Department of Computer Science
New Mexico State University
CS 482/502 Database Management Systems I

Assignment 1: Relational model and basic SQL

This is an individual assignment.

"ABC media" has a number of digital displays, which are placed in bars and restaurants. Clients can purchase airtime packages for advertising using these digital displays. "ABC media" has hired you as a database administrator to manage the database which store the advertisement related information.

Assume that "ABC media" has decided to have the relational schema for their database.

1. Video (videoCode: integer, videoLength: integer)
2. Model (modelNo: char(10), width: numeric (6,2), height: numeric (6,2), weight: numeric (6,2), depth: numeric (6,2), screenSize: numeric (6,2))
3. Site (siteCode: integer, type: varchar (16), address: varchar(100), phone: varchar(16))
4. DigitalDisplay (serialNo: char(10), schedulerSystem: char(10), modelNo: char(10))
   Foreign key: modelNo references *Model* (*modelNo*)
5. Client (clientId: integer, name: varchar (40), phone: varchar (16), address: varchar (100))
6. TechnicalSupport (empId: integer, name: varchar (40), gender: char (1))
7. Administrator (empId: integer, name: varchar (40), gender: char (1))
8. Salesman (empId: integer, name: varchar (40), gender: char (1))
9. AirtimePackage (packageId: integer, class: varchar (16), startDate: date, lastDate: date, frequency: integer, videoCode: integer)
10. AdmWorkHours (empId: integer, day: date, hours: numeric (4,2))
    Foreign key: empId references *Administrator* (*empId*)
11. Broadcasts (videoCode: integer, siteCode: integer)
    Foreign key: videoCode references *Video* (*videoCode*)
    Foreign key: siteCode references Site (siteCode)
12. Administers (empId: integer, siteCode: integer)
    Foreign key: empId references *Administrator* (*empId*)
    Foreign key: siteCode references *Site* (*siteCode*)
13. Specializes (empId: integer, modelNo: char(10))
    Foreign key: empId references *TechnicalSupport* (*empId*)
    Foreign key: modelNo references *Model* (*modelNo*)
14. Purchases (clientId: integer, empId: integer, packageId: integer, commissionRate: numeric (4,2))
    Foreign key: clientId references *Client* (*clientId*)
    Foreign key: empId references *Salesman* (*empId*)
    Foreign key: packageId references *AirtimePackage* (*packageId*)
15. Locates (serialNo: char (10), siteCode: integer)
    Foreign key: serialNo references *DigitalDisplay* (*serialNo*)
    Foreign key: siteCode references *Site* (*siteCode*)

Answer the following questions.

1. (10 points) How many super keys does the relation Client have? List all the super keys of the Client relation.
2. (10 points) How many primary keys does the relation Purchases have? List all the super keys that the relation Purchases has.
3. (10 points) How many candidate keys does the relation Salesman have? List all the candidate keys that the relation Salesman has.

4. (10 points) Write an SQL statement to find the information of a client named ‘Peter Smith’. Show the client’s id, name, phone number, and address.
5. (10 points) A video is defined to be a short video if its length is shorter than 2. Write an SQL statement to find all the short videos and show the video code of all such short videos.
6. (10 points) Write an SQL statement to find all the sites that are located on ‘University Dr’. Note that an address consists of both the street name and street no. Show the site’s code, type, address, and phone number.
7. (10 points) Write an SQL statement to find the administers who work at the site with site code 111. Show such administers’ id, name, and gender information.
8. (10 points) Write an SQL statement to find the clients who ever purchased packages from the employee named ‘John’. Show such employees’ id, the clients’ id, name, and phone information.
9. (10 points) Write an SQL statement to find the digital displays that locate at the site with site code 112. Show the digital display’s serial nos.
10. (10 points) Write an SQL statement to find the digital displays that locate at the site with site code 112. Show the distinct schedule systems of such displays.
11. (10 points) Write an SQL statement to find all the models whose screen size is bigger than 10 and weight is less than 3. Show all the attributes of those models.
12. (10 points) Write an SQL statement to find all the digital displays that are located in a ‘bar’. Show the serial no, model no, and schedular system of such digital displays.
13. (10 points) An employee is defined to work overtime if he/she works more than 8 hours in a day. Write an SQL statement to find the employees who worked overtime. Show the ids of such employees and the days that the employee worked overtime.

Grading criteria:

- Please use ONE and ONLY ONE SQL statement to answer each question. I.e., to answer each question, if you write multiple small SQL statements, points will be deducted even though the combined multiple SQL statements may answer the question correctly.
- No extra tables should be used in each SQL statement. If you use extra unnecessary tables, points will be deducted.
- Please use standard SQL syntax instead of DBMS specific SQL syntax.

Submission: You have to submit your assignment electronically (through Canvas). Printed copies are not accepted. Please submit.pdf file with name “hw-answer-(your banner id)”. See course syllabus for policies on late submission and plagiarism.