

Gradiance Online Accelerated Learning

Homework Assignment Submitted Successfully.

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- Home Page
- Assignments Due
- Progress Report
- Handouts
- Tutorials
- Homeworks
- · Lab Projects
- Log Out

Help

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You obtained a score of 105.0 points, out of a possible 105.0 points. You have answered all the questions correctly.

Congratulations, you have achieved the maximum possible score.

Submission number: 515396 **Submission certificate:** HJ871058

Submission time: 2020-02-18 11:09:15 PST (GMT - 8:00)

| Number of questions: | 7 |
|-------------------------------|------|
| Positive points per question: | 15.0 |
| Negative points per question: | 0.0 |
| Your score: | 105 |

1. Suppose relation R(a, b, c, d, e) currently has the tuples: R

| a | b | c | d | e |
|---|---|---|---|---|
| 1 | 4 | 3 | 7 | 3 |
| 2 | 1 | 4 | 3 | 3 |
| 5 | 3 | 1 | 2 | 2 |
| 3 | 8 | 5 | 1 | 7 |

Which of the following tuples is in the generalized projection PROJ_{b, d - a, 3 * e(R)?

- a) (4, 2, 9)
- b) (3,3,4)
- (4,6,9)
- d) (1, 2, 3)

Answer submitted: c)

You have answered the question correctly.

2. Suppose relation R(L, M, N) has the tuples:

| L | M | N |
|---|---|---|
| 1 | 1 | 2 |
| 2 | 1 | 1 |
| 2 | 3 | 2 |
| | | |

| 1 | 1 | 1 |
|---|---|---|
| 3 | 2 | 1 |
| 1 | 1 | 3 |

Using bag projection and intersection, compute $\Pi_{(L,M)}(R) \cap \varrho_{S(L,M)}(\Pi_{(M,N)}(R))$. Note that the renaming is only to give the two projections the same schema. Which of the following is true about the tuples that appear in the result?

- a) (3, 2) does not appear in the result.
- b) (2, 3) does not appear in the result.
- c) (1, 3) appears once in the result.
- d) (3, 2) appears twice in the result.

Answer submitted: **b**)

You have answered the question correctly.

3. Consider the relational database shown below:

```
student(studentname, street, city)
```

study(studentname, universityname, SAT)

university(universityname, city)

tutor(tutorname, personname)

Identify the correct relational algebra expression for the queries shown below.

Assume the following notations:

- Π Projection
- ∞ Natural Join
- σ Selection
- × Products
- a) Find the names and cities of residence of all students who study at NC State University. $\Pi_{studentname, city}(student \circ (\sigma_{universityname="NC State University"}(study)))$
- b) Find the names of all students in this database who live in the same city as the university for which they study. $\Pi_{\text{studentname}}$ (student ×(study ∞ university))
- c) Find the names and cities of residence of all employees who work for First Bank Corporation. $\Pi_{studentname, city}(student \times (\sigma_{universityname="NC State University"}(study)))$
- d) Find the names of all students whose SAT score is greater than the SAT score for every student of NC State University. $\Pi_{studentname}(study) (\sigma_{study.studentname}(study) \sim study.SAT <= study2.SAT and study2.universityname = "NC State University" Q study2(study)))$

Answer submitted: a)

You have answered the question correctly.

4. Suppose relation R1(L, M) has the tuples:

R1

| | 1 |
|---|---|
| L | M |
| 7 | f |
| 3 | d |
| 4 | e |
| 6 | d |
| 1 | a |
| 9 | b |
| 3 | j |

and suppose relation R2(M,N) has the tuples:

R2

| _ | _ |
|---|---|
| M | N |
| c | 3 |
| d | 2 |
| b | 6 |
| i | 5 |
| e | 3 |

Identify which of the following (L,M,N) tuples can result from the left natural outer-join of R1 and R2.

- a) (1, a, 6)
- b) (6, d, 3)
- c) (3, d, 2)
- d) (null, null, null)

Answer submitted: **c**)

You have answered the question correctly.

5. Suppose relation R(A, B, C, D) has the tuples:

| A | В | C | D |
|---|---|---|---|
| 2 | 2 | 3 | 3 |
| 3 | 2 | 4 | 4 |
| | 3 | | |
| 3 | 3 | 2 | 5 |
| 4 | 4 | 3 | 3 |
| 4 | 4 | 4 | 4 |
| 5 | 3 | 5 | 2 |
| 3 | 2 | 2 | 5 |
| 5 | 2 | 3 | 3 |
| 5 | 2 | 4 | 4 |

Using bag projection and difference, compute

$$\pi_{A,B}(R) - \varrho_{S(|A,B)}(\pi_{C,D}(R)).$$

Note that the remaining is only to give the two projections the same schema.

Which of the following is true about the tuples that appear in the result?

- a) (5, 2) appears once in the result.
- b) (5, 3) appears once in the result.
- c) (2, 2) does not appear in the result.
- d) (5, 3) appears twice in the result.

Answer submitted: **b**)

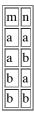
You have answered the question correctly.

6. Here are three relations, R1(m, n), R2(m, n), and R3(m, n). Their current values are:

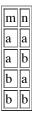
R1

| m | n |
|---|---|
| a | a |
| a | b |
| b | a |
| b | b |

R2



R3



Compute the result of the following query:

SELECT R1.m, R1.n, R2.n, R3.n FROM R1, R2, R3 WHERE R1.n = R2.m AND R2.n ⇔ R3.n AND R3.m ⇔ b;

Identify in the list below the true statement about whether or not a tuple appears in the output and how many times it appears in the output.

- a) (b, b, b, a) appears twice.
- b) (b, b, a, a) does not appear.
- c) (a, b, b, a) does not appear.
- d) (a, b, b, b) appears once.

Answer submitted: **b**)

You have answered the question correctly.

7. Suppose relation R(X, Y, Z) has the tuples:

| X | Y | Z |
|---|---|---|
| 2 | 6 | 5 |
| 5 | 6 | 1 |
| 9 | 0 | 1 |
| 9 | 0 | 7 |
| 5 | 6 | 5 |

Compute the bag union of the following four expressions, each of which is the bag projection (PI) of a grouping (GAMMA) operation using renaming (RHO):

- 1. $PI_A(RHO_R\{X, Y, A\}(GAMMA_\{X, Y, AVG(Z)\}(R)))$
- $2.\ PI_A(RHO_R\{Y,A\}(GAMMA_\{Y,SUM(Z)\}(R)))\\$
- $3. PI_A(RHO_R\{X, A\}(GAMMA_\{X, MIN(Z)\}(R)))$
- $4. PI_A(RHO_R\{Y, A\}(GAMMA_\{Y, MAX(X)\}(R)))$

Demonstrate that you have computed this bag correctly by identifying, from the list below, the correct count of occurrences for one of the elements.

- a) 5 appears exactly two times.
- b) 8 appears exactly three times.
- c) 1 appears exactly three times.
- d) 5 appears exactly three times.

Answer submitted: **d**)

You have answered the question correctly.