

Name: (SID:)

Database Systems: Written Qualifying Exam.

Jan. 7, 2011

1. (20 points) Explain the three-layer database architecture.
2. (20 points) Explain database system in comparison with file management system.
3. (20 points) Show how the below company data are modeled into (1) an ER schema and (2) relational tables.
 - 'In a company, an employee belongs to a department and may participate in up to two projects based on different work_hours (such as half_time, full_time, etc.). Projects are conducted by a department, and a project must have a minimum of four employees.' (You may design the entities' properties as attributes. Hint: Show entity sets, relationships, primary/foreign keys, cardinality, and connectivity.)
4. (10 points) From the database above, a database application has the query below:

"Find all the female employees who work for the CUSTOMER SERVICE department, and give their names, addresses and work locations of their department."

Show (1) a query plan (in the form of a query tree), and (2) stepwise algebra operations.
5. (30 points) Short-answer questions. (Choose six questions only)

Choose three from (a) ~ (f):

 - (a) Base data, auxiliary data, metadata
 - (b) Relational integrity constraints
 - (c) ER modeling view
 - (d) Entities, entity sets, attributes
 - (e) Primitive algebra operations
 - (f) Key concepts of OO data modeling beyond the Relational modeling

Choose three from (g) ~ (k):

 - (g) Database Transaction
 - (h) Two-phase Locking Protocol
 - (i) Transaction Log
 - (j) Write-ahead Logging
 - (k) Transaction COMMIT and ROLLBACK

Note)

- You are kindly suggested to use pencil and eraser.
- Begin with the new question on the new page.