R17

Code No: 843AA

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
MCA III Semester Examinations, March/April - 2022
DATABASE MANAGEMENT SYSTEMS

Time: 3 Hours **Max.Marks:75**

Answer any five questions
All questions carry equal marks
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1. Define ER diagram. What are additional features of ER diagrams? Explain in detail with suitable examples. [15]

2. A university registrar's office maintains data about the following entities: (a) courses, including number, title, credits, syllabus, and prerequisites; (b) course offerings, including course number, year, semester, section number, instructor(s), timings, and classroom; (c) students, including student-id, name, and program; and (d) instructors, including identification number, name, department, and title. Further, the enrollment of students in courses and grades awarded to students in each course they are enrolled for must be appropriately modeled.
Construct an E-R diagram for the registrar's office. Document all assumptions that you make about the mapping constraints. [15]

3. Consider the following relations: [15]
Student (snum: integer, sname: string, major: string, level: string, age: integer)
Class (name: string, meets_at: time, room: string, fid: integer)
Enrolled (snum: integer, cname: string)
Faculty (fid: integer, fnarne: string, deptid: integer)
The meaning of these relations is straightforward; for example, Enrolled has one record per student-class pair such that the student is enrolled in the class.
Write the following queries in SQL. No duplicates should be printed in any of the answers.
1. Find the nari1es of all Juniors (level = JR) who are enrolled in a class taught by I. Teach.
2. Find the age of the oldest student who is either a History major or enrolled in a course taught by I. Teach.
3. Find the names of all classes that either meet in room R128 or have five or more students enrolled.
4. Find the names of all students who are enrolled in two classes that meet at the same time.
5. Find the names of faculty members who teach in every room in which some class is taught.
6. Find the names of faculty members for whom the combined enrollment of the courses that they teach is less than five.
7. Print the level and the average age of students for that level, for each level.
8. Print the level and the average age of students for that level, for all levels except JR.

4. Explain about complex integrity constraints in SQL and designing active databases. [15]

5. Describe selection, projection, set operations, renaming and joins in relational algebra with examples. [15]

6.a) Consider the relation R on attributes (ABCDE) with functional dependencies.
AB → CDE, AC →BDF, B→C, C→B, C →D, B→E
i) Determine a Key for relation R
ii) Find 3NF decomposition for R using normalization process.
b) What are the pitfalls in relational database design? [8+7]

7.a) Describe the two-phase locking protocol with the help of an example.
b) What are the basic properties of a transaction? Explain these properties with the help of an example? [8+7]

8. Explain the following:
a) Buffer manager
b) Composite search key
c) ISAM. [5+5+5]

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