CS5225: Parallel & Distributed Databases
Quiz 1 – 17 September 2007 (15 minutes)

Name: _____ **Matric No:** _____

State if the following statements are TRUE (T) or FALSE (F)

1. Consider a database schema with the following two relations:

S(*eid, dob, project, hours*)
R(*eid, name, sex*)

where *eid* is the employee id, *dob* is the date-of-birth, *project* is the project that the employee participates in, *hours* is the number of hours the employee spent on the project, *name* is the employee name, and *sex* is the sex of the employee. The key attributes are underlined (i.e., (*eid,dob*) is a composite key of S, and *eid* is the key of R). Moreover, *sex* can only be M (male) or F (female). The following predicates appear in the majority of queries:

hours ≤ 5, *hours* ≤ 15, *sex* = M, *sex* = F

We would like to fragment R and S using the techniques we learn in the lecture.

a) *S1* = $\sigma_{hours \leq 15}$ S is one fragment for S. [F]

b) There are in total 2 fragments of S and 2 fragments of R. [F]

c) Relation R can be further fragmented using derived horizontal fragmentation based on the fragmentations of S. [F]

d) The vertical fragmentation of S into S1(eid, project) and S2(eid, dob, hours) is desirable if queries frequently access (eid, dob, hours). [F]

2. In query optimization, an exhaustive strategy with pruning heuristics (e.g., avoid cross products) will always produce a better plan than one with across products. [F]

3. R1 SEMIJOIN R2 = R1 SEMIJOIN (R2 SEMIJOIN R1) [T]

4. R1 JOIN R2 JOIN R3 = R2 JOIN R3 SEMIJOIN (R1 JOIN R2) [F]

5. In query optimization, the number of tuples per relation can influence the search space (i.e., the number of query plans). [F]

6. Consider the following hybrid fragmentation:

   $EMP1=\sigma_{ENO\leq"4"}(\Pi_{ENO,ENAME}(EMP))$

   $EMP2=\sigma_{ENO>"4"}(\Pi_{ENO,ENAME}(EMP))$

   $EMP3=\Pi_{ENO,TITLE}(EMP)$

   Consider the query: **SELECT** TITLE **FROM** EMP **WHERE** ENO > “5”.

   a) The optimal plan involves EMP2 and EMP3 only. [F]

   b) The optimal plan pushes down selection on ENO to EMP2 and pushes down projection to EMP2 (to prune away ENAME). [F]