Question-1

Choose the correct option from following:

When we create a relational database schema from an ER diagram, which among the following is may or may not be correct:

A. A table is required if the cardinality between the relationship is M:N.

B. A table is required if the given entity is Strong entity

C. A table is required if the given entity is Weak entity

D. A table is not required if there is full participation between a relation (without any attribute) and an entity

Question-2

Choose the following operations which violate referential integrity in the following scenario - A and B are two relational database schema such that A (p,q,r) and B (s,t,u) and s= foreign key of B, refers to the primary key of A.

I) Insert into A

II) Insert into B

III) Delete from A

IV) Delete from B

Which of the following cannot cause violation of the referential integrity constraint above?

A. None of (I),(II),(III) or (IV) cannot cause its violation.

B. All of (I),(II),(III) and (IV) cannot cause its violation.

C. Both (I) and (IV) cannot cause its violation.

D. Both (II) and (III) cannot cause its violation

Question-3

Consider a relation scheme R = (A, B, C, D, E, H) on which the following functional dependencies hold: {A→B, BC→D, E→C, D→A, C→H}.

What are the candidate keys of R?

A. AE, BE

B. AE, BE, DE

C. AEH, BEH, BCH

D. AEH, BEH, DEH

Question-4

Consider the following relation schema pertaining to a students database:

Traveller (ticket_id,name,Phone_no)

Travel (ticket_id,Train_name,date)

where the primary keys are shown underlined. ticket_id is Forign Key referencing to Traveller table. The numberof tuples in the Traveller and Travel tables are 1220 and 128 respectively. What are the maximum and minimum numberof tuples that can be present in (Traveller* Travel), where '*' denotes natural join?

A. 128, 128

B. 1220, 128

C. 156160, 128

D. 156160, 1220

Question-5

. Consider the relation scheme R(X, Y, Z) with the following functional dependencies:

$X, Y \rightarrow Z,$

$Z \rightarrow X$

What is correct statement about:

i) The schema R is in 3NF.

ii) The schema R is not in BCNF.

iii) The schema R is in 2NF.

iv) The candidate keys are XY, YZ.

A. iii,iv

B. i,iii,iv

C. i,ii,iii,iv .

D. i,ii,iii

Question-6

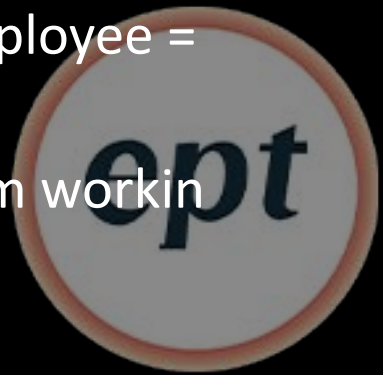
Consider the relation workin (employee, department) in which (employee, department) is the primary key, and the relation paid (employee, salary) where employee is the primary key. Assume no null values and no foreign keys or integrity constraints. Given the following four queries:

Query1: select employee from workin where employee in (select employee from paid)

Query2: select employee from paid where employee in (select employee from workin)

Query3: select E.employee from workin E, paid P where E.employee = P.employee

Query4: select employee from paid where exists (select * from workin where workin.employee = paid.employee)



Which one of the following statements is correct?

A. All queries return identical row sets for any database

B. Query2 and Query4 return identical row sets for all databases but there exist databases for which Query1 and Query2 return different row sets.

C. There exist databases for which Query3 returns strictly fewer rows than Query2.

D. There exist databases for which Query4 will encounter an integrity violation at runtime.

Question-7

Match the pairs:

1)A key that can be uniquely used to identify a database record, that may contain extra attributes that are not necessary to uniquely identify records.

2)A candidate key that is not the primary key

3) A Primary Key, made up of multiple attributes

4) A single key that is unique and not-null. It is one of the candidate keys.

i) Composite Key

ii)Alternate key

iii)Primary key

iv) Super Key

A. 1-iii, 2-ii, 3-i, 4-iv

B. 1-iv, 2-iii, 3-i, 4-ii

C. 1-i, 2-ii, 3-iv, 4-iii

D. 1-iv, 2-ii, 3-i, 4-ii

Question-8

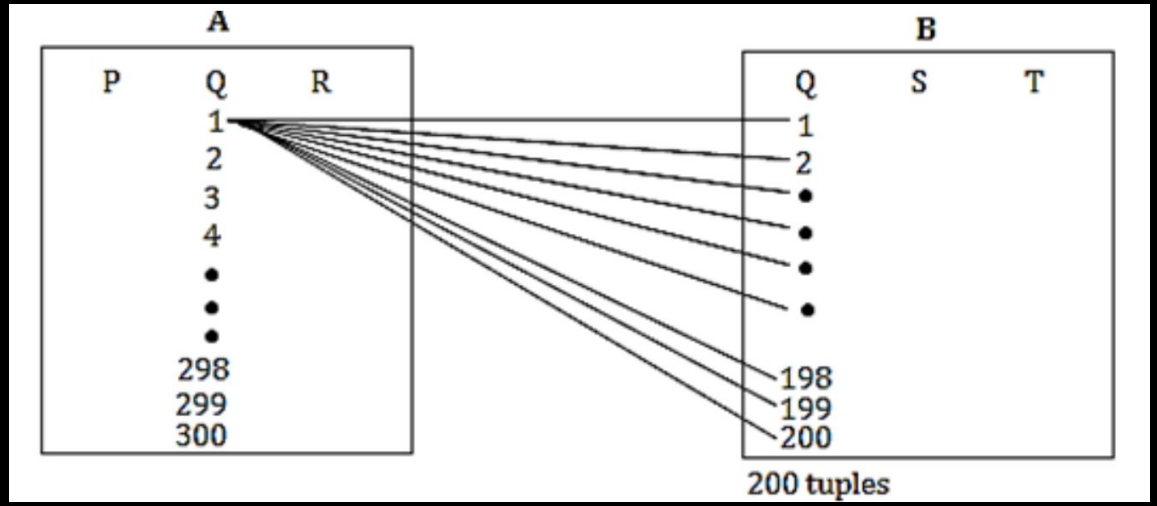
Take an example of following functional dependencies hold for relations:

A(P,Q,R) and B(Q,S,T) :

$Q \rightarrow P$

$P \rightarrow R$

300 tuples are there in the relation A and 200 tuples are there in the relation B. Q is the foreign key in relation B. What is the maximum number of tuples possible in the natural join A⋈B?



A. 200

B. 300

C. 500

D. 700

Question-9

The following functional dependencies are given:

AB → CD,

AF → D,

DE → F,

C → G ,

F → E,

G → A

i) CF+ = {ACDEFG}

ii) BG+ = {ABCDG}

iii) AF+ = {ACDEFG}

iv) AB+ = {ABCDFG} Candidates keys are: A. i and ii only B. i , ii and iii only C. iii, ii only D. i,ii,iv onl

Candidates keys are:

A. i and ii only

B. i , ii and iii only

C. iii, ii only

D. i,ii,iv onl

Question-10

Consider R=ABCDEFGH and the following FD's:

H-GD

E⟶ D

HD->CE

BD A

Identify the minimal cover of the given FD's?

