Database Fundamentals

Labsheet 5

Note: If you already finished question 1 or any other in lab 4 then start working on rest of questions. Else, continue working on question 1 and try to finish at least 2 more questions in lab 5. You can submit lab 4 and lab 5 work together in one word document as B000xxxstudentnamelab4_5.doc. See your lecture notes and example exercise for help with the steps of Normalization. Lab 5 is **MANDATORY** to submit.

Objective:

1. Recap on ERDs
2. Relational modeling
3. Bring relations to 3rd normal form
   a. 1NF- Repeating groups
   b. 2NF – Partial dependencies
   c. 3NF – Transitive dependencies

For First Two Exercises:

1. Create logical level ERD in the MySQL workbench which includes attributes and primary keys.
2. Mapped logical level ERD to a relational model.
3. Normalize the relational model upto 3NF to create a set of well-structured relations.

For Last Two Exercises:

4. Normalize the relational model upto 3NF to create a set of well-structured relations.
5. Take a screen print for each ERD' and copy to a word document also include the relational model in **3rd normal form** in the word document (B000xxxstudentnamelab4_5.doc).
6. All work must be uploaded before leaving the lab

Exercise 1:

A library needs a database to record details about its members, its books and what books are out on loan. Members can borrow a number of books, and a book can be borrowed by many members.

For members, the library needs to record their membership number, name, address, contact number and their date of birth.

For each book, the library records the ISBN number, title, author, publisher, print date and number of copies.

When a customer borrows a book, the library records who has the book, and when it's due back.

Exercise 2:

'We Have It" general stores needs you to design a database to manage their business. They need the system to record all items which the shop sells including the item's ID, description, quantity currently in stock and selling price.

The system must also record transactions at the till, which will include a transaction ID, date, time, staff ID, items purchased, quantity purchased and price.

The staff table just needs to include staff ID and staff name.

Staff can raise a purchase order for any supplier set up in the database. The suppliers name, address and phone number is stored in the database. The purchase order will record the items to be purchased, the order quantity and who raised the order. Purchase orders are sent to suppliers.

Exercise 3:

For the table following, convert the table into a set of relations in 3rd normal form. In each step identify if you are handling a 1NF, 2NF and 3NF.

Table 1Non-normalised relation

TransactionNo	Transaction Date	CustID	Item	Qty	Amount
T10	01/10/2014	4	Paint	2	60
T10	01/10/2014	4	Paint Brushes	4	30
T30	02/10/2014	9	Sealer	1	25

Exercise 4:

For the table following, convert the table into a set of relations in 3rd normal form. In each step identify if you are handling a 1NF, 2NF and 3NF.

StudentName	StudentPhone	StudentDept	StudentDeptName	AdvisorName	AdvisorPhone	AdvisorDept	Term
Tolstoy	593-3824	21	English	Caplice	253-3233	ESD	Fall
Thoreau	644-2343	21	English	Caplice	253-3233	ESD	Fall
James	534-2534	21	English	Lapide	253-1111	ESD	Fall
Woolf	643-5436	18	Mathematics	Toomre	253-6322	Mathematics	Spring
Shakespeare	634-6344	8	Physics	Smith	253-8453	Physics	Spring
Pushkin	534-9832	7	Biology	Griffith	253-9833	Bio Engr	Spring