CS 34800 Homework 2

Deadline for returning the HW: Monday February 6th, 2012 at the end of the CS 34800 class.
Instructions. Print the homework and mark the reply on the homework.
Return the hard copy of the homework marked with the replies to the instructor at the end of the class.

1. Consider the following schema for the Student table.
   Students (Sid, Fname, Lname, Minit).
   Here Sid is a five digit unique identifier for each student, Fname is the first name of the student, Lname is the last name of the student and Minit is the middle initial of the student.

   Which of the following CREATE TABLE statements accurately reflects the above table definition?

   a) CREATE TABLE Students(Sid DATE, Fname VARCHAR(15), Lname VARCHAR(15), Lname VARCHAR(15),Minit CHAR);
   b) CREATE TABLE Students(Sid NUMBER(5), Fname VARCHAR(15), Lname VARCHAR(15), Lname VARCHAR(15),Minit CHAR);
   c) CREATE TABLE Students(Sid NUMBER(5), Fname VARCHAR(15), Lname VARCHAR(15), Minit CHAR,PRIMARY KEY(Sid));
   d) both b and c

2. Assume that we need to store the phone numbers of people in a database. Each phone number is 10 digits long and we need to store only the phone numbers that begin with area code 765. So the general format of the phone numbers is 765xxxxxxx. Which of the following domain creation statements is suitable for creating a domain to store these phone numbers?

   a) CREATE DOMAIN PHONE_TYPE AS NUMBER(5)
      CHECK(PHONE_TYPE > 7649999999 AND PHONE_TYPE < 7660000000);
   b) CREATE DOMAIN PHONE_TYPE AS NUMBER(10)
      CHECK(PHONE_TYPE > 7649999999 AND PHONE_TYPE < 7660000000);
   c) CREATE DOMAIN PHONE_TYPE AS VARCHAR(10)
   d) both b and c

3. Consider the following schema:
   Employees (eid, ename,age,salary)
   Works (eid ,did, pct_time)
   Dept(did, budget,managerid)

   The Employees table contains the eid (a unique identifier for each employee), name, age and salary of each employee. The Works table stores information about the department where each employee works and the percentage of time the employee works in that department. The Dept table stores the did (a unique identifier for each department), the budget of the department and the manager id.

   eid is the primary key for Employees table, did is the primary key for the Dept table and (eid,did) is the primary key for the Works table. Also the eid and did columns of the Works table are foreign keys to the Employees table and the Dept table respectively.

Which of the following CREATE TABLE statements accurately reflects the primary key and foreign key constraints mentioned above?

a) CREATE TABLE Employees (eid INT, ename VARCHAR(15), age INT, salary DECIMAL(10,2) FOREIGN KEY(eid) references Works);

CREATE TABLE Works (eid INT, did INT, pct_time DECIMAL(4,2), PRIMARY KEY(eid,did));

CREATE TABLE Dept(did INT, budget DECIMAL(10,2), managerid INT, FOREIGN KEY(did) references Works);

b) CREATE TABLE Employees (eid INT, ename VARCHAR(15), age INT, salary DECIMAL(10,2) PRIMARY KEY(eid));

CREATE TABLE Works (eid INT, did INT, pct_time DECIMAL(4,2), PRIMARY KEY(eid,did), FOREIGN KEY(eid) REFERENCES Employees, FOREIGN KEY(did) REFERENCES Dept);

CREATE TABLE Dept(did INT, budget DECIMAL(10,2), managerid INT, PRIMARY KEY(did));

c) both a and b

d) CREATE TABLE Employees (eid INT, ename VARCHAR(15), age INT, salary DECIMAL(10,2) PRIMARY KEY(eid));

CREATE TABLE Works (eid INT, did INT, pct_time DECIMAL(4,2), PRIMARY KEY(eid,did));

CREATE TABLE Dept(did INT, budget DECIMAL(10,2), managerid INT, PRIMARY KEY(did));

4. Consider the following schema:

Sailors(sid,sname,rating,age)
Boats(bid,bname,color)
Reserves(sid,bid,day)

These tables are created using the following CREATE TABLE statements

CREATE TABLE Sailors (sid INT DEFAULT 1, sname VARCHAR(15), rating INT, age INT, PRIMARY KEY(sid));

CREATE TABLE Boats(bid INT DEFAULT 2, bname VARCHAR(15), color VARCHAR(10), PRIMARY KEY(bid));

CREATE TABLE Reserves (sid INT, bid INT, day DATE,
PRIMARY KEY(sid,bid),
FOREIGN KEY(sid) REFERENCES Sailors ON DELETE CASCADE,
FOREIGN KEY(bid) REFERENCES Boats ON UPDATE SET DEFAULT);

Consider the following state of the database after few insertions.

Sailors

sid	sname	rating	age
22	Dustin	7	40
32	Andy	9	25
44	Bob	3	30

Reserves

sid	bid	day
22	101	10/10/00
22	102	10/10/01
32	104	09/29/03
32	102	08/22/10
32	101	09/25/11

Boats

bid	bname	color
101	Interlake	blue
102	Interlake	red
103	Clipper	green
104	Marine	red

What will be the state of the Reserves table when the following statement is executed?

