CSCI 332 Database Management Systems
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Assignment 6 - Functional Dependencies and Normalization - **Due December 1, 2020**

Please place all of your solutions to this exercise in the pdf file **CSCI332-Assign6-*yourInitials*.pdf** and upload the file Be sure your name is also somewhere in your submission. Perhaps the easiest approach to this assignment is to type all of your solutions into a Word file, or a text file, and save it as a pdf file.

1. Complete problem 14.15 on page 429 of your textbook.

2. Consider the relation `R(A,B,C,D,E,F,G,H,I,J)` and the set of functional dependencies

   `{{A,B}→C, A→{D,E}, B→F, F→{G,H}, D→{I,J}`

   a. Determine a primary key for R.

   b. Decompose R first into 2NF relations. Use names such as R1, R2, R3 etc for any **new** relations that you must define.

   c. Decompose any relations from part b. that are not in 3NF into 3NF relations. Use names such as R21, R22, R23, etc for any **new** relations that you must define. The first of the digits in the 3NF names indicates the 2NF relation from which it arose.

3. Repeat problem 4, but use the set of functional dependencies

   `{{A,B}→C, {B,D}→{E,F}, {A,D}→{G,H}, A→I, H→J}`

4. Consider the relation

   `DiskDrive(SerialNum,Manufacturer,Model,Batch,Capacity,Retailer)`.

   Each tuple in the relation contains information about a disk drive with a unique serial number, made by a manufacturer, with a particular model number, released in a certain batch, which has a certain storage capacity and is sold by a certain retailer. For example, the tuple

   `('1978619', 'Western Digital', 'A2235X', '765234', 500, 'CompUSA')`

   specifies that Western Digital made a disk drive with serial number 1978619 and model number A2235X, released in batch 765234. It is 500GB and is sold by CompUSA. Write each of the following dependencies as a functional dependency:

   a. The manufacturer and serial number together uniquely identifies the drive.

   b. A model number is registered by a manufacturer and therefore can't be used by another manufacturer.

   c. All disk drives in a batch are the same model.

   d. All disk drives of a certain model of a particular manufacturer have the same listed capacity.

5. a. Give a complete 2NF decomposition for the disk drive relation of problem 4.

   b. If the relation from 5a. is not in give a complete 3NF decomposition