Paper Code : SWL:406
Paper Name : Software Lab VI (DBMS)

Assignment 1
The following tables form part of a database held in a relational DBMS:

Hotel (Hotel_No , Name, Address)
Room (Room_No, Hotel_No, Type, Price)
Booking (Hotel_No, Guest_No, Date_From, Date_To, Room_No)
Guest (Guest_No, Name, Address)

Where Hotel contains hotel details and Hotel_No is the primary key. Room contains room details for each hotel and (Hotel_No, Room_No) forms the primary key.

Booking contains details of the bookings and the primary key comprises (Hotel_No, Guest_No, Date From) and Guest contains guest details and Guest_No is the primary key.

Write the SQL statements for the following:

a. List full details of all hotels in Mumbai.
b. List the names and addresses of all guests in New Delhi, alphabetically ordered by name.
c. List all double or family rooms with a price below Rs.800 per day, in ascending order of price.
d. List the bookings for which no date to has been specified.
e. What is the total daily revenue from all the double rooms?
f. How many different guests have made bookings for August, 2006?
g. List the price and type of all rooms at the hotel Land Mark.
h. What is the total income from bookings for the hotel Manor Today?

Assignment 2

Create an E R diagram and relational schema to hold information about the situation in many institutions affiliated to some University, many teachers of different disciplines are teaching to many students enrolled in many courses offered by the university to the students through the institutions. Use concept of keys, aggregation, generalization, cardinality etc. in a proper way.

Say the schema of respective entities is:

Teacher(T#, Tname, Tqual, Tsubject, Tcourse, Prog)
Student(Roll#., Sname, Sage, Saddress, Scourse.Prog , Smarks)
Teaches(T#, Roll# , Scourse, Prog ,University)

Assignment 3.
Performa following queries in SQL using the above schema:

a. Find details of Teachers who taught DBMS.
b. Find details of students who did MCA from PB University.
c. Find courses taught by T# 5078.
d. Find address of students whose marks are less than 50.

Assignment 4.

Consider the following requirements for a construction company that uses database system to keep track of its projects, workers and material requirements of various projects.

The projects for the company are of two kinds:

(i) Turn key projects and
(ii) Others.

All the projects have a life cycle (Please note that the turn key projects have a maintenance phase in addition). And workers are allotted as per the phase of the project. Each project has its own plan of completion that is drawn at the start of the project. The worker and material requirement of project is calculated at the start of the project.
The store manages the materials. One of the major constraints for the store is that it requires 15 days to acquire a product. Thus, the inventory should fulfill the requirements of the next 15 days.

The store also keeps track of the issue of materials and return of defective materials to various projects.

The company keeps the information of all the clients including the information about the projects that are being maintained by the company (turn key projects).

Draw an ER diagram for the above company. Specify key attributes and constraints of each entity type and of each relationship type. Note any unspecified requirements and make appropriate assumptions to make the specification complete. Also, design the normalized tables with required integrity and security constraints.

Assignment 5.

Assume that a Consumer item lease Company which leases various household items to its clients for their use for a specific period of time, maintains the following tables:

Clients (clientID, name, address, contact Phone)
Itemlist (itemID, itemName, itemCost, purchase Date)
Leaselist (clientID, transactionNO, itemID, startDate, returnDate,
amountTObeCharged)

Note: A client may lease an item many times. Amount to be charged is calculated as per a fixed rate multiplied by number of days item is leased. All items have unique itemID. However, two or more items may have same name.

Create the tables having appropriate referential integrity constraints. Make and state assumptions, if any.

Write and run the following SQL queries on the tables:

a. Find all the client names that have not got any item leased during the last month and no leased item is pending with them.
b. Find the list of all the items that were leased or returned last month.
c. Find the names of all those clients who have given the business to the company in the decreasing order of total amount paid by a client.
d. List the client's details and the items leased to them at present.
e. Find the client who has been leased at least two items.

Assignment 6

Produce an E-R diagram, which documents the entities and relationships involved in the staff management and pay-roll for the employees working in a super market. Create a relational schema to hold information. Identify the tables, perform normalization to the tables and fully implement the code with necessary validations using MS-Access / FOXPRO / DBASE or any other similar package. Provide necessary documentation and coding for the project.

