

CMPS 182, Midterm Exam, Winter 2016, Shel Finkelstein

Student Name: _____

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Midterm Points

Part	Max Points	Points
I	36	
II	20	
III	32	
IV	18	
Total	106	

Part I: (36 points, 6 each):

Question 1: Assume that R is a relation that has 10 tuples in it, and S is a relation that has 8 tuples in it. How many tuples are there in the result of the following SQL query?

```
SELECT *  
FROM R, S;
```

Answer 1: _____

Question 2: Let R(A,B,C) be a relation, where attributes A, B and C can't be NULL, and where A is the primary key for that relation. Assume that A's domain has 12 different values, B's domain has 5 different values, and C's domain has 2 different values. What is the maximum number of different tuples that can be in R?

Answer 2: _____

Question 3: What do the following statements do?

```
DELETE FROM Employees;
```

```
DROP TABLE Employees;
```

Answer 3:

DELETE statement does the following:

DROP statement does the following:

Question 4: We discussed the ACID properties for transactions. What do the A, C, I and D in ACID stand for? Also, explain what one of those 4 properties means. (If you explain more than one, only the first will be graded.)

Answer 4:

A

C

I

D

Explanation of one of the above:

Question 5:

- a) Give one reason why primary keys of relations have indexes.
- b) There could be indexes on all attributes of relations, but there aren't. Give one reason why aren't all attributes indexed?

Answer 5a):

Answer 5b):

Question 6A: SQL uses 3-valued logic, with TRUE, FALSE and UNKNOWN. Fill in the truth table for OR.

Answer 6A:

P	Q	P or Q
TRUE	TRUE	
TRUE	FALSE	
TRUE	UNKNOWN	
FALSE	TRUE	
FALSE	FALSE	
FALSE	UNKNOWN	
UNKNOWN	TRUE	
UNKNOWN	FALSE	
UNKNOWN	UNKNOWN	

Part II: (20 points, 5 each)

The following questions concern a table that was created by the statement:

```
CREATE TABLE Employees (  
    name          CHAR(30) ,  
    salary        INTEGER,  
    age           INTEGER,  
    department    CHAR(5) NOT NULL DEFAULT ('Sales');  
    PRIMARY KEY (name)  
);
```

Answer each questions with **TRUE** or **FALSE**.

Question 6B: department can never have value NULL, but any other attribute could be NULL.

Answer 6B: _____

Question 7: The answer to the query:

```
SELECT COUNT(*)  
FROM Employees;
```

might be a larger number than the answer to the query:

```
SELECT COUNT(salary)  
FROM Employees;
```

Answer 7: _____

Question 8: The following is a legal SQL query:

```
SELECT department, MIN(age), MAX(age)  
FROM EMPLOYEES  
WHERE salary > 9000  
GROUP BY department;
```

Answer 8: _____

Question 9: If ('Smith', 6000, 21, 'Sales') is a tuple in the Employees table, and the following is executed, with no other work going on:

```
BEGIN TRANSACTION;
```

```
UPDATE Employees  
SET salary = salary + 1000  
WHERE name = 'Smith';
```

```
UPDATE Employees  
SET salary = salary + 500  
WHERE department = 'Sales';
```

```
ROLLBACK TRANSACTION;
```

then afterwards, Smith's salary will be 7500.

Answer 9: _____

Part III: (32 points, 8 each):

Questions 10-13 are about the instances of the tables Customers, Slopes and Activities on the sheet at the back of the test.

Show attribute names at the top for all SQL results.

Question 10: What is the result of the following SQL query:

```
SELECT *  
FROM Customers  
WHERE age >= 20;
```

Answer 10:

Question 11: What is the result of the following SQL query:

```
SELECT DISTINCT color
FROM Slopes
WHERE EXISTS ( SELECT *
                FROM Activities
                WHERE Slopes.slope-id = Activities.slope-id );
```

Answer 11:

Question 12: What is the result of the following SQL query:

```
SELECT c.cname, s.sname  
FROM Activities a, Customers c, Slopes s  
WHERE a.cid = c.cid  
AND a.slope-id = s.slope-id  
AND a.day = '01/07/09';
```

Answer 12:

Question 13: What is the result of the following SQL query:

```
SELECT type, MAX(age)
FROM Customers
GROUP BY type
ORDER BY type;
```

Answer 13:

Part IV: (18 points, 9 each):

Question 14-15 are also about the relations Customers, Activities and Slopes that appear at the end of the test. For these questions, you should write SQL queries that are correct for any instances of the relations, not just for the data shown.

(If you want to create and then use views to answer these questions, that's okay, but it's not required.)

Question 14: Write a SQL query whose result is the age for customers whose level is Beginner and who had an activity on 01/06/09. The result should only include age, and shouldn't include any age more than once.

Answer 14:

Question 15: Write a SQL query that determines the total number of activities that took place on each slope. Your result should show the slope-id, the name of the slope and the total number of activities on it. But don't include any slopes that had no activities on them.

Answer 15:

For Part III-IV (Questions 10-15), here are the relations Customers, Activities and Slopes that describe customer participation in winter activities on slopes.

- cid is the primary key for Customers, slope-id is the primary key for Slopes, and (cid, slope-id) is the primary key for Activities.

Customers

<u>cid</u>	cname	level	type	age
36	Cho	Beginner	snowboard	18
34	Luke	Inter	snowboard	25
87	Ice	Advanced	ski	20
39	Paul	Beginner	ski	33

Activities

<u>cid</u>	<u>slope-id</u>	day
36	s3	01/05/09
36	s1	01/06/09
36	s1	01/07/09
87	s2	01/07/09
87	s1	01/07/09
34	s2	01/05/09

Slopes

<u>slope-id</u>	sname	color
s1	Mountain Run	blue
s2	Olympic Lady	black
s3	Magic Carpet	blue
s4	KT-22	green