A. (H⟶ G, ED, H⟶C, HD⟶E, BD⟶ A}

B. (HG, HD, ED, H⟶ C, BD⟶ A}

C. (HG, ED, H⟶ C, HD⟶ C, BD⟶ A)

D. {H⟶G, ED, H⟶ C, H⟶E, BD⟶A)

Question-11

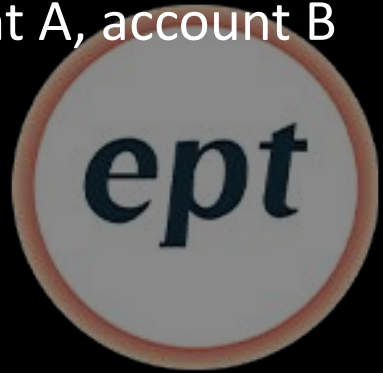
Assume the relation account (customer, balance) where customer is a primary key and there are no null values. We would like to rank customers according to decreasing balance. The customer with the largest balance gets rank 1. ties are not broke but ranks are skipped: if exactly two customers have the largest balance they each get rank 1 and rank 2 is not assigned Query1: select A.customer, count(B.customer) from account A, account B where A.balance<=B.balance

group by A.customer

Query2: select A.customer, 1+count(B.customer) from account A, account B where A.balance

where A.balance<B.balance

Group by A.customer



Consider these statements about Query1 and Query2.

1. Query1 will produce the same row set as Query2 for some but not all databases.
2. Both Query1 and Query2 are correct implementation of the specification
3. Query1 is a correct implementation of the specification but Query2 is not
4. Neither Query1 nor Query2 is a correct implementation of the specification
5. Assigning rank with a pure relational query takes less time than scanning in decreasing balance order assigning ranks using ODBC

Which two of the above statements are correct?

A. 2 and 5

B. 1 and 3

C. 1 and 4

D. 3 and 5

Question-12

Book (title, price) contains the titles andprices of different books. Assuming that no two bookshave the same price, what does the following SQL querylist?

```
select title
from book as B
where (select count(*)
from book as T
where T.price>B.price) < 6
```

A. Titles of the five most expensive books

B. Title of the sixth most inexpensive book

C. Title of the sixth most expensive book Titles of thesix most expensive books

D. Titles of the six most expensive books

Question-13

Consider a schema R(P, Q, R, S) and functional dependencies P $\rightarrow$ Q and R $\rightarrow$ S. Then the decomposition of R into R1 (P, Q) and R2(R, S) is

A. dependency preserving and lossless join

B. lossless join but not dependency preserving

C. dependency preserving but not lossless join

D. not dependency preserving and not lossless join

Question-14

Relation R with an associated set of functional dependencies, F, is decomposed into BCNF. The redundancy (arising out of functional dependencies) in the resulting set of relations is

A. Zero

B. More than zero but less than that of an equivalent 3NF decomposition

C. Proportional to the size of F+

D. Indeterminate

Question-15

Consider R and S be relational schemes such that R={a,b,c} and S={c}. Now consider the following queries on the database:

I. $\pi_{(R-S)}(r) - \pi_{(R-S)}(\pi_{(R-S)}(r) \times s - \pi_{(R-S,S)}(r))$

II. $\{t \mid t \in \pi_{(R-S)}(r) \wedge \forall u \in r(\exists v \in s(u = v[s] \wedge t = v[R-S]))\}$

III. $\{t \mid t \in \pi_{(R-S)}(r) \wedge \forall v \in r(\exists u \in s(u = v[s] \wedge t = v[R-S]))\}$

IV. SELECT R.a,R.b FROM R,S WHERE R.c=S.c

Which of the above queries are equivalent?

A. I and II

B. I and III

C. II and IV

D. III and IV

Question-16

If a multivalued dependency holds and is not implied by the corresponding functional dependency, it usually arises from one of the following sources.

A. A many-to-many relationship set

B. A multivalued attribute of an entity set

C. A one-to-many relationship set

D. Both A many-to-many relationship set and A multivalued attribute of an entity set

Question-17

Consider the following schedules involving two transactions. Which one of the following statement is true?

S1: R1(A) R1(B) R2(A) R2(B) W2(B) W1(A)

S2: R1(A) R2(A) R2(B) W2(B) R1(B) W1(A)

A. Both S1 and S2 are conflict serializable

B. Only S1 is conflict serializable

C. Only S2 is conflict serializable

D. None

Question-18

. Given relations R1(A, B) and R2(C, D), the result of select distinct A, B from R1, R2 is guaranteed to be same as R1,

A. r has no duplicates and s is non-empty

B. r and s have no duplicates

C. s has no duplicates and r is non-empty

D. r and s have the same number of tuples

Question-19

See the below two statements and choose from the following option which is correct.

Statement 1 : Every table with two single-valued attributes is in 1NF, 2NF, 3NF and BCNF.

Statement 2 : PQ $\rightarrow$ R, S $\rightarrow$ T, T $\rightarrow$ R is a minimal cover for the set of FDs PQ $\rightarrow$ R, S $\rightarrow$ T, PQ $\rightarrow$ T, T $\rightarrow$ R

A. Statement 1 & Statement 2 - False,

B. Statement 1 - True, Statement 2 - False,

C. Statement 1 & 2 - True

D. None of this

Question-20

See the following statements below and choose from the following option which is FALSE?

Statement - 1: Any relation with two attributes is in BCNF

Statement - 2:A relation in which every key has only one attribute is in 2NF

Statement - 3: A prime attribute can be transitively dependent on a key in a BCNF relation.

Statement - 4: A prime attribute can be intransitively dependent on a key in a 3NF relation.

A. Statement - 1 & 2

B. Statement 3 & 4

C. Statement 3 & 2

D. None of the above.

Question-21

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 dataitems that can be stored in it. The B^+ - tree is initially empty 12, 3, 6, 8, 4, 2, 1

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

A. 2

B. 3

C. 4

D. 5

Question-22

Which of the following queries will give the names of the employees who are earning maximum salary?

