Practice Questions for Final Exam
CMPS 182, Summer 2017, UCSC

These are sample questions for the post-midterm material (but remember the final exam is cumulative.)

Question 1: What is an advantage of using Stored Procedures (such as Persistent Stored Modules, or PSMs)?

Question 2: What is an advantage of XML over relational models?

Question 3: Assume that relation R(A,B,C,D) includes the row (1,2,3,4), and that R has Functional Dependencies {A,B} → {C} and {C} → {D}. (Note: by convention, these could also be written without the curly braces.) Mark each row below with a check if it might also be in R, and mark each row below with an X if it cannot also be in R.

_____ (1,2,4,7) _____ (1,3,8,9) _____ (1,2,3,5) _____ (2,2,4,6) _____

Question 4: Is the following relation with the specified Functional Dependencies in **Third Normal Form**? The following are both keys: {zip, street} and {city, street}.

(Important caveat: to be complete and certain, one needs to consider *all* functional dependencies, not just those that are given in the problem statement. There may well be other FDs that are implied by the given ones. However, to avoid doing too much "busy work", for this problem we assume that it is sufficient to test the given FDs.)

R(city, street, zip)
{city, street} → {zip}
{zip} → {city}

YES NO

Question 5: Is the same relation with the specified Functional Dependencies in **Boyce Codd Normal Form**? (Same relation, keys, and FDs as in question 4. Also, same caveat applies.)

YES NO

Question 6: Here are declarations of two relations R and S:

```
CREATE TABLE S(
    c INT PRIMARY KEY,
    d INT
);
CREATE TABLE R(
    a INT PRIMARY KEY,
    b INT,
    CHECK(b IN (SELECT c FROM S))
);
```

R(a,b) currently contains the four tuples (0,4), (1,5), (2,4), and (3,5).
S(c,d) currently contains the four tuples (2,10), (3,11), (4,12), and (5,13).

For each of the following modifications, circle YES or NO to indicate whether or not the modification is allowable. (In other words, YES it *would* be allowed, or NO it *would not* be allowed.) Note: Each of these 4 modifications is a separate problem, starting with the 8 tuples listed above. That is, this does *not* represent a *sequence* of modifications.

YES NO Inserting (7,3) into R.
YES NO Inserting (3,1) into S.
YES NO Updating (3,5) in R to be (3,1).
YES NO Deleting (5,13) from S.

Note: This question was based on one of our Gradiance questions. Reminder: if you revisit the Gradiance questions after their due dates, the system shows you a more complete explanation.

Question 7: Relation R has schema:

```
CREATE TABLE R (
    a INT PRIMARY KEY,
    b INT DEFAULT 0,
    c INT NOT NULL
);
```

R is currently empty.

For each of the following insertions, circle YES or NO to indicate whether or not the modification is allowable. Note: Each of these 4 modifications is a separate problem, starting with R empty. That is, this does *not* represent a *sequence* of modifications.

YES NO INSERT INTO R VALUES(1,NULL,2);
YES NO INSERT INTO R(c,a,b) VALUES(3,4,5);
YES NO INSERT INTO R(b,a) VALUES(5,6);

YES NO INSERT INTO R(b,c) VALUES(3,4);

Question 8a:

```
CREATE TABLE Employee (
    empNum INT PRIMARY KEY,
    name CHAR(30) NOT NULL,
    deptNum INT,
    salary INT
 );
```

How would you change the CREATE statement above if we wanted to enforce Referential Integrity by making deptNum in the Employee table be a foreign key referring to a deptNum attribute in a Department table?

Question 8b: Now assume that the following table declaration is used to create the Department table mentioned in Question 8a:

```
CREATE TABLE Department (
    deptNum INT,
    deptName CHAR(30) NOT NULL
 );
```

What change to this CREATE statement is needed to make your foreign key, in your answer to Question 8a, legal?

Question 8c: Describe two (out of the three) different actions that might be taken if a department that had employees in it was deleted from the Department table.

Question 9: Do Textbook Exercise 7.1.1, all parts.

Question 10: Do Textbook Exercise 7.2.1.

Question 11: Do Textbook Exercise 7.2.4.

Question 12: Do Textbook Exercise 7.5.2 (b), 7.5.3 (a), and 7.5.3 (b).

Note: These complete trigger problems are for study and practice. Any trigger problem on the exam will be smaller and more focused than this.

Question 13: Assume that a JDBC connection myCon has been established to a database that has a table Sells(bar, beername, price), where bar and beername are character strings and price is float.

Print out all the beernames and prices that are sold at 'GoodBar'. Don't bother with including libraries or variable declarations, and you can have an informal print statement if you want. Here 's an outline of what you need to write:

```
// Execute the query
// Loop through the results
    // For each value in the result, get the values of beername and price, and print them
```

Question 14a: Refer to Figure 11.5 in Textbook Chapter 11. Show how you would add the facts that Star Wars was directed by George Lucas and produced by Gary Kurtz. (If you need new tags, you can make them up.)

Question 14b: In addition, add elements for 2 more movies: *Empire Strikes Back and Return of the Jedi,* including the facts that Carrie Fisher and Mark Hamill appeared in both of these. (It's OK to omit the Year elements for these 2 films.)

Question 15: does the XML document shown in Textbook Figure **11.3** conform to the XML SCHEMA shown in Textbook Figures 11.19 and 11.20?

YES NO

If not, describe something in the document that is a violation of one or both of the schemas, and explain what's the problem.

Question 16: does the XML document shown in Textbook Figure **11.5** conform to the XML SCHEMA shown in Textbook Figures 11.19 and 11.20?

YES NO

If not, describe something in the document that is a violation of one or both of the schemas, and explain what's the problem.

Question 17: Normal forms help avoid anomalies. We discussed 3 types of anomalies (Update, Delete and Insert) in class. Explain 2 of these 3 anomalies, giving examples of the problems that could arise.

You may use this table Employee(eid, name, addr, rank, salary-scale), with the Functional Dependency rank → salary-scale, to discuss the anomalies, if you want.

eid	name	addr	rank	salary-scale
34-133	Jane	Elm St.	6	70-90
33-112	Hugh	Pine St.	3	30-40
26-002	Gary	Elm St.	4	35-50
51-994	Ann	South St.	4	35-50
45-990	Jim	Main St.	6	70-90
98-762	Paul	Walnut St.	4	35-50