Lab 5: Understanding of SQL

Dr. Keshav Sinha

Question 1

Title: Consider the following set of requirements for a UNIVERSITY database that is used to keep track of students' transcripts.

1. The university keeps track of each student's name, student number, Social Security number, current address and phone number, permanent address and phone number, birth date, sex, class (freshman, sophomore, ..., graduate), major department, minor department (if any), and degree program (B.A., B.S., ..., Ph.D.). Some user applications need to refer to the city, state, and ZIP Code of the student's permanent address and to the student's last name. Both Social Security number and student number have unique values for each student.

a. Each department is described by a name, department code, office number, office phone number, and college. Both name and code have unique values for each department.

b. Each course has a course name, description, course number, number of semester hours, level, and offering department. The value of the course number is unique for each course.

c. Each section has an instructor, semester, year, course, and section number. The section number distinguishes sections of the same course that are taught during the same semester/year; its values are 1, 2, 3, ..., up to the number of sections taught during each semester.

d. A grade report has a student, section, letter grade, and numeric grade (0,1, 2, 3, or 4).

Design an Entity-Relationship diagram for the mail order database and enter the design using a data-modeling tool such as ERWin/free tool. Specify key attributes of each entity type, and structural constraints on each relationship type. Note any unspecified requirements and make appropriate assumptions to make the specification complete.

Question 2

Title. Consider the following set of requirements for a Company database that is used to keep track of employee.

The company is organized into departments. Each department has a unique name, a unique number, and a particular employee who manages the department. We keep track of the start date when that employee began managing the department. A department may have several locations.

a. A department controls a number of projects, each of which has a unique name, a unique number, and a single location.

b. We store each employee's name, Social Security number,2 address, salary, sex (gender), and birth date. An employee is assigned to one department, but may work on several projects, which are not necessarily controlled by the same department. We keep track of the current number of hours per week that an employee works on each project. We also keep track of the direct supervisor of each employee (who is another employee).

c. We want to keep track of the dependents of each employee for insurance purposes. We keep each dependent's first name, sex, birth date, and relationship to the employee.

Design an Entity-Relationship diagram for the company database and enter the design using a data-modeling tool such as ERWin/free tool.

Question 3

Objective: To understand the concept of designing issue related to the database with creating, populating the tables. To understand the concept of data constraints that is enforced on data being stored in the table. Focus on Primary Key and the Foreign Key.

   a. **Create the tables for** Company database as per ER diagram of Exp 2.

TABLE 1: EMPLOYEE
[Fname VARCHAR(15) NOT NULL,
Minit CHAR,

Lname VARCHAR(15) NOT NULL,

Ssn CHAR(9) NOT NULL,

Bdate DATE,

Address VARCHAR(30),

Sex CHAR,

Salary DECIMAL(10,2),

Super_ssn CHAR(9),

Dno INT NOT NULL,

PRIMARY KEY (Ssn),

FOREIGN KEY (Super_ssn) REFERENCES EMPLOYEE(Ssn),

FOREIGN KEY (Dno) REFERENCES DEPARTMENT(Dnumber)

]

TABLE 2: DEPARTMENT

[Dname VARCHAR(15) NOT NULL,

Dnumber INT NOT NULL,

Mgr_ssn CHAR(9) NOT NULL,

Mgr_start_date DATE,

PRIMARY KEY (Dnumber),

UNIQUE (Dname),

FOREIGN KEY (Mgr_ssn) REFERENCES EMPLOYEE(Ssn));

]

 TABLE 3: DEPT_LOCATIONS

(Dnumber INT NOT NULL,

Dlocation VARCHAR(15) NOT NULL,

PRIMARY KEY (Dnumber, Dlocation),

FOREIGN KEY (Dnumber) REFERENCES DEPARTMENT(Dnumber));

TABLE 4: PROJECT

(Pname VARCHAR(15) NOT NULL,

Pnumber INT NOT NULL,

Plocation VARCHAR(15),

Dnum INT NOT NULL,

PRIMARY KEY (Pnumber),

UNIQUE (Pname),

FOREIGN KEY (Dnum) REFERENCES DEPARTMENT(Dnumber));