Note: Assumptions can be made wherever necessary

Assignment 7

The NBA (NDHU Basketball Association) is in dire need of a database in order to keep track of the activities in their league.
The entities in the database are

People (with attributes **id**, **name** and **age**),
Teams (with attributes **team name** and **manager**), and
Courts (with attributes **court id**, **address** and **capacity**).

Furthermore, people are specialized into **Referees** and **Players**.

Referees have the extra attribute **level** and
Players have the extra attribute **height**.
Players play in **teams**, and **teams** and **referees** participate in a game that takes place in a court on a certain date.

This league is quite violent and very often players are fouled out by referees. This causes bad relationships between teams and referees and some teams disqualify some referees from refereeing their games.

Some way of recording each game is also required. This will need to store the home and away teams scores.

No player plays for more than one team. Only one game is played on one court on any one day.

a. Produce a set of normalized entities to 1NF. *Add attributes as you think they are required.*
b. Create an ER diagram that models the relationships in the system.

Assignment 8

Normalization of the CAR_SALE Table
The purpose of this exercise is for you to demonstrate your ability to take a database schema and convert it up through the Third Normal Form. Upon completion of this exercise you will have:

a. Listed the functional dependencies for a database schema.
b. Explained why a specific schema is not in Second or Third Normal Form.
c. Normalized a given schema into the Third Normal Form

The below scenario has been created to help you determine the table structures required for each of the subsequent normalized tables.

Scenario

You are given the database schema for a car sales database as follows:

Table Name: CAR_SALE

ColumnName Car_num Date_sold Salesman Commission_percent Discount_amt

KeyType Primary Primary

Assuming that a car can be sold by multiple salesmen and, therefore, the attributes of ar_num and Salesman {Car_num, Salesman} taken together are the primary key for the relation. In addition, you are told that the date the car sells determines the discount amount and that each salesman has a unique commission rate.

Directions

To complete exercise one, you should do the following:

a. Read and complete each of the three steps identified under exercise two.
b. Create a response for each step listed under exercise two.
c. Create your response using MS Word.
d. When appropriate, use the table feature within Word to create your tables.
e. Save the document as identified in the "Labs" section of the roadmap and upload the file in the course communication space drop-box.

Step 1

List the functional dependencies in the relation CAR_SALE. Based on the given primary key, decide if the dependency is

a. Completely dependent on the primary key (primary keydependency),
b. Partially dependent on the primary key (partial key dependency), or
c. Dependent on a non-key column (transitive dependency) for each of the Functional Dependencies you list.

Step 2

Explain why the relation CAR_SALE is not in 2NF or 3NF

Step 3

Normalize the relation CAR_SALE into 3NF. Show your results by providing the resulting table schemas.

Assignment 9

Exam Administration

Consider the following relation that keeps track of the exams taken by students at a University department:

Exam (studID, studName, courseID, courseTitle, acadYear, examSession, mark, degreeCourse)

Suppose the following functional dependencies hold on the relation:

studID -> studName, degreeCourse
courseID -> courseTitle
studID, courseID, acadYear, examSession -> mark
studID, courseID -> acadYear, examSession

a. Decompose the relation in smaller relations such that

– each of the smaller relations is in BNCF with respect to the projection of the original dependencies;
– the decomposition is a lossless join decomposition.

b. Is your decomposition dependency preserving? If your answer is “yes”, argue why. If your answer is “no”, show which dependencies have been lost.

Assignment 10

Wholesale Dealer
Consider the following relation that keeps track of the sales of a wholesale dealer in trousers:

TrousersSold(customerID, customerName, model, size, day, numberSold, price)

Suppose the following functional dependencies hold on the relation:

customerID -> customerName
customerID, model, size, day -> numberSold
model, size -> price
model, price -> size

a. Decompose the relation in smaller relations such that
– each of the smaller relations is in BNCF with respect to the projection of the original dependencies;
– the decomposition is a loss less join decomposition.
b. Is your decomposition dependency preserving? If your answer is “yes”, argue why. If your answer is “no”, show which dependencies have been lost.

Assignment 11

Manufacturing
Consider the following relation that keeps track of the orders placed by a manufacturing company:

Orders(orderDate, deliveryDate, supplier, partID, material, price).

