UNIVERSITY OF VICTORIA

PRACTICE EXAMINATION #3

(SQL & Transactions)

CSC 370: Database Systems

(0 hours, 45 minutes)

This examination consists of ten equally-weighted multiple choice questions. You should record your solutions in the provided bubble sheet. Each question has a single best solution; if you record more than one solution for the same question, you will receive a score of zero on that question. If you answer x questions correctly, then your grade on the exam will be x/10, i.e., you must answer at least five questions correctly to pass. This exam is closed-book: you are welcome to bring with you empty pages and a single-sided A4/US letter note sheet, but you cannot bring other notes nor electronic devices to your desk. Please confirm immediately after the exam starts that you have all ? pages and ten questions.

Sections: A01, A02, A03

CRN's: 10874, 10875, 14303

Instructors: Mr. Yichun Zhao + Dr. Sean Chester

Data		
x	y	z
1	'foo'	'9 July'
2	'bar'	'13 Aug'
3	'foobar'	NULL

Question 1

You are provided with the table "Data", below in which *x* is the primary key. Which of the three provided queries could plausibly add a new tuple to the table?

(a) INSERT INTO Data(y) VALUES(NULL);

(b) INSERT INTO Data VALUES(1, NULL, NULL);

(c) INSERT INTO Data(y,x,z) VALUES(NULL, NULL, NULL)

Question 2

You are provided with the table "Data", below in which *x* is the primary key.Which of the three provided queries would be the best choice if you wanted to remove all tuples from that table?

(a) DELETE * FROM Data;

(b) DELETE FROM Data WHERE y LIKE 'foo%' OR x <3;

(c) DROP TABLE Data;

Question 3

Which of the following SQL statements creates a database constraint?

(a) ALTER TABLE R MODIFY x INT CHECK(x > 0);

(b) DELETE FROM S WHERE S.x <= 0;

(c) SELECT * FROM T WHERE T.x > 0;

(d) All of the above

Question 4

Which of the scenarios below best describes an example of the *Consistency* property being violated?

(a) One transaction runs twice and produces a different result each time

(b) A transaction commits a duplicate primary key value

(c) A transaction causes non-deterministic (i.e., random) behaviour

Question 5

A table and a SQL query are specified below. Indicate which of the three specified tuples would be returned by this query if executed on this table using MySQL with default settings.

R		
x	**y**	**z**
1	1	'Alice'
1	2	'Eve'
1	3	'Eve'
2	4	'Carol'
3	5	'Eve'
4	6	'Bob'

```
SELECT x, COUNT(z)
FROM R
GROUP BY x;
```

(a) (1,2)

(b) (1,3)

(c) (1,4)

Question 6

A pair of tables and a SQL query are specified below. Indicate which of the three specified tuples would ***not*** be returned by this query if executed on these tables using MySQL 11 with default settings.

R		
x	**y**	**z**
1	1	'Alice'
1	2	'Eve'
1	3	'Eve'
2	4	'Carol'
3	5	'Eve'
4	6	'Bob'

S		
t	**u**	**v**
1	NULL	'a'
2	4	'b'
3	2	'a'
4	5	'b'
5	3	'a'
6	2	'b'

```
SELECT *
FROM R
        JOIN S ON (R.x = S.u);
```

(a) (1,1,'Alice',1,NULL,'a')

(b) (2,4,'Carol',2,'b')

(c) Neither of these tuples would be returned by this query

(d) Both of these tuples would be returned by this query

Question 7

Which of the behaviours written below best describe the effect of this trigger?

```
DELIMITER //
CREATE TRIGGER t
AFTER INSERT ON R
FOR EACH ROW
BEGIN
        IF NEW.x > NEW.y THEN
                SET NEW.x = NEW.y;
        END IF;
END; //
DELIMITER ;
```

(a) This trigger has no effect / is invalid

(b) If a tuple is added to R then *all* tuples that have a larger x value than y value will be updated to have equal x and y values

(c) It ensures that no tuples can be added to R in which the value for the x attribute is larger than the value for the y attribute

Question 8

You have tables corresponding to the relations below and you would like to retrieve all states that have fewer than 30 counties.

Which of the three proposed queries is the simplest one of the three that is correct?

County(county_id, state_id, name)

State(state_id, name)

```
(a) SELECT *
      FROM County
      NATURAL JOIN State
      GROUP BY state_id
      HAVING COUNT(*) <30;

(b) SELECT *
      FROM State
      WHERE state_id NOT IN (
      SELECT state_id
      FROM County
      WHERE COUNT(*) <30
      );

  (c) SELECT *
      FROM State
      NATURAL JOIN (
            SELECT state, COUNT(*) As num
            FROM County
            GROUP BY state
      ) AS Subquery
      WHERE Subquery.num <30;
```

Question 9

You have a table Enrollments described by the relation below.

Enrollments(student_id, course_id, semester, grade)

What is the effect on the Enrollments table of executing the following two queries in sequence?

```
CREATE VIEW `SummerEnrollments` AS (
        SELECT *
        FROM Enrollments
        WHERE semester = '202205'
);

DELETE
FROM SummerEnrollments
WHERE student_id = 123456;
```

(a) This query will remove the student with id=123456 from all Summer 2022 courses in which they are enrolled

(b) This query will remove the student with id=123456 from all courses in which they are enrolled, irrespective of the semester

(c) This query will only remove the student with id=123456 from the view;
if we recreate the view from scratch, the student's summer enrollments will be restored

Question 10

You have a MySQL 11 database in which the following relations have been created as tables.

The tables currently have *no* indexes. Which of the three queries below would **not** create a new index?

Employee(employee_id, department_id, job_title)

Department(department_id, name, manager)

(a) ALTER TABLE Employee ADD INDEX (employee_id, department_id)

(b) ALTER TABLE Employee ADD FOREIGN KEY (department_id) REFERENCES Department(id);

(c) ALTER TABLE Employee ADD UNIQUE KEY(employee_id, department_id);