TABLE 5: WORKS_ON

(Essn CHAR(9) NOT NULL,

Pno INT NOT NULL,

Hours DECIMAL(3,1) NOT NULL,

PRIMARY KEY (Essn, Pno),

FOREIGN KEY (Essn) REFERENCES EMPLOYEE(Ssn),

FOREIGN KEY (Pno) REFERENCES PROJECT(Pnumber));

TABLE 6: DEPENDENT

(Essn CHAR(9) NOT NULL,

Dependent_name VARCHAR(15) NOT NULL,

Sex CHAR,

Bdate DATE,

Relationship VARCHAR(8),

PRIMARY KEY (Essn, Dependent_name),

FOREIGN KEY (Essn) REFERENCES EMPLOYEE(Ssn));

b.   **Insert the following data into their respective tables of Company database.**

DEPARTMENT

DNAME	DNUMBER	MGRSSN	MGRSTARTDATE
Research	5	333445555	1988-05-22
Administration	4	987654321	1995-01-01
Headquarters	1	888665555	1981-06-19

EMPLOYEE

FNAME	LNAME	SSN	BDATE	ADDRESS	SEX	SALARY	SUPERSSN	DNO
John	Smith	123456789	1965-01-09	731 Fondren, Houston TX	M	30000	333445555	5

EMPLOYEE

FNAME	LNAME	SSN	BDATE	ADDRESS	SEX	SALARY	SUPERSSN	DNO
Franklin	Wong	333445555	1965-12-08	638 Voss, Houston TX	M	40000	888665555	5
Alicia	Zelaya	999887777	1968-01-19	3321 Castle, Spring TX	F	25000	987654321	4
Jennifer	Wallace	987654321	1941-06-20	291 Berry, Bellaire TX	F	43000	888665555	4
Ramesh	Narayan	666884444	1962-09-15	975 Fire Oak, Humble TX	M	38000	333445555	5
Joyce	English	453453453	1972-07-31	5631 Rice, Houston TX	F	25000	333445555	5
Ahmad	Jabbar	987987987	1969-03-29	980 Dallas, Houston TX	M	25000	987654321	4
James	Borg	888665555	1937-11-10	450 Stone, Houston TX	M	55000	null	1

PROJECT

PNAME	PNUMBER	PLOCATION	DNUM
ProductX	1	Bellaire	5
ProductY	2	Sugarland	5
ProductZ	3	Houston	5
Computerization	10	Stafford	4
Reorganization	20	Houston	1
Newbenefits	30	Stafford	4

WORKS_ON

ESSN	PNO	HOURS
123456789	1	32.5
123456789	2	7.5
666884444	3	40.0

WORKS_ON

ESSN	PNO	HOURS
453453453	1	20.0
453453453	2	20.0
333445555	2	10.0
333445555	3	10.0
333445555	10	10.0
333445555	20	10.0
999887777	30	30.0
999887777	10	10.0
987987987	10	35.0
987987987	30	5.0
987654321	30	20.0
987654321	20	15.0
888665555	20	null

DEPENDENT

ESSN	DEPENDENT_NAME	SEX	BDATE	RELATIONSHIP
333445555	Alice	F	1986-04-04	Daughter
333445555	Theodore	M	1983-10-25	Son
333445555	Joy	F	1958-05-03	Spouse
987654321	Abner	M	1942-02-28	Spouse
123456789	Michael	M	1988-01-04	Son
123456789	Alice	F	1988-12-30	Daughter
123456789	Elizabeth	F	1967-05-05	Spouse

DEPT_LOCATIONS

DNUMBER	DLOCATION
1	Houston
4	Stafford
5	Bellaire

DEPT_LOCATIONS

DNUMBER	DLOCATION
5	Houston
5	Sugarland

Question 4

Objective: To understand the concept of data constraints that is enforced on data being stored in the table. Focus on Primary Key and the Foreign Key.

1. Create the tables described below:

Table name: CLIENT_MASTER

Description: used to store client information.