Suppose the following functional dependencies hold on the relation:

orderDate, supplier -> deliveryDate
partID, supplier, orderDate -> price
partID -> material
material -> supplier.

a. Decompose the relation in smaller relations such that
– each of the smaller relations is in BNCF with respect to the projection of the original dependencies;
– the decomposition is a lossless join decomposition.
b. Is your decomposition dependency preserving? If your answer is “yes”, argue why. If your answer is “no”, show which dependencies have been lost.

Assignment 12

Database Schema for the exercise:
Professor (ssn , profname, status, salary)
Course(crscode ,crsname,credits)
Taught(crscode,semester,ssn)

Assumptions:

a. Each course has only one instructor in each semester.
b. All professors have different salaries.
c. All professors have different names.
d. All courses have different names.
e. Status can take value from “full”,”associate” , and “assistant”.

i) Return those professors who have taught “csc6710” but never “csc7710”
ii) Return those professors who have taught “csc6710” and “csc7710” in same semester.
iii) Return those professors who have taught “csc6710 “ or “csc7710” but not both.
iv) Return that course which have never been taught.
v) Return that courses that have been taught atleast in two semester.
vi) Return the names of all professors who have ever taught “csc7710”.
vii) Change all credits to 4 for those courses that are taught in semester “f2006:.
viii) Return the professor who earns second highest salary.
ix) Delete those professors who have never taught.

Assignment 13

a. Create a tables Employee with following columns :
   Employee
   Emp _ no integer NOTNULL
   Emp_fname char(20) NOTNULL
   Emp_lname char(20) not null
   Dept_no char(4) null
b. Create a table Department with following columns:
   Department Table
   Dept_no char(4) not null
   Dept_name char(25) not null
   Location char(30) null
c. Create a table project with following columns:
   Project table:
   Project_no char(4) notnull
   Project_name char(15) not null
   Budget float null
d. Create a table works_on with the following columns:
   Works_on table
   Emp_no integer notnull
   Project_no char(4) notnull
   Job char(15) null

Assignment 14

a. Using INSERT statement enter the following data in the Employee table:
   Emp_no Emp_fname Emp_lname Dept_no
   25348 Mathew Smith D3
   10102 Ann Jones D3

18316 John Barrimore D1
29356 James James D2
9031 Elke Hansel D2
2581 Elsa Bertoni D2
28559 Sybill Moser D1

b. Using INSERT statement enter the following data in the Department table:
Dept_no Dept_name Location
D1 Research Dallas
D2 Accounting Seattle
D3 Marketing Dallas

c. Using INSERT statement enter the following data in the Project table:
Project_no Project_name Budget
P1 Apollo 120000
P2 Gemini 95000
P3 Mercury 185600

d. Using INSERT statement enter the following data in the works_on table
Emp_no Project_no Job
10102 P1 Analyst
10102 P3 Manager
25348 P2 Clerk
18316 P2 Null
29346 P2 Null
2581 P3 Analyst
9031 P1 Manager
28559 P1 Null
28599 P2 Clerk
9031 P3 Clerk
29346 P1 Clerk

Assignment 15

a) See the records of all the tables with SELECT command.
b) List the Employee number of all the clerks.
c) Get the employee numbers for all employees who have a leading job (Analyst or Manager) in project P1.
d) Get the employee number and first name of all employees whose first name starts with A.
e) Find the employee details having Maximum salary.

Assignment 16

a) Find the employee details having second highest salary.
b) Insert the data of a new employee called Jullia Long , whose employee number is 11111. Her department no is not known yet.
c) Change the name of the department of the employee James .The new department name is Sales.
d) Find the employee number for all employees who are clerks or works in Department D3.
e) Create a table Sample and get all the record from employee table with select statement.

Assignment 17

a) Alter table sample , add new column Telephone_no char(12) null.
b) Drop the Column Telephone_no from Sample table.
c) Get the list of all the employee except the employees having emp_no either 10102 or 9031.
d) List the name of the project whose budget lies between 95000 to 12000.

e) Get the names of all the employees whose first name contains the letter “a” as the second character.
f) Get Full details of all the employees whose departments are located in Dallas.
g) Get all jobs of the employees.
h) List the project numbers for all the projects employing less than four persons.