

corresponding relation instances r_1 and r_2 . Which one of the following relational algebra expressions would necessarily produce an empty relation ?

GATE2004

- 1) $\Pi_D(r_2) - \Pi_C(r_1)$
- 2) $\Pi_C(r_1) - \Pi_D(r_2)$
- 3) $\Pi_D(r_1 \bowtie C^1 D r_2)$
- 4) $\Pi_C(r_1 \bowtie C = D r_2)$

SOLUTION:2

4. Consider the following relation schema pertaining to a students database: Student (rollno, name, address)

Enroll (rollno, courseno,
coursename)

where the primary keys are shown underlined. The number of tuples in the Student and Enroll tables are 120 and 8 respectively. What are the maximum and minimum number of tuples that can be present in (Student * Enroll) where '*' denotes natural join ?

GATE 2004

- 1) 8, 8
- 2) 120, 8
- 3) 960, 8
- 4) 960, 120

SOLUTION:3

5. The relation scheme Student Performance (name, courseNo, rollNo, grade) has the following functional dependencies:

GATE 2004

name, courseNo $\rightarrow$ grade

rollNo, courseNo $\rightarrow$ grade

name $\rightarrow$ rollNo

rollNo $\rightarrow$ name

The highest normal form of this relation scheme is

- a) 2 NF b) 3 NF c) BCNF d) 4NF
- SOLUTION a

6. The order of an internal node in a B^+ tree index is the maximum number of

Q1 : Select e.empld
 From employee e
 Where not exists
 (Select * From employee s Where s.department = "5" and s.salary > =
 e.salary)

Q2 : Select e.empld From
 employee e Where
 e.salary > Any
 (Select distinct salary From employee s Where s.department = "5")

- a) Q1 is the correct query.
- b) Q2 is the correct query.
- c) Both Q1 and Q2 produce the same answer.
- d) Neither Q1 nor Q2 is the correct query.

SOLUTION B

17. Which one of the following statements is FALSE?

GATE 2007

- a) Any relation with two attributes is in BCNF.
- b) A relation in which every key has only one attribute is in 2NF.
- c) A prime attribute can be transitively dependent on a key in a 3NF relation.
- d) A prime attribute can be transitively dependent on a key in a BCNF relation.

SOLUTION C

18. The order of a leaf node in a B^+ -tree is the maximum number of (value, data record pointer) pairs it can hold. Given that the block size is 1K bytes, data record pointer is 7 bytes long, the value field is 9 bytes long and a block pointer is 6 bytes long, what is the order of the leaf node?

GATE 2007

- a) 63
- b) 64
- c) 67
- d) 68

SOLUTION B

19. Consider the following schedules involving two transactions. Which one of the following statements is TRUE ?

GATE 2007

S_1 : $r_1(X)$; $r_1(Y)$; $r_2(X)$; $r_2(Y)$; $w_2(Y)$;
 $w_1(X)$ S_2 : $r_1(X)$; $r_2(X)$; $r_2(Y)$; $w_2(Y)$;
 $r_1(Y)$; $w_1(X)$

$[x] W_1 [y] W_2 [y]$
 $S_2 : R_1 [x] R_2 [x] R_2 [y] W_1$
 $[x] W_2 [y] W_1 [y]$
 $S_3 : R_1 [x] W_1 [x] R_2 [x] W_1$
 $[y] R_2 [y] W_2 [y]$
 $S_4 : R_2 [x] R_2 [y] R_1 [x] W_1$
 $[x] W_1 [y] W_2 [y]$

Which of the above schedules are conflict-serializable?

- a) S_1 and S_2
- b) S_2 and S_3
- c) S_3 only
- d) S_4 only

SOLUTION B

22. The following key values are inserted into a B+ - tree in which order of the internal nodes is 3, and that of the leaf nodes is 2 in the sequence given below. The order of internal nodes is the maximum number of tree pointers in each node, and the order of leaf nodes is the maximum number of data items that can be stored in it. The B+ - tree is initially empty.

GATE 2009

10, 3, 6, 8, 4, 2, 1

The maximum number of leaf nodes would get split up as a result of these insertions is

- a) 2
- b) 3
- c) 4
- d) 5

SOLUTION C

23. Which of the following statements are TRUE about an SQL query?

GATE 2012

P : An SQL query can contain a HAVING clause even if it does not have a GROUP BY clause

Q : An SQL query can contain a HAVING clause only if it has GROUP BY clause

R : All attributes used in the GROUP BY clause must appear in the SELECT clause

S : Not all attributes used in the GROUP BY clause need to appear in the SELECT clause

- (A) P and R
- (B) P and S
- (C) Q and R
- (D) Q and S

3. AEH,BEH,DEH

4. AE,BE,DE

Answer:3

62. THE RELATIONAL SCHEMA STUDENT PERFORMANCE(NAME, COURSENO, ROLLNO, GRADE)
HAS THE FOLLOWING FUNCTIONAL INDEPENDENCE

NAME, COURSENO -> GRADE

ROLLNO,COURSENO -> GRADE

NAME-> ROLLNO

ROLLNO->NAME

THE HIGHEST NORMAL FORM OF THIS RELATION SCHEME IS

1.2NF

2.BCNF

3.3NF

4.4NF

Answer:3

63. A B+ tree index is to be built on the name attribute of the relation Student. Assume that all students name are of length 8 bytes, disk blocks are of size 512 byte and index pointer are of size 4 bytes. Give this scenario, what would be the best choice of the degree [GATE 2002]

1. 16

2. 43

3. 42

4.44

Answer:1

64. The relation book(title,price) contains the titles and prices of different books. Assuming that no two books have the same price, what does the following sql query list ?[GATE 2005]
Select title from book as B where (select count(*) from book as T where T.price >B.price)<5

7. There are five records in a database.

GAT
E
1998

Name	Age	Occupation	Category
Rama	27	CON	A
Abdul	22	ENG	A
Jeniffer	28	DOC	B
Maya	32	SER	D

There is an index file associated with this and it contains the values 1,3,2,5 and

Which one of the fields is the index built from?

- (a) Age (b) Name (c) Occupation (d) Category

SOLUTION

8. Consider the schema $R = (S, T, U, V)$ and the dependencies $S \rightarrow T, T \rightarrow U, U \rightarrow V$ and $V \rightarrow S$. Let $R = (R_1 \text{ and } R_2)$ be a decomposition such that $R_1 \cap R_2 = \emptyset$. The decomposition is

GAT
E 1999

- (a) not in 2NF (b) in 2NF but not 3NF (c) in 3NF but not in 2NF (d) in both 2NF and 3NF

SOLUTION

9. . Which of the following is/are correct?

GAT
E 1999

- (a) An SQL query automatically eliminates duplicates
(b) An SQL query will not work if there are no indexes on the relations
(c) SQL permits attribute names to be