Fourth Semester B. Tech. Degree Examination 2015
13.405 Database Design

Time : 3 hours

Marks: 100

Part A

(Answer all questions. Each carries 4 marks)

1. Write four significant differences between file processing and database management systems.
2. When is the concept of weak entity set is used data modeling? Define weak entity type, owner entity type, identifying relationship type..
3. Express division operation using basic relation algebraic operations.
4. What do you meant by closure set of functional dependencies? Illustrate with an example.
5. What are ACID properties

PART B
(Answer any **One** questions from each module)
Module 1

6 a. Describe three-schema architecture? Why do we need mapping between schema levels? (7)

  b. What is Aggregation?   Give an example   (6)

  c. What is difference between specialization and generalization? Why we do not display this difference in schema diagrams   (7)

OR

7. a. What is the difference between DDL and DML? Write one example for each category.

(6)

  b. You have got a job planning databases for the various States in the India and maintain information about their inhabitants. Your model should capture the following information:

- In each State, there are many districts, which contain many towns. There cannot be two districts with the same name, and there cannot be two towns with the same name in a single State.
- People live in towns. Men and women (adults) work in a town. Children learn in towns.
- A person can be a man, a woman, or a child, and has a first-name, last-name, id, and birthday. Children are any people under the age of 18.
- A man can be married to a woman (polygamy is not allowed, i.e., one man can be married only to one woman).
- For each marriage, store the date of the marriage and information about who are the children of the married couple

Draw an entity relationship diagram to model the information described above.   (14)

Module II

8.a. Consider the following relations:

   Student(<u>snum: integer</u>, sname: string, major: string, level: string, age: integer)

   Class(<u>name: string</u>, meets at: string, room: string, fid: integer)

   Enrolled(<u>snum: integer</u>, cname: string)

   Faculty(<u>fid: integer</u>, fname: string, deptid: integer)

Write the following queries in SQL

- Find names of students enrolled for 'database design' course.
- Find names of students who have not yet enrolled for any course
- Find the names of all Juniors (level = JR) who are enrolled in a class taught by Dr. Santhosh.
- Find the name of students who is either a History major or enrolled in a course taught by Dr. Santhosh.
- For each level, print the level and the average age of students for that level.   (15)

b. List different data types available in SQL   (5)

9. a. Consider the ER diagram ?
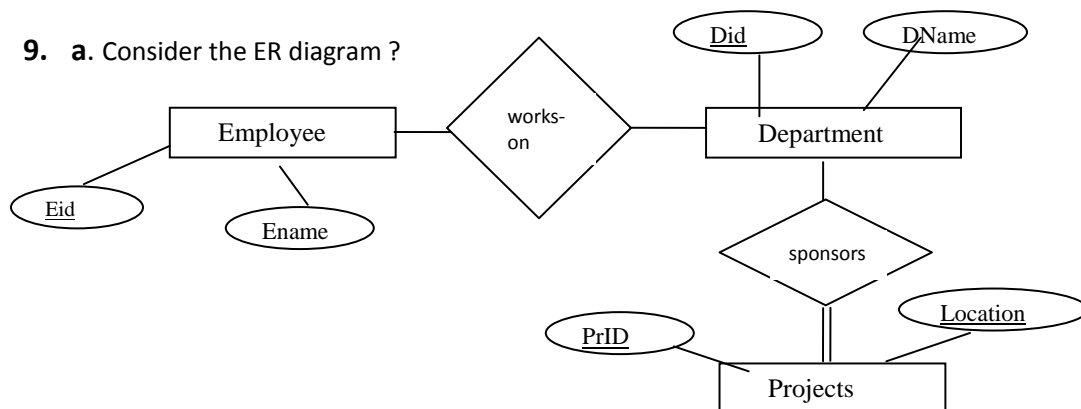
   i. Identify the minimum set of relations required to map this to a relational model. (4)

   ii. Draw a schema diagram showing all relations.   (5)

   iii. SQL DDL statements for'works-on' relationship   (5)

 b. How Equi-Join, Natural Join and Theta-Join differ?.   (6)

Module III

10 a. Discuss insertion, deletion and modification anomalies. Why are considered bad?
   Illustrate with examples   (8)

 b. Given a relation schema R(ABCD) and set of dependencies G={A→B, BC→D, A→C}
   1. Identify the key.   (2)
   2. Identify the normal form.   (5)
   3. Decompose into BCNF.   (5)

OR

11 a. What is dependency preservation property of decomposition? Why is it important?
                                                                                     (6)

b. Suppose you are given with a relation schema R(ABCD). Each of the following FDs, assuming
   they are the dependencies hold over R, state whether or not proposed decomposition of R
   into smaller relation is a good decomposition. Explain Why?
   1. AB →B C→A, C→D, decompose into ACD and BC
   2. A→ BC, C →AD, A→C, decompose into BCD and AC   (8)
c. What Minimal Cover. Illustrate with an example   (6)

Module IV

12 a.What are the differences between among primary, secondary and clustering
   indexes? How these differences effect affect the ways in which these indexes are
   implemented? Which of the indexes are dense?   (14)
   b. Describe the structure of B Tree nodes   (6)

OR

13. a Why do we need Concurrency Control   (8)
   b. What is a serial schedule? What is serializable schedule   (4)
   c. What is two-phase locking protocol? How does it guarantee serializability? (8)