



Gradiane Online Accelerated Learning

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- [Home Page](#)
- [Assignments Due](#)
- [Progress Report](#)
- [Handouts](#)
- [Tutorials](#)
- [Homeworks](#)
- [Lab Projects](#)
- [Log Out](#)

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Help

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

A	B	C	D
2	2	3	3
3	2	4	4
3	3	5	2
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

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

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?

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

Answer submitted: **a)**

You have answered the question correctly.

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

R1



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

Answer submitted: **a)**

You have answered the question correctly.

3. 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 $\text{PROJ}_{\{b, d - a, 3 * e\}}(R)$?

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

Answer submitted: **a)**

You have answered the question correctly.

4. 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

\Join - Natural Join

σ - Selection

\times - Products

- Find the names of all students in this database who live in the same city as the university for which they study. $\sigma_{\text{studentname}} (\text{student} \Join (\text{study} \times \text{university}))$
- Find the names and cities of residence of all employees who work for First Bank Corporation. $\Pi_{\text{studentname}, \text{city}} (\text{student} \times (\sigma_{\text{universityname} = \text{"NC State University"}} (\text{study})))$
- Find the names of all students whose SAT score is greater than the SAT score of every student of NC State University. $\Pi_{\text{studentname}} (\text{study}) - (\Pi_{\text{study.studentname}} (\text{study} \Join \text{study.SAT} \leq \text{study2.SAT and study2.universityname} = \text{"NC State University"} \text{ Qstudy2}(\text{study})))$
- Find the names and cities of residence of all students who study at NC State University. $\Pi_{\text{studentname}, \text{city}} (\text{student} \Join (\sigma_{\text{universityname} = \text{"NC State University"}} (\text{university})))$

Answer submitted: **d)**

Your answer is incorrect.

5. 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 $\Pi_{(L,M)}(R) \cap \Pi_{(L,M)}(\Pi_{(M,N)}(R))$. 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?

- (3, 2) appears twice in the result.
- (1, 1) appears five times in the result.
- (3, 2) appears once in the result.
- (1, 2) appears once in the result.

Answer submitted: c)

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

m	n
a	a
a	b
b	a
b	b

R3

m	n
a	a
a	b
b	a
b	b

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 \diamond R3.n AND R3.m \diamond 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) (a, b, a, b) appears twice.
- c) (b, b, a, a) does not appear.
- d) (a, a, b, b) appears once.

Answer submitted: c)

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

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) 4 appears exactly two times.
- b) 2 appears exactly once.
- c) 11 appears exactly once.
- d) 7 appears exactly once.

Answer submitted: **c)**

You have answered the question correctly.