DELETE FROM Sailors WHERE sid = 22

a) Reserves

sid	bid	day
22	101	10/10/00
22	102	10/10/01
32	104	09/29/03
32	102	08/22/10
32	101	09/25/11

b) Reserves

sid	bid	day
32	104	09/29/03
32	102	08/22/10
32	101	09/25/11

c) Reserves

sid	bid	day
1	101	10/10/00
1	102	10/10/01
32	104	09/29/03
32	102	08/22/10
32	101	09/25/11

d) Reserves

sid	bid	day
NULL	101	10/10/00
NULL	102	10/10/01
32	104	09/29/03
32	102	08/22/10
32	101	09/25/11

5. Consider the schema, CREATE TABLE statements and database state given in question 4. What will be the state of the Reserves table when the following statement is executed?

UPDATE Boats SET bid = 5 where bid =102;

a) Reserves

sid	bid	day
22	101	10/10/00
22	102	10/10/01
32	104	09/29/03
32	102	08/22/10
32	101	09/25/11

b) Reserves

sid	bid	day
22	101	10/10/00
32	104	09/29/03
32	101	09/25/11

c) Reserves

sid	bid	day
22	101	10/10/00
22	2	10/10/01
32	104	09/29/03
32	2	08/22/10
32	101	09/25/11

d) Reserves

sid	bid	day
22	101	10/10/00
22	5	10/10/01
32	104	09/29/03
32	5	08/22/10
32	101	09/25/11

6. Consider the tables and the database state given in question 4. Consider the query
SELECT B.color FROM Sailors S, Reservers R,Boats B
WHERE S.sid = R.sid AND R.bid = B.bid AND S.sname = 'Andy' ORDER BY B.color;
What is the result of the following query?
   a) red
      green
   b) blue
      red
   c) blue
      red
      red
   d) green
      red

7. Consider the tables and the database state given in question 4. Consider the query
'Find the names of sailors who have reserved a red boat'
Which of the following SQL statements correspond to the above query?
   a) SELECT S.sname FROM Sailors S, Reserves R WHERE S.sid = R.sid;
   b) SELECT S.sname FROM Sailors S, Reserves R,Boats B WHERE S.sid = R.sid AND B.color = 'red';
   c) SELECT S.sname FROM Sailors S, Reserves R,Boats B WHERE S.sid = R.sid AND R.bid = B.bid AND B.color = 'red';
   d) both b and c

8. Consider the tables and the database state given in question 4. Consider the query
'Find the names of sailors who have reserved a red or a green boat'
Which of the following SQL statements correspond to the above query?
   a) SELECT sname FROM Reserves R, Boats B WHERE R.bid = B.bid AND (B.color = 'red' OR B.color = 'green');
   b) SELECT S.sname FROM Sailors S, Reserves R, Boats B WHERE S.sid = R.sid AND R.bid = B.bid AND (B.color = 'red' OR B.color = 'green');
   c) SELECT sname FROM Sailors,Reserves, Boats WHERE Sailors.sid = Reserves.sid AND Reserves.bid = Boats.bid AND (Boats.color = 'red' OR Boats.color = 'green');
   d) both b and c

9. Consider the tables, database state and the CREATE TABLE statements given in question 4. The CREATE TABLE statements give the primary and foreign key constraints associated with the tables.
   Consider the following SQL statements
   I. INSERT INTO Sailors VALUES (22, 'Rusty', 8, 25);
   II. INSERT INTO Sailors (sname, rating) VALUES ('Zorba',10);
   III. UPDATE Reserves SET sid = 12 WHERE bid = 104;
   IV. INSERT INTO Sailors VALUES(100,'Horatio',9,26);
   Assume that the DBMS provides checking for all constraints and each statement is independently executed on the database state given in question 4.

   Which of the above SQL statements are rejected by the SQL database due to constraint violations?

   a) all of the above
   b) both III and IV
   c) none of the above (All statements are accepted and executed by the DBMS)
   d) I, II and III

10. Consider the tables, database state and the CREATE TABLE statements given in question 4.
    Consider the query
    'Find the sids of sailors who have a rating of 10 and reserved boat with bid 104'
    Which of the following SQL statements correspond to the above query?

    a) SELECT S.sid FROM Sailors S, Reserves R, Boats B WHERE S.sid = R.sid AND R.bid=B.bid AND B.bid = 104;

    b) (SELECT sid FROM Sailors WHERE rating = 10) INTERSECT (SELECT sid FROM Reserves WHERE bid = 104);

    c) (SELECT sid FROM Sailors WHERE rating = 10) UNION (SELECT sid FROM Reserves WHERE bid = 104);

    d) SELECT S.sid FROM Sailors S, Reserves R, Boats B WHERE S.sid = R.sid AND R.bid=B.bid AND S.rating = 10;