A. Select name from emp

where sal = (select max(sal) from emp)

B. Select name from emp where sal >= (select sal from emp)

C. Both (a) and (b) are correct queries but the processing time is too high in (b) than in (a)

D. Both (a) and (b) are correct but processing is too high in (a) than in (b

Question-23

Consider the following relation schema: Author (A_name, A_city) Book (B_title, A_name, P_name, Price)

Publisher (P_name, P_city)

From the queries given below, which query is syntactically and logically incorrect for above schemas:

A. SELECT B_title, Price from BOOK Where P_name IN (Select P_name, P_city

from Publisher where P_City = "Delhi");

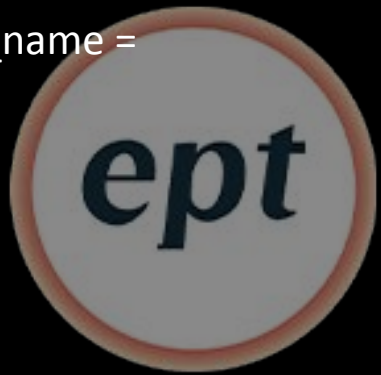
B. SELECT P_name, A_name,

B_title from BOOK Where price BETWEEN 1000 AND (Select avg (price) from BOOK

where P_name = "TMH")

C. SELECT A_name, A_city, Count (P_name FROM Author, BOOK Where Author.A_name = BOOK.A_name GROUP by A_name) having COUNT (P_name) > 5

D. All of these



Question-24

Suppose a phone book contain 500 pages and each page can contain upto 500 records.Suppose we want to search for a particular name in a phone book. Give a worst case bound on number of pages that must be looked to perform a search using an index for the name of the first entry of each page.

A. 1

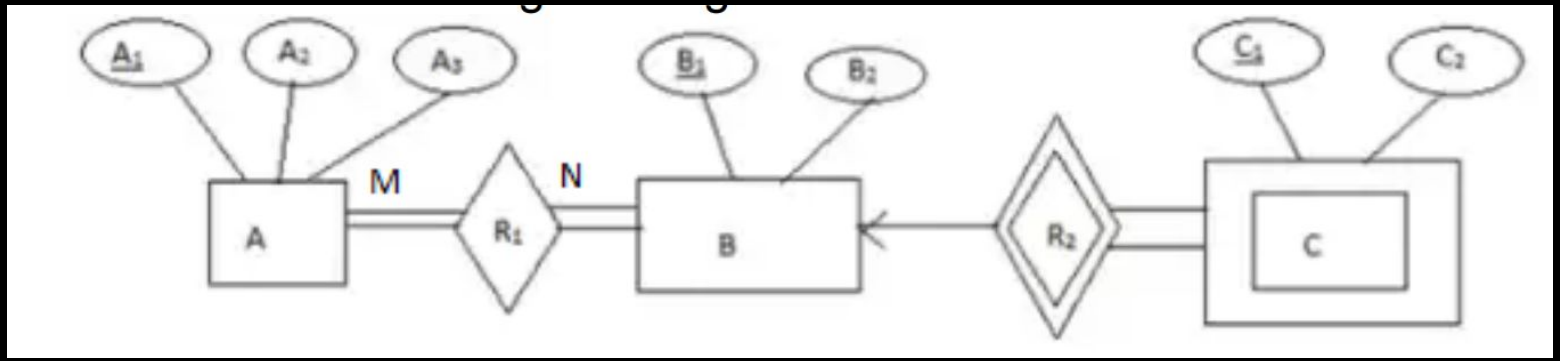
B. 2

C. 9

D. 500

Question-25

Consider the following ER diagram



The minimum number of tables required to represent A, B, C, R1, and R2 are

A. 5

B. 3

C. 2

D. 4

Question-26

Let the relation R(X, Y, Z, A, B) with given functional dependencies

X -> YZ

Z -> A

A -> B

AZ -> X

The number of super keys possible_____ ?

A. 32

B. 16

C. 12

D. 24

Question-27

S1:1:1, 1:N and N:M relationships are also known as HAS-A relationships.

S2:An entity is something that can be identified in the user's work environment; something that the users want to track.

A. S1 is true and S2 is false

B. S1 and S2 both are false

C. S1 is false and S2 is true

D. S1 and S2 both are true

Question-28

Consider the statements
S1: "Delete" is used to delete the table from database.
S2: "Truncate table" is used to delete all the data but not table.
S3: "Drop table" is used to delete the data as well as table
Which of the above statement(s) is/are true?
A. S1 and S2
B. S2 and S3
C. S1 and S3
D. S1, S2 and S3

Question-29

Choose the correct option:

(1) Natural join removes the duplicate attributes.

(2) Outer join replaces the missing data with nulls.

A. 1 is correct, 2 is wrong

B. 1 is wrong, 2 is correct

C. 1 & 2 are true

D. 1 & 2 are false

Question-30

A database table 71 has 4000 records and occupies 50 disk blocks. Another table 72 has 300 records and occupies 20 disk blocks. These two tables have to be joined as per a specified join condition that needs to be evaluated for every pair of records from these two tables. The memory buffer space available can hold exactly one block of records for T1 and one block of records for 72 simultaneously at any point in time. No index is available on either table. If Nested- loop join algorithm is employed to perform the Join, with the most appropriate choice of table to be used in outer loop, the number of block accesses required for reading the data are _____

Question-31

Consider the following relational schema:

Students (sid: integer, sname: string, address: string)

Courses (cid: integer, cname: string, instructor_name: string)

Enroll (sid: integer, cid: integer, grade: string)

Note: The key fields are underlined and domain of each field is listed after the field name.

What is the “efficient” relational algebra expression that gives “Names of Students who enrolled in some courses instructed by Snape” ?

A. πsname (πsname (σinstructor_name =’Snape’ (πcid (Courses) ⋈ Enroll) ⋈ Students)

B. πsname (πsid (σinstructor_name =’Snape’ (Courses ⋈ Enroll)) ⋈ Students)

C. πsname (πsid (πcid (σinstructor_name =’Snape’ (Courses)) ⋈ Enroll) ⋈ Students)

D. None of the above

Question-32

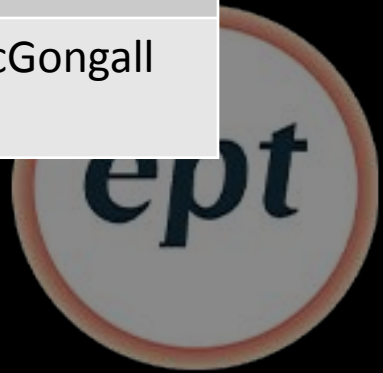
Consider the following two relations Enrolled and Courses as shown below:

Enrolled

Sid	Cid	Grade
1	C1	A
2	C3	B
3	C4	A
1	C2	C

Course

Cid	Course	Instructor
C1	Potions	Snape
C2	Charms	Filius Flitwick
C3	Herbology	Pomona sprout
C4	Transfication	McGongall



ΠSid (Enrolled) / πCid (σinstructor=”Rolanda"(Courses))

If the above relation algebra query executes over the above tables, the number of resultant rows _?

