

Quiz #2

Variant 2

Part 1 (5 points)

Please answer the following MCQ:

1. Suppose relation $R(A,C)$, $S(B,C,D)$ has the following tuples:

A	C
1	2
3	4
5	6

B	C	D
2	4	6
4	6	8
4	7	9

Compute the natural join of R and S. Assume each tuple has schema (A,B,C,D).

2. Suppose relation $R(A,B,C)$ has the following tuples:

A	B	C
1	2	3
4	2	3
4	5	6
2	5	3
1	2	6

and relation $S(A,B,C)$ has the following tuples:

A	B	C
2	5	3
2	5	4
4	5	6
1	2	3

Compute the intersection of the relations R and S.

3. Consider the following query:

```
Select * From Student, Apply, College
Where Student.sID = Apply.sID and Apply.cName = College.cName
And Student.GPA > 1.5 And College.cName < 'Cornell'
```

Suppose we are allowed to create two indexes, and assume all indexes are tree-based. Which two indexes do you think would be most useful for speeding up query execution?

- A. Student.sID, College.cName
- B. Student.sID, Student.GPA
- C. Apply.cName, College.cName
- D. Apply.sID, Student.GPA

4. Consider a database containing two relations

```
Borrower(customer-name, loan-number)
Loan(loan-number, amount)
```

We define a view loan-info as

```
CREATE VIEW loan-info as
    SELECT customer-name, amount
    FROM Borrower, Loan
    WHERE Borrower.loan-number=Loan.loan-number
```

Consider the following insertions

- I. INSERT INTO Borrower VALUES ('Johnson', null)
INSERT INTO Loan VALUES (null,1900)
- II. INSERT INTO Borrower VALUES ('Johnson', 1209)
INSERT INTO Loan VALUES (1209,1900)

Which of the above operations will have the effect of inserting tuple ("Johnson",1900) into *loan-info* (assuming it is not there previously) and why?

5. Consider the following SQL table declaration:

```
CREATE TABLE R (a INT, b INT, c INT, CHECK( [fill-in] ));
```

Currently R contains the tuples (1,4,14), (2,3,15), and (3,3,16). Which of the following tuple-based CHECK constraints will cause the following insertion to be rejected?

```
INSERT INTO R VALUES (4,4,9);
```

- A. $b < (\text{SELECT MIN}(c) \text{ FROM } R)$

- B. $b > (\text{SELECT AVG}(a) \text{ FROM } R)$
- C. $c \geq (\text{SELECT SUM}(b) \text{ FROM } R)$
- D. $a \leq \text{ALL} (\text{SELECT } c - b \text{ FROM } R)$

Part 2 (5 points)

Please write SQL queries for following tasks. Consider following schemas:

Movie

mID	title	year	director
101	Gone with the Wind	1939	Victor Fleming
102	Star Wars	1977	George Lucas
103	The Sound of Music	1965	Robert Wise
104	E.T.	1982	Steven Spielberg
105	Titanic	1997	James Cameron
106	Snow White	1937	<null>
107	Avatar	2009	James Cameron
108	Raiders of the Lost Ark	1981	Steven Spielberg

Reviewer

rID	name
201	Sarah Martinez
202	Daniel Lewis
203	Brittany Harris
204	Mike Anderson
205	Chris Jackson
206	Elizabeth Thomas
207	James Cameron
208	Ashley White

Rating

rID	mID	stars	ratingDate
201	101	2	2011-01-22
201	101	4	2011-01-27
202	106	4	<null>
203	103	2	2011-01-20
203	108	4	2011-01-12
203	108	2	2011-01-30
204	101	3	2011-01-09
205	103	3	2011-01-27
205	104	2	2011-01-22

6. List movie titles and average ratings, from highest-rated to lowest-rated. If two or more movies have the same average rating, list them in alphabetical order.
7. For each movie that has at least one rating, find the lowest number of stars that movie received. Return the movie title and number of stars. Sort by movie title.
8. Some reviewers didn't provide a date with their rating. Find the names of all reviewers who have ratings with a NULL value for the date.
9. Create materialized view for the next statement. Find the titles of all movies directed which have review from Ashley White.
10. Create index to speeding up previous query.