**Gradiance Online Accelerated Learning** 



### Suraj Sunil

# Homework Assignment Submitted Successfully.

• Home Page

• Assignments Due

• Progress Report

• Handouts

Tutorials

Homeworks

• Lab Projects

• Log Out

Help

Copyright © 2007-2015 Gradiance Corporation.

You obtained a score of 90.0 points, out of a possible 105.0 points. You have answered 6 questions correctly. You have answered 1 question incorrectly. For each correct answer, you received 15.0 points and for each incorrect answer, you lost 0.0 points.

**Submission number:** 515450 **Submission certificate:** GI882076

**Submission time:** 2020-02-18 19:23:06 PST (GMT - 8:00)

Number of questions:7Positive points per question:15.0Negative points per question:0.0Your score:90

**1.** 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) 2 appears exactly once.
- b) 1 appears exactly three times.
- c) 5 appears exactly two times.
- d) 11 appears exactly once.

Answer submitted: **d**)

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) (1,3) appears once in the result.
- b) (2, 3) does not appear in the result.
- c) (3, 2) does not appear in the result.
- d) (2, 1) 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 of all students in this database who live in the same city as the university for which they study.  $\Pi_{\text{studentname}}$  (student ×(study  $\infty$  university))
- 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  $\infty$  study  $\infty$  university)
- c) Find the names and cities of residence of all students who study at NC State University.  $\Pi_{studentname, city}(student \propto (\sigma_{universityname} = "NC State University")$

(university)))

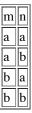
d) Find the names of all students in this database who live in the same city as the university for which they study.  $\sigma_{studentname}$  (student  $\infty$  (study  $\times$  university))

Answer submitted: c)

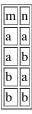
Your answer is incorrect.

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

**R**1



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

Answer submitted: **b**)

You have answered the question correctly.

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

2/18/2020

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

Answer submitted: **b**)

You have answered the question correctly.

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

|   | В |   |   |
|---|---|---|---|
| 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

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

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 twice in the result.
- b) (5, 2) appears once in the result.
- c) (5, 3) appears twice in the result.
- d) (5, 3) appears once in the result.

Answer submitted: **d**)

You have answered the question correctly.

**7.** 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 |
|---|---|
| С | 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) (4, e, null)
- b) (null, b, 6)
- c) (null, null, null)
- d) (3, d, 2)

Answer submitted: **d**)

You have answered the question correctly.