A. 4

B. 5

C. 0

D. 3

Question-33

Consider the relations R(A,B) and S(B,C) and the following four relational algebra queries over R and S:

I. $\pi_{A,B}(R \bowtie S)$

II. $R \bowtie \pi_{B}(S)$

III. $R \cap (\pi_{A}(R) \times \pi_{B}(S))$

IV. $\pi_{A,R.B}(R \times S)$ where R.B refers to the column B in table R. One can determine that:

A. I, III and IV are the same query.

B. II, III and IV are the same query.

C. I, II and IV are the same query.

D. I, II and III are the same query

Question-34

Let

Employee (Eid, Fname, DeptNo)

Department (Dno, Dname, Mgr_SSN)

be two relational schemas, where primary keys are shown underlined and let DeptNo is the foreign key in Employee referring to Department (Assume every employee will be working in a department).

Suppose there is no violation of the above referential integrity constraint in the corresponding relation instances r1 and r2. Which one of the following relational algebra expressions would necessarily produce an empty relation?

A. ∏Dno (Department) - ∏DptNo (Employee)

B. ∏Dno (Employee ⋈DeptNo≠Dno Department) - ∏DptNo (Employee)

C. ∏Dno (Employee ⋈DeptNo=Dno Department)

D. ∏DptNo (Employee) - ∏Dno (Department)

Question-35

Let StudInfo(studId, name, sex, address) and CourseInfo(courseId, Instructorname, sex) and enroll(studId, courseId) be three relational schemes where the primary keys are shown underlined. What does the following relational algebra expression represent?(Assume at least one course is instructed by a female instructor). ((Enroll)÷(πcourseId (σsex='female' (courseInfo))))

A. CourseId's of all courses leading by female instructor

B. CourseId's of all courses leading by male instructor

C. StudentId's of all students who took courses lead by female instructor

D. None of these

Question-36

Suppose a relation R1(A,B,C) and R2(X,Y,Z) are two relation schemas. Let r1 and r2 be the corresponding relation instances. C is a foreign key that refers to X in r2 . If data in r1 and r2 satisfy referential integrity constraints then which of the following is always false?

A. $\pi C(r1) - \pi X(r2) = \phi$

B. $\pi X(r2) - \pi C(r1) = \phi$

C. $\pi C(r1) - \pi X(r2) \neq \phi$

D. $\pi X(r2) - \pi C(r1) \neq \phi$

Question-37

Selecting the victim to be rollbacked to the previous state is determined by the minimum cost. The factors determining cost of rollback is

A. How long the transaction has computed, and how much longer the transaction will compute before it completes its designated task

B. How many data items the transaction has used

C. How many more data items the transaction needs for it to complete

D. All of the mentioned

Question-38

Suppose we have 2 relation schemes.

Enroll (Sid, Cid)

CourseInfo(Cid)

Then which of the relational algebra query gives "Sid's of students enrolled for every course".?

A. πSid (πSid (Enroll) × CourseInfo)

B. πSid (πSid (Enroll) × CourseInfo - Enroll)

C. πSid (Enroll) - πSid (πSid (Enroll) × CourseInfo - Enroll)

D. None of the above

Question-39

Which query from the following gives the dissimilar results from the remaining queries?

A. select * from table1 cross join table2 where table1.id = table2.id2

B. select * from table1 join table2 on table1.id = table2.id2

C. select * from table1 full outer join table2 on table1.id = table2.id2

D. select * from table1 , table2 where table1.id = table2.id2

Question-40

Map the following statements with True (T)/ False (F)

S1: Participation of the weak entity set in identifying relationship must be total.

S2: Multivalued attributes in E-R diagram require separate tables when converted into relational model with satisfy 2NF.

A. FT

B. TF

C. FF

D. TT

Question-41

For the following relational tables,

Grocery(Grocery_ID, Name, Category,Exp_date,Mfg_date)

Sale_Grocery(SaleID,Grocery_ID)

Sale(SaleID, Price)

What is the total money made by selling “Tomato_Sauce” by December 2017? Choose correct SQL query from below for above question :

A. a) SELECT Sum(Sale.Price) FROM Sale INNER JOIN Sale_Grocery ON Sale.SaleID = Sale_Grocery.SaleID WHERE ((Exp_date < '2017-31-12') AND Grocery.Name = ‘Tomato_Sauce’)

B. SELECT Sum(Sale.Price) FROM Sale LEFT JOIN Sale_Grocery ON Sale.SaleID = Sale_Grocery.SaleID WHERE ((Exp_date < '2017-31-12') AND Grocery.Name = ‘Tomato_Sauce’);

C. SELECT Sum(Sale.Price) FROM Sale FULL JOIN Sale_Grocery ON Sale.SaleID = Sale_Grocery.SaleID WHERE ((Exp_date < '2017-31-12') AND Grocery.Name = ‘Tomato_Sauce’);

D. None of these

Question-42

Below the relations is given-

student (id, marks, branch) and

branch (branchno, branchname, email)

Choose from the below queries which cannot be expressed using the basic relational algebra operations (-,x,σ,π,U,ρ)?

A. All students of a given branch

B. Students whose id is the same as their branchno

C. The sum of all students' marks .

D. Branch email of every student

Question-43

Consider the relations:
Proj (pid, pname, budget, city) Q: SELECT pname
FROM proj P_1
WHERE NOT EXISTS
(SELECT budget
FROM proj P_2
WHERE city = 'DELHI'
AND P..budget <= P_2.budget)
Q finds project name whose budget is
A. greater than some project in DELHI
B. greater than all project in DELHI
C. less than all project in DELHI
D. less than any project in DELHI

Question-44

Consider the set of relations shown below and the SQL query that follows.

Students: (Roll_number, Name, Date_of_birth)

Courses: (Course number, Course_name, Instructor)

Grades: (Roll_number, Course_number, Grade)

The Grade values in Grades tables are A,B,C,D whereas D is considered as Fail.

select distinct Name

from Students, Courses, Grades where Students. Roll_number = Grades.Roll_number and Courses.Instructor = Verma and Courses.Course_number = Grades.Course_number and Grades.grade <> D Which of the following sets is computed by the above query?

A. Name of all passed students in at the minimum one of the courses taught by Verma

B. Names of students who have failed in all courses taught by Verma

C. Name of all passed students in all of the courses taught by Verma

D. Names of students who have failed in at least one of the courses taught by Verma

Question-45

Consider the following queries:

Q1: SELECT max (sal) FROM emp GROUP BY dept no HAVING dept no <>10;

Q2: SELECT max (sal) FROM emp WHERE dept no<>10 GROUP BY deptno;

Which of the following is false about queries?

A. Both queries can be used for the required

result

B. Q1 is faster than Q2

C. Q2 is faster than Q1

D. None of these

Question-46

Consider the following relation schema pertaining to suppliers parts database S(S#, SNAME), P (P, COLOR) and SP denotes

the product of S and P. What does the following

SQL query produces? SELECT DISTINCTS. NAME

FROM S

WHERE S. S# IN (SELECT SP. S# FROM SP WHERE SP. P# IN (SELECT PP# FROM PWHERE P. COLOR="RED')).

