COP 4710 – Database Systems – Fall 2013

Final Exam Review Sample Problems

Problem #1 – SQL Queries

Construct correct SQL expressions for the following queries.

Use this sample database:

s (s#, name, rank, city, workers)
p (p#, name, color, weight, city)
j (j#, name, workers, city)
spj (s#, p#, j#, qty)

where: in s: rank is a numeric field, and workers is the number of employees of that supplier.
in p: city is the city in which the part is built.
in j: workers is the number of workers on that job.

A. List the names of all suppliers who supply part number P2 to any job.

B. List the supplier names for those suppliers who do not supply part P2.

C. List the names of those suppliers who supply at least one red part.

D. List all supplier number/part number/ job number triples, such that no two of the indicated supplier, part, or job are located in the same city.

E. Get the total quantity of part number P1 that is supplied by supplier number S1.

F. List the part numbers for those parts which are supplied by more than one supplier.

Problem #2 – Serializability

Shown below is a concurrent schedule S of five transactions operating under an exclusive-locking protocol. Determine if the schedule S is serializable. If the schedule S is serializable, produce a serial schedule equivalent to the concurrent schedule S.

S = [(T1: Xlock A), (T2: Xlock B), (T5: Xlock C), (T2: Unlock B), (T4: Xlock B),
(T1: Unlock A), (T5: Unlock C), (T4: Unlock B), (T5: Xlock A), (T3: Xlock C),
(T1: Xlock B), (T1: Unlock B), (T3: Unlock C), (T5: Unlock A), (T3: Xlock A),
(T3: Unlock A)]

Problem #3 – Timestamping protocol

Using the timestamping mechanism for deadlock prevention, we presented two different protocols: "wait or die" and "wound or wait". Given the transaction time stamps ts(T1) = 8, ts(T2) = 4, ts(T3) = 6, and ts(T4) = 2, determine the action for both protocols given the scenarios shown below.

Action	"wait or die" protocol	"wound or wait" protocol
T1 requests an object held by T3	T1: T3:	T1: T3:
T2 requests an object held by T1	T2: T1:	T2: T1:
T4 requests an object held by T2	T4: T2:	T4: T2:
T4 requests an object held by T3	T4: T3:	T4: T3:
T3 requests an object held by T2	T3: T2:	T3: T2:

Problem #4 – Relational Algebra Queries

Construct correct relational algebra expressions for the following queries.

Use this sample database:

s (s#, name, rank, city, workers)
p (p#, name, color, weight, city)
j (j#, name, workers, city)
spj (s#, p#, j#, qty)

where: in s: rank is a numeric field, and workers is the number of employees of that supplier.
in p: city is the city in which the part is built.
in j: workers is the number of workers on that job.

A. List the names of all suppliers who supply part number P2 to any job.

B. List the supplier names for those suppliers who do not supply part P2.

C. List the names of those suppliers who supply at least one red part.

D. List the part names for those parts which are shipped by every supplier.

E. List all supplier number/part number/ job number triples, such that no two of the indicated supplier, part, or job are located in the same city.