Department of Applied Mathematics
DTU
Database Management System (MC 302)
Assignment 1

Q1. Neeta has a large DVD movie collection. Her friends like to borrow her DVD's, and she needs a way to keep track of who has what. She maintains a list of friends, identified by unique FID's (friend's identifier) and a list of DVD's identified by DVDID's (DVD's identifier). With each friend is the Name and all-important telephone numbers which she can call to get the DVD back. With each DVD is the star actor and actress name and movie title. Whenever a friend borrows a Neeta will enter the fact into database along with the date borrowed. Whenever the DVD gets returned, the fact too gets noted along with the date returned. Neeta wants to keep a complete history of her friend's borrowing habits. Draw the ER diagram for this situation. Specify the entities, relationships, attributes of entities and relationships, cardinality and participation constraints and also the Primary Keys. Specify clearly any assumptions that you have made. Suppose in the above question Neeta has a large collection of music DVDs as well, where each music DVD is identified by Unique DVDID and has an album_name. Neeta also lends her music DVDs to her friends and records the borrowed date and returned date as well. What changes in the ER diagram are required to include these facts?
Map the given ER schema into a relational schema. Specify all the primary and foreign keys.

Q2. What role ER model plays in the Database Design Process?

Q3. What two courses of actions are available to a database designer when he encounters multi valued attribute? Explain with an example of your own and also discuss their advantages and disadvantages.

Q4. Define redundancy with respect to data storage. How can the database approach help in controlling redundancy?

Q5. The Hudson Engineering Group (HEG) has contacted you to create a conceptual model whose application will meet the expected database requirements of the company's training program. The description of the operating requirement is given below
The HEG has 12 instructors and can handle up to 30 trainees per class. HEG offers five advanced technology courses each of which may generate several classes. If a class has fewer than 10 trainees, it will be cancelled. Therefore, it is possible for a course not to generate any classes. Each class is taught by one instructor. Each instructor may teach up to two classes or may be assigned to do research only. Each trainee may take up to two classes per year. Draw the ER diagram for this situation.

   (i) Identify the entities. Take suitable attributes for each one of them.
   (ii) Identify relationships between/among entities.
   (iii) Specify the cardinality constraints, participation constraints and min, max constraint
        for each relation.
   (iv) Specify the assumptions made if any.

Q6.

SHOP(<u>Shop_No</u>, Shop_name, Address, owner)

ITEM(<u>I-No,</u> I-Name)

SUPPLIED(<u>I-No, C_No, Shop_No</u>, Date, Price)

REQUIRES(<u>C_No, I-No</u>)

CUSTOMER(<u>C_No</u>, C_Name,C_Address)

SUPPLIED relation gives data about items supplied by a shop to a customer and REQUIRES relation gives data about items required by a customer. Primary keys of each relation are underlined.

      a. Write DDL statements to create these tables. Specify the Primary and Foreign Key constraints.

      b. Write query statements for the following queries in SQL

            a. names of customers who have been supplied items of maximum total value.

            b. Names of customers who are supplied all the items from only "Jindal Stores".

            c. List of shop owners who supplied some item to the address "Krishna Nivas, MG Road".