CS3020 Database and Management Systems
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Exercise Sheet 1 : Hand out 08.02.23, Due 15.02.23 - 23 :59

Assignment 1: DBMS vs File System

(a) Among databases and file systems, which enables easy data sharing. Why does the other one fail ?

(b) Consider similar data is stored in different files in a file system. What is this scenario called, and how does DBMS deal with this problem ?

(c) Consider some information of students, like assigned TA courses, working hours, and assigned mentor, need to be restricted and preferably moved to a new table. The student table is also linked to the course table in the database.

How does a file system handle the scenario ? How does DBMS handle it ? Which properties of DBMS must be preserved while doing the modification ? What advantages do we get from that ? Does physical schema get affected by the alteration ?

Assignment 2: ER model

Draw an ER Diagram for Quiz management system of moodle by considering below design requirements.

— Basic Entities : Student, Course, Quiz, Faculty, Login.

— Identify necessary attributes for the above entities and draw them in ER Diagram.

— Include the appropriate relationships with meaningful names.

— Include at least one ternary relationship.

— It should contain at least one multivalued and one composite attributes.

— Draw a relationship which connects an entity to itself.

— Student can take multiple courses and each course has at least one student enrolled in it.

— Each faculty can teach multiple courses and each course has one or more faculty.

Apart from Basic Entities, you can include additional entities to design the model, preserving the above design Requirements.

Assignment 3: Analysing ER Model

(a) Construct an alternative ER diagram that uses 3 binary relationships instead of ternary relationship in assignment 2 ER Model.

(b) Identify the possible candidate attributes and derived attributes for the ER Model in assignment 2.

(c) Identify the weak entities in the ER diagram in assignment 2 (there should be at least one) and justify why it is a weak entity.

Assignment 4: Relational Model

(a) Convert the created ER diagram from assignment 2 to a relational model.

(b) List all the primary keys and foreign keys in each table for the relational model.

(c) What integrity constraint and domain constraints can you add to avoid erroneous datain the relational model and how ?