

COP 4710 – Database Systems – Fall 2013

Practice Problems for Exam #2

Problem #1 - Queries

Use this sample database:

s	(<u>s#</u> , name, rank, city, workers)
p	(<u>p#</u> , name, color, weight, city)
j	(<u>j#</u> , name, workers, city)
spj	(<u>s#</u> , <u>p#</u> , <u>j#</u> , 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.

For each of the queries listed below, produce a relational algebra, tuple calculus, and SQL expression that will produce correct results for the query.

- (1) List the names of all the suppliers who supply part P2 to any job.
- (2) List the names of those cities in which there is a job located that employs more than 200 workers.
- (3) List the supplier names for those suppliers who supply at least one red part.
- (4) List the supplier names from those suppliers who do not supply part number P2.
- (5) List the names of those suppliers who both job number J1 and J2 with any part.
- (6) List all quadruples of the form (s#, p#, s#, p#) where the first supplier number ships the same part number as the second supplier, but the first supplier has at least one shipment of that part in a quantity greater than the second supplier. Eliminate from your result, all cases where the two supplier numbers happen to be the same. (Note that this query requires assigning an alias, i.e., renaming the shipments relation.)

Problem #2 – 3NF Decomposition

Given the relation scheme R, the set of functional dependencies F, and the set of keys K shown below, produce a 3NF decomposition scheme of R with respect to F. Clearly show the final decomposition scheme. Do NOT test for either the lossless join nor the preservation of dependencies – just do the decomposition.

R = (number, name, status, city, quantity, division)
K = { number }
F = { status → quantity, city → division, name → city }