A. Get supplier names for suppliers who supply only RED parts

B. Get supplier names for suppliers who supply atleast one red part

C. Get supplier name for suppliers who do not supply red parts

D. None of the above

Question-47

Consider the following relations:
Student (snum, sname, major, level, age) Class (name, meets at, room, fid)
Enrolled (snum.cname)
Faculty (fid, fname, deptid) What does the following query find?
SELECT C.name
FROM Class C
WHERE C.room = 'R128"
or C.name in (SELECTE.Cname) FROM Enrolled
EGROUP BY ECname HAVING count(*) >= 5)

A. Finds the names of all classes that either meet in room R128 and have five or more students enrolled

B. Finds the names of all classes that either meet in room R128 or have five or more students enrolled

C. Finds the name of atmost one class that either meet in room R128 or have five or more students enrolled

D. Finds the names of all classes that meet in room R128 that has five or more students enrolled in it

Question-48

The relation, vegetables contains the Name and Prices of different vegetables. Assuming that no two vegetables have the same price, what does the following SQL query list?

```
select tag
from vegetable as V
where (select count(*)
from vegetable as A where A.price > V.price) < 5
```

A. Names of the four most expensive vegetables

B. Names of the fifth most inexpensive vegetable

C. Names of the fifth most expensive vegetable

D. Names of the five most expensive vegetables

Question-49

In a database file, the search key field is 9 bytes long the block size is 512 bytes, a record pointer is 6 bytes and block pointer is 7 bytes. The largest possible order of a non leaf node in B+ tree implementing this file structure (order defines maximum number of keys present}

A. 23

B. 31

C. 32

D. 42

Question-50

Consider the following schedule.

$W_1(y), R_1(x), R_1(w), W_1(w), W_2(x), C_2, W_3(w) C_3, W_4(w), C_4, W_1(z) C_1$

Which of the following transaction order is not possible in the given serializable schedule?

A. T1 -> T2 -> T3 -> T4

B. T$\rightarrow$T3$\rightarrow$ T2$\rightarrow$ T4

C. T_{1} -> T3-> T4 -> T2

D. T1 -> T2-> T4 -> T3

Question-51

There are two integer columns A and B in a table T. The record (A=1, B=1) was inserted into the table. Let MaxA and MaxB are respective maximum values of A and B among all records in the table at any point in time. Using MaxA and MaxB, new records are inserted in the table 128 times with A and B values being MaxA+1, 2*MaxB+1 respectively. It may be noted that each time after the insertion, values of MaxA and MAxB change. What will be the output of the following SQL query after the steps mentioned above are carried out? SELECT B FROM T WHERE A=7;

A. 129

B. 255

C. 127

D. 257

Question-52

Consider the given schedule

The given schedule is

A. Recoverable and cascadeless
B. Recoverable but not cascadeless
C. Not recoverable
D. Recoverable, cascadeless and strict

T1	T2
R(x)	
	R(x) R(y) X=x+y
R(x)	
	commit
commit	

Question-53

Which protocol is satisfied by following transaction:

LOCK – X(A)

LOCK – S(B)

R(A)

R(B)

W(A)

UNLOCK(A)

COMMIT

UNLOCK(B)

A. Strict 2PL

B. Conservative 2PL

C. Rigorous 2PL

D. None of these

Question-54

Which of the following is the key factor for preferring B+ tree to binary search trees for indexing database relations?

A. B+ trees requires less memory than binary search tree

B. Data transfer from Disks is in block

C. Database relations are stored on primary key

D. Database relations have a large number of records

Question-55

Consider the transactions T_1, T_2, and T, and the schedules S, and S_2 given below.

T: (X); (Z); wi(X); wi(Z)

T_2: 12(Y); r2(Z); w2Z)

T_3: 13(Y); r3(X); w3(Y)

S_1: (X); r3 (Y); r3(X); r2(Y); r2(Z); w3(Y);

w2(Z); (Z); w1(X); w(Z)

S_2: (X); r3(Y); 2(Y); r3(X); w2(Z); r(Z); r2(Z);

w3(Y); w1(X); w1(Z)

Which one of the following statements about the schedules is true?

A. Only S_1, is conflict-serializable.

B. Only S_2 is conflict-serializable.

C. Both S_1, and S_2 are conflict-serializable.

D. Neither S_1, nor S_2 is conflict-serializable

Question-56

Consider the following schedule:

l1(A) R1(A) , u1(A) , l2(A) W2(A) , u2(A) l1(A) . W1(A), u1(A)

Identify the schedule?

A. Schedule satisfies 2PL and conflict serializable

B. Satisfies 2PL and non-conflict serializable

C. Not satisfies 2PL and conflict serializable

D. Not satisfies 2PL and not conflict serializable

Question-57

Which of the following statements are correct?

A.Every recoverable schedule is cascadeless

B. Every cascadeless schedule is recoverable

C. The dirty scenario may lead to non recoverability

D. The schedules having dirty read are cascadeless

A.B & C are correct

B. A & B are correct

C. A & D are correct

D. A, B, C are correc

Question-58

2PL guarantees serializability, but it does not prevent deadlocks. 2PL has two phases: growing and shrinking. Which of the following rules are used to govern the 2PL protocol?

A. Two transactions can not have conflicting locks.

B. No unlock operation can precede a lock operation in the same transaction.

C. No data are affected until all locks are obtained i.e, until the transaction is in its locked point.

D. All of these

Question-59

Assume basic timestamp ordering protocol and that time starts from 1, each operation takes unit amount of time and start of transaction Ti is denoted as Si. The table of timestamp is given below:

Time	OP
1	S_1
2	r_1
3	S_2
4	r_2 (b)
5	W_2 (b)
6	W_1 (a)
7	S_3
8	w_3 (a)
9	w_3 (b)

Find rts(a), wts(a), rts(b) and wts(b) at the end

A. 1, 5, 2, 5

B. 1, 7, 3, 3

C. 3, 7, 3, 7

D. 1, 7, 3, 7

Question-60

In wound-wait scheme, transactions T1 and T2

have timestamps 7 and 9 respectively. If requests a data item held by T2 then T1

A. T1will wait

B. T1 will be rolled back

C. T2 will wait

D. T2 will be rolled back

Question-61

B + tree index is to be built, the name attribute of relation EMPLOYEE. Assume all EMPLOYEE names are of

length = 16 bytes

disk blocks = 512 bytes

Index pointers = 4 bytes

What would be the best choice of the degree (number of pointers per node) of the B+ tree?

