi_{course\_name} (KING\_COURSES \bowtie_{course\_number=course\_number} COURSE)$

SQL: SELECT Course\\_name FROM  
COURSE NATURAL JOIN SECTION  
WHERE Instructor = "King"

c) Relational:

$KING\_SECTIONS \leftarrow \sigma_{instructor='king'} (SECTION)$

$STUDENTS\_IN\_SECTIONS \leftarrow (KING\_SECTIONS \bowtie_{section\_identifier=section\_id} GRADE\_REPORT)$

RESULT  $\leftarrow section\_identifier \ \& \ COUNT \ section\_identifier, \ course\_number, \ semester, \ year$   
STUDENTS\\_IN\\_SECTIONS

SQL:

SELECT Course\\_Number, semester, Year, COUNT(\*)

FROM GRADE\\_REPORT, SECTION

WHERE Instructor = "King" AND section\\_identifier =  
GRADE\\_REPORT, section\\_identifier.

Group BY Course\\_Number, semester, Year



3

R. Alg:

d) SENIORS  $\leftarrow \pi_{name, student\_number} (\sigma_{class=4 \text{ AND } major='CS'} (STUDENT))$

TRANSCRIPT\_INFO  $\leftarrow ((SENIORS \bowtie_{student\_number=student\_number} (GRADE\_REPORT) \bowtie_{section\_identifier=section\_identifier} (SECTION) \bowtie_{course\_number=course\_number} (COURSE)))$

$\pi_{name, course\_name, course\_number, credit\_hours, semester, year, grade} (TRANSCRIPT\_INFO)$

SQL: SELECT name, course\_name, course\_number, credit\_hours, semester, year, grade  
FROM ((STUDENT NATURAL JOIN GRADE\_REPORT)  
NATURAL JOIN SECTION) NATURAL JOIN COURSE)  
WHERE major = "CS" AND class = 4.

3. a) INSERT INTO 'STUDENT' ('Name', 'Student-number', 'class', 'major') VALUES ('Johnson', 25, 1, 'Math');
- b) UPDATE 'STUDENT'  
SET class = 2  
WHERE name = 'Smith'
- c) INSERT INTO 'COURSE' ('course\_name', 'course\_number', 'credit\_hours', 'Department') VALUES ('Knowledge engineering', 'CS 4390', 3, 'CS');
- d) DELETE FROM 'STUDENT'  
WHERE name = 'Smith' AND student\_number = 17;



→ Group: Heather Warner, David Merrick

~~4/6) Find names of Pokemon located in Route 1?~~

~~RATg~~

~~Route 1 = (0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10)~~

~~Pokemon IDs = Route 1 + Location ID (Remain Locations)~~

~~Result = 1 + 10 = 11 (Pokemon 11 = Porygon)~~

~~SQL~~

~~Select Plan Name~~

~~From (Location Natural Total Pokemon Locations)~~

~~Natural Total Pokemon~~

~~Where Location name = Route 1~~