Column name	data type	Size	Constraints
CLIENTNO	Varchar	6	Primary key / first letter must start with 'C'
NAME	Varchar	20	Not Null
ADDRESS 1	Varchar	30	
ADDRESS 2	Varchar	30	
CITY	Varchar	15	
PINCODE	Integer	8	
STATE	Varchar	15	
BALDUE	Decimal	10,2	

Table   Name: PRODUCT_MASTER

Description: used to store product information

Column name	data type	Size	Attributes
PRODUCTNO	Varchar	6	Primary Key/ first letter must start with 'P'
DESCRIPTION	Varchar	15	Not Null
PROFITPERCENT	Decimal	4,2	Not Null
UNIT MEASURE	Varchar	10	Not Null
QTYONHAND	Integer	8	Not Null

REORDERL VL	Integer	8	Not Null	
SELLPRICE	Decimal	8,2	Not Null	
COSTPRICE	Decimal	8,2	Not Null	

Table Name: SALESMAN_MASTER

Description: used to store salesman information working for the company.

Column name	data type	Size	Attributes
SALESMANNO	Varchar	6	Primary Key/ first letter must start with 'S'
SALESMANNAME	Varchar	20	Not Null
ADDRESS 1	Varchar	30	Not Null
ADDRESS 2	Varchar	30	
CITY	Varchar	20	
PINCODE	Integer	8	
STATE	Varchar	20	
SALAMT	Real	8,2	Not Null , Cannot be 0
TGTTOGET	Decimal	6,2	Not Null , Cannot be 0
YTDSALES	Double	6,2	Not Null
REMARKS	Varchar	60	

1. **Insert the following data into their respective tables:**

    a) Data for **CLIENT_MASTER** table:

Client no	Name	City	Pincode	State	BalDue
C00001	Ivan bayross	Mumbai	400054	Maharashtra	15000
C00002	Mamta muzumdar	Madras	780001	Tamil nadu	0
C00003	Chhaya bankar	Mumbai	400057	Maharashtra	5000
C00004	Ashwini joshi	Bangalore	560001	Karnataka	0
C00005	Hansel colaco	Mumbai	400060	Maharashtra	2000
C00006	Deepak sharma	Mangalore	560050	Karnataka	0

    b) Data for **PRODUCT_MASTER** table:

Product No	Description	Profit percent	Unit measure	Quantity On hand	Recorder Level	Sell Price	Cost Price

P00001	T-Shirt	5	Piece	200	50	350	250
P0345	Shirts	6	Piece	150	50	500	350
P06734	Cotton jeans	5	Piece	100	20	600	450
P07865	Jeans	5	Piece	100	20	750	500
P07868	Trousers	2	Piece	150	50	850	550
P07885	Pull Overs	2.5	Piece	80	30	700	450
P07965	Denim jeans	4	Piece	100	40	350	250
P07975	Lycra tops	5	Piece	70	30	300	175
P08865	Skirts	5	Piece	75	30	450	300

c) Data for **SALESMAN_MASTER** table:

Salesman No	Name	Address1	Address2	City	Pin Code	State
S00001	Aman	A/14	Worli	Mumbai	400002	Maharashtra
S00002	Omkar	65	Nariman	Mumbai	400001	Maharashtra
S00003	Raj	P-7	Bandra	Mumbai	400032	Maharashtra
S00004	Ashish	A/5	Juhu	Mumbai	400044	Maharashtr(a

2. **Exercise on retrieving records from a table.**
   a. Find out the names of all the clients.
   b. Retrieve the entire contents of the Client_Master table.
   c. Retrieve the list of names, city and the state of all the clients.
   d. List the various products available from the Product_Master table.
   e. List all the clients who are located in Mumbai.
   f. Find the names of salesman who have a salary equal to Rs.3000.

3. **Exercise on updating records in a table**
   a. Change the city of ClientNo 'C00005' to 'Bangalore'.
   b. Change the BalDue of ClientNo 'C00001' to Rs.1000.
   c. Change the cost price of 'Trousers' to rs.950.00.
   d. Change the city of the salesman to Pune.

4. **Exercise on deleting records in a table**

   a.   Delete all salesman from the Salesman_Master whose salaries are equal to Rs.3500.

b.   Delete all products from Product_Master where the quantity on hand is equal to 100.

c.   Delete from Client_Master where the column state holds the value 'Tamil Nadu'.

5. **Exercise on altering the table structure**

   a.   Add a column called 'Telephone' of data type integer to the Client_Master table.

   b.   Change the size off SellPrice column in Product _Master to 10, 2.

6. **Exercise on deleting the table structure along with the data**

   a.   Destroy the table Client_Master along with its data.