A. 26

B. 42

C. 44

D. 16

Question-62

See the following transactions along with the data items along with A & B with initialization score=0

T1	T2
read(A);	read(B)
read(B);	read(A)
if A=0 then B:=B+1	if B=0 then A:=A+1;
write(B);	write(A);

Non-serial inter leaving of T1 & T2 for concurrent execution leads to →

A. A schedule for which a procedure graph cannot be drawn

B. A conflict serialization schedule.

C. A schedule that is not conflict serializable

D. A serializable schedule

Question-63

Which of the following is true about 2-phase locking protocol?

S1 : Lock upgradation and degradation are allowed only in shrinking phase.

S2:2-phase locking allows lock degradation in shrinking phase.

A. Only S1,

B. Only S2

C. Both S1 and S2

D. Neither S1 nor S2

Question-64

Consider the following functional dependencies in a database:

Date of Birth → Age

Age → Eligibility

Name→ Roll_number Roll number→ Name

Course_number→→→ course_name

Course_number→ Instructor (Roll_number, Course_number) → Grade The relation (Roll_number, Name, date of birth,

Age) is

A. In 2NF but not in 3NF

B. in 3NF but not in BCNF

C. in BCNF

D. None of the above

Question-65

Take one example where log sequence of 2 transactions on bank account details are follows:

Initial balance $\rightarrow$ 20,000

Transfer 5,000 to a mortgage payment Apply 10% discount interest.

T1=Start

T1=B_{old} =20000,new=15000

T1=M_{old} =0,new=5000

T1=commit

T2=Start

T2=B_{old} =15000,new=16500

T2=commit

If before log record of is written the database system crashed then when the system restarted. Choose true statement from the below options of recovery procedure

A. We can apply redo & undo operations in random order because they are idemponent.

B. We must redo log record 6 to set B to 16,500

C. We must undo log record 6 to set B to 15,000 and then redo log records 2 & 3.

D. We need not redo log records 2 & 3 because transaction has committed.

SOLUTION

Solution-1

Answer: A

Explanation: creation of table may or may not depend on cardinality

But all other points in b c d are mandatory to create a table

Solution-2

Answer: C

Explanation: Insertion into B can cause inconsistency, since it has foreign key which refers to the primary key of A. Deletion from A can cause inconsistency because it’s primary key is the foreign key for B. Both II and III can cause for violation.

Solution-3

Answer: B

Explanation: Using the given functional dependencies and looking at the dependent attributes, E is not dependent on any. So, it must be part of any candidate key. So, only option is D. Where as H should not be part of Candidate key(eliminate c,d).

Solution-4

Answer: A

Explanation: ticket_idin Traveller is key, and Traveller table has 1220 tuples. In Travel table ticket_id is FK referencing to Traveller table. In natural join it'll return the records where

the ticket_idvalue of Travel matches with the ticket_idof Traveller so in both conditions min and max records will be resulted (128,128).

Solution-5

Answer: C
Explanation: The Candidate Keys are XY and YZ. None of the given functional dependencies are partial. So, the scheme qualifies for 2 NF. There is no transitive dependency. So, the scheme qualifies for 3 NF. All determinants are not Candidate Keys. So, the scheme does not qualify for BCNF.

Solution-6

Answer: A
Explanation: The output of Query2, Query3 and Query4 will be identical. Query1 may produce duplicate rows. But rowset produced by all of them will be same.

Table working employee department

abc c1

xyz c1

abc c2

pqr c1

Table paid employee salary

abc 20000

xyz 10000

rst 10000

Output of Query 1

abc

abc

xyz

Output of Query 2

abc

xyz

Output of Query 3

abc

xyz

Output of Query 4

abc

xyz

Solution-7

Answer D

Explanation: Primary Key: A single key that is unique and not-null. It is one of the candidate keys. Foreign Key: FK is a key in one table (child) that uniquely identifies a row of another table (parent). A FK is not-unique in the child table. It is a candidate key in the parent table. Referential integrity is maintained as the value in FK is present as a value in PK in parent table else it is NULL. Composite Key: PK made up of multiple attributes

SuperKey: A key that can be uniquely used to identify a database record, that may contain extra attributes that are not necessary to uniquely identify records. Candidate Key: A candidate key can be uniquely used to identify a database record without any extraneous data. They are Not Null and unique. It is a minimal super-key. Alternate Key: A candidate key that is not the primary key is called an alternate key

Solution-8

Answer A

Explanation: Tuples Relations FDs

300 A(P,Q,R) $Q \rightarrow P$

200 B(Q,S,T) $P \rightarrow R$

Max tuple possible in natural join $A \bowtie B$ => A.Q = B.Q

Q = Foreign key in B Table

Every value of Min tuples matches = 200

Max tuples = Min tuples = 200

Solution-9

Answer D

Explanation:

Closure of AF or AF+ = {ADEF}, closure of AF doesn’t contain C and G. Hence it is not a candidate key

Solution-10

Answer(d)
Postal Study Package
Given FDs:
H -> GD E -> D
HD -> CE
BD -> A
(1) Right reduced FDs:
H -> G H -> D
E -> D
HD -> C
HD -> E
BD -> A
(2) Left reduced FDs:
H -> G
H -> D
E -> D
H -> C
H -> E
BD -> A
(3) Minimal cover:
H -> G
E -> D
H -> C
H -> E
BD -> A

Solution-11

Answer: C

Explanation: Query 1 computes the group of customer where the balance of first group is less than or equal to another group. Some rows of query 1 is same as query 2 but not all results are equal. Both query 1 and 2 does not compute the required problem rank the customers according to decreasing balance and the customer with the largest balance gets rank 1.

Solution-12

Answer: D

Explanation: The above SQL query compute “Titles of the six most expensive book”

Solution-13

Answer: C

Explanation: While decomposing a relational table we must verify the following properties:

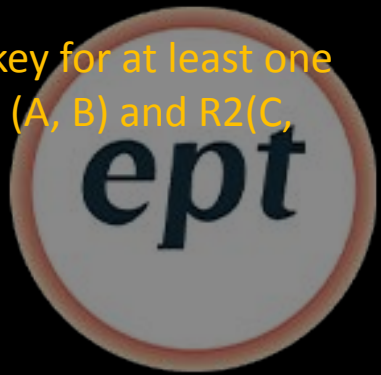
ii)Dependency Preserving Property: A decomposition is said to be dependency preserving if F+=(F1 ∪ F2 ∪ .. Fn)+, Where F+=total functional dependencies(FDs) on universal relation R, F1 = set of FDs of R1, and F2 = set of FDs of R2. For the above question R1 preserves A⟶B and R2 preserves C⟶D. Since the FDs of universal relation R is preserved by R1 and R2, the decomposition is dependency preserving.

ii)Lossless-Join Property: The decomposition is a lossless-join decomposition of R if at least one of the following functional dependencies are in F+:-

a) R1 ∩ R2 ⟶ R1

b) R1 ∩ R2 ⟶ R2

It ensures that the attributes involved in the natural join ( ) are a candidate key for at least one of the two relations.In the above question schema R is decomposed into R1 (A, B) and R2(C, D), and R1 ∩ R2 is empty. So, the decomposition is not lossless



Solution-14

Answer: B

Explanation: Redundancy in BCNF is low when compared to 3NF. For more details on BCNF.

Solution-15

Answer: C

Explanation: II and IV are equivalent.

Solution-16

Answer: D

Explanation: For a many-to-many relationship set each related entity set has its own schema and there is an additional schema for the relationship set. For a multivalued attribute, a separate schema is created consisting of that attribute and the primary key of the entity set.

Solution-17

Answer: C

Explanation: To convert it to a serial schedule, we have to swap non-conflicting operations so that S1 becomes equivalent to serial schedule T1→T2 or T2→T1. In this case, to convert it to a serial schedule, we must have to swap R2(X) and W1(X) but they are conflicting. So S1 can't be converted to a serial schedule.

Now, let us check serializabilityof S2:

S2: R1(X) R2(X) R2(Y) W2(Y) R1(Y) W1(X)

Swapping non conflicting operations R1(X) and R2(X) of S2, we get

S2': R2(X) R1(X) R2(Y) W2(Y) R1(Y) W1(X)

Again, swapping non conflicting operations R1(X) and R2(Y) of S2', we get

S2'': R2(X) R2(Y) R1(X) W2(Y) R1(Y) W1(X)

Again, swapping non conflicting operations R1(X) and W2(Y) of S2'', we get

S2''': R2(X) R2(Y) W2(Y) R1(X) R1(Y) W1(X) which is equivalent to a serial schedule T2→T1.

So, correct option is C. Only S2 is conflict serializable..

Solution-18

Answer A

Explanation: The query selects all attributes of r. Since we have distinct in query, result can be equal to R1 only if R1 doesn’t have duplicates.

If we do not give any attribute on which we want to join two tables, then the queries like above become equivalent toCartesian product.Cartisian product of two sets will be empty if any of the two sets is empty. So, R2 should have atleast one record to get all rows of R1.

Solution-19

Answer **B**

Explanation: Every two attribute relation - BCNF. Statement 1 True

FD = {PQ $\rightarrow$ R, S $\rightarrow$ T, PQ $\rightarrow$ T, T $\rightarrow$ R}

PQ $\rightarrow$ R, S $\rightarrow$ T, T $\rightarrow$ R is not a minimal cover. PQ cannot determine T. Statement 2 False.

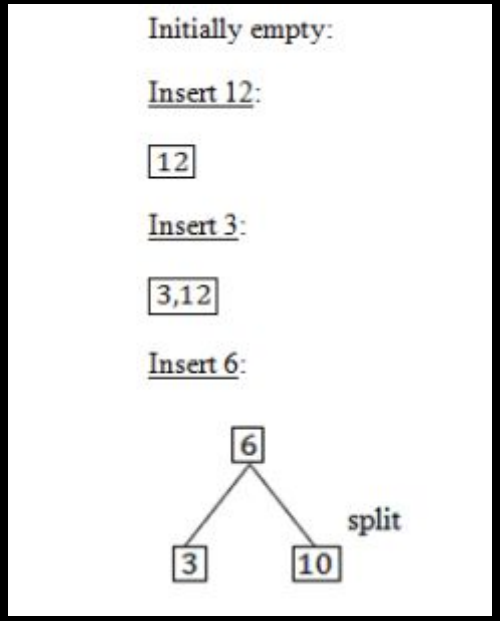
Solution-20

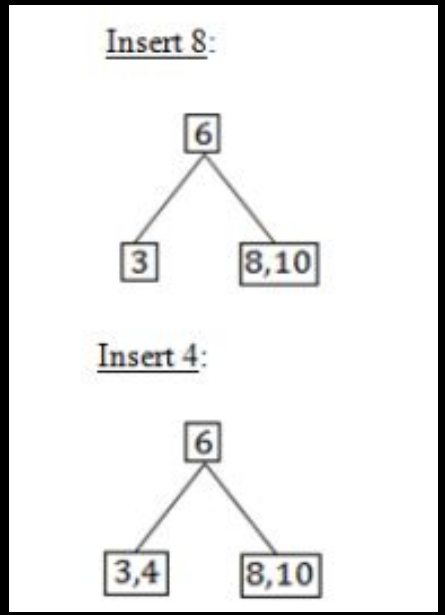
Answer B

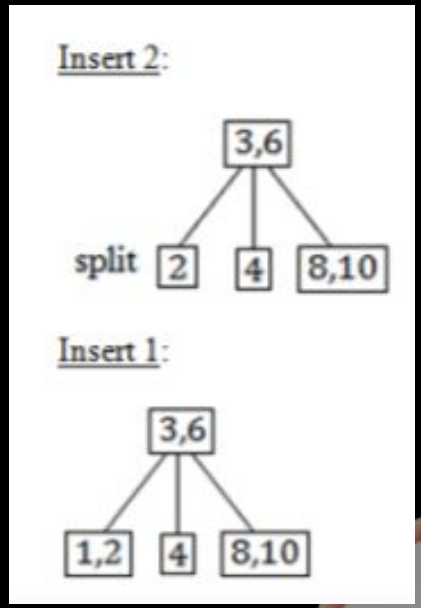
Explanation: Statement 3 and 4 are false. In BCNF relation a prime attribute can not be transitively dependent on a key and in 3NF a prime attribute can not be intransitively dependent on a key

Solution-21

Answer A







Solution-22

. Explanation;

(a)

Query (b) is not correct. Correct form of query

(b) is

Select name from emp

where sal > = ALL (select sal from emp)

Solution-23

Answer D

Query (A): When use 'IN' the inner query must retrieve only a single attribute.

Query (B): Between cannot be used with a sub-

query.

Query (C): In select clause only grouping attributes and aggregate functions are allowed, when using group by

Solution-24

Answer B

If the book were organized as a heap file in a linear search so worst case bound is 500. By using binary search the worst case bound is $[\log_2 500]=9$ using the fact that the book is ordered by names with an index for the name of the first entry on each page we get worst case bound is 2 because the index has 500 pages, so entire index files in one page 1 access to the index and 1 to the data.

Solution-25

Answer D

Explanation:

Relation R1 is M: N. So, we need 3 relations/ tables for A, B and R1. The three tables are A (A1, A2, A3), B(B1, B2) and R1(A1 B1).

Relation R2 is 1:N and is identifying relationship. So we need two tables represent R2. The two relations are B (B1, B2) and C (C1, B1, C2)

Total no. of tables = 4 (A, B, R1, C). Therefore answer is option [d].

Solution-26

Answer .D

Explanation: The candidate keys for the given relation are {A, C}

The number of Super keys possible with these keys are #keys with{A or C} = #keys with {A} + #keys with {C} - #keys with {A and C} = $2^4 + 2^4 - 2^3 = 24$

Solution-27

Answer D

Explanation:

S1: In database design and object oriented program architecture, has-a is a relationship where one object (often called the composited object) "belongs" to (is a part or member of) another object (called the composite type) , and behaves according to the rules of ownership. In simple words, has-a relationship in an object is called a member field of an object.

S2: The minimum cardinality indicates the smallest number of participants in a relationship, which can be 0 or 1 (optional or mandatory).

Maximum cardinality indicates how many instances are participating in a relationship. The possibilities include one-to-one (1:1), one-to-many (1:M), or many-to-many (M:N).

Solution-28

Answer .B

"Delete" is used to delete the data specified in the where clause. If where cause is absent then it will delete all the data from the table.
"Truncate table" is used to delete all the data but not able

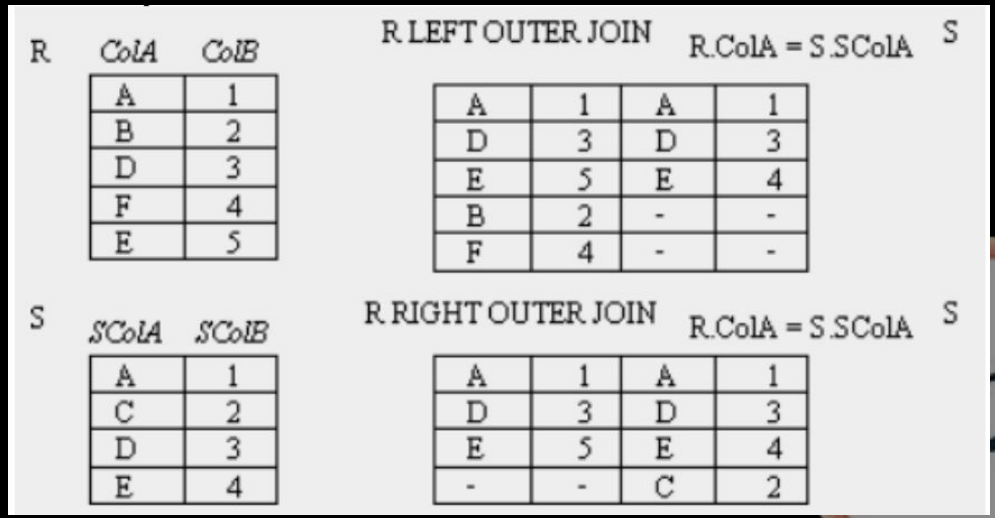
“Drop table” is used to delete the data as well as the table

Solution-29

Answer .C

Explanation: Natural join will require that the attributes have the same name to identify the attribute(s) to be used in the join. Natural join make sure that the relations do not have two attributes with the same name by accident.

An outer join retains the information that would have been lost from the tables, replacing missing data with nulls.



R

ColA	ColB
A	1
B	2
D	3
F	4
E	5

S

SColA	SColB
A	1
C	2
D	3
E	4

R LEFT OUTER JOIN R.ColA = S.SColA S

A	1	A	1
D	3	D	3
E	5	E	4
B	2	-	-
F	4	-	-

R RIGHT OUTER JOIN R.ColA = S.SColA S

A	1	A	1
D	3	D	3
E	5	E	4
-	-	C	2

Solution-30

Answer(15020)

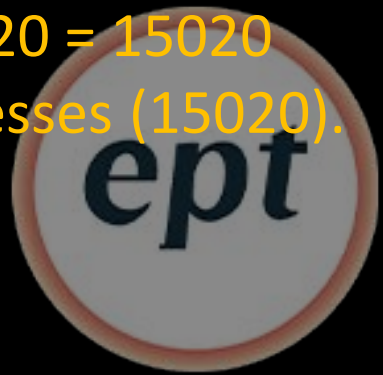
Nested Loop algorithm will involve n,x b_{12}+ b, block transfers. n, records in relation r, b, blocks in

relation n, records in relation s, b, blocks In

relation s Either 71 can be R or 72. If Ris T1 then total number of block access is

4000 x 20+ 50-80050

If R is 72 then total number of block access. is 300 x 50+ 20 = 15020
Better one is the second case, total number of block accesses (15020).



Solution-31

Answer: C

Explanation: We first find the cid's of Courses that Snape has instructed and then we compute the natural join of this with Enroll from this we project Sid which gives ids of the students who enrolled in courses taught by Snape, then we take the natural join of this with student which gives us the names students enrolled for courses instructed by Snape.

So, the correct answers are option (b) and (c)

Since they asked for efficient relational algebra expression, option (c) is correct, since we first find all the course ids of courses taught by Snape.

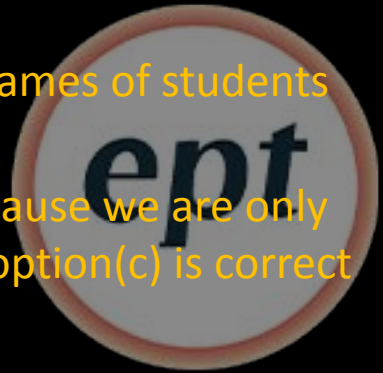
πcid (σinstructor_name ='Snape' (Courses))

The resultant of the above expression is joined with Enroll and get the ids of students enrolled for the courses taught by Snape.

πsid (πcid (σinstructor_name ='Snape' (Courses)) ⋈ Enroll)

The resultant of the above expression is joined with Students and get the names of students who were enrolled in the courses taught by Snape.

But in option (b), we first join Courses with Enroll, which is not efficient because we are only interested in courses taught by Snape but not all the other instructors. So, option(c) is correct answer.



Solution-32

Answer: D

Explanation:

ΠCid (σinstructor =’Rolanda’ (Courses)) -> empty relation

ΠSid (Enrolled) / (empty relation)

Therefore, the distinct Sid values in Enrolled will be displayed.

The distinct number of tuples = 3

Solution-33

Answer: D

Explanation: Lets consider relations R, S

R= {(10,1),(20,2)} and S={(2,30),(3,40)}

I) R⋈S= {(20, 2,30)}. So π A, B R⋈S = {(20,2)}

II) π B (S) ={(2),(3)}. So R⋈π B (S) = {(20,2)}

III) π A (R) X π B (S) ={10,20} X {2,3} ={(10,2),(10,3),(20,2),(20,3)} R ∩ π A (R) X π B (S)={(20,2)}

IV) R X S = {(10,1,2,30),(10,1,3,40),(20,2,2,30),(20,2,3,40)} π A, R.B R X S ={(10,2),(10,3),(20,2),(20,3)}

Thus, I,II,III are same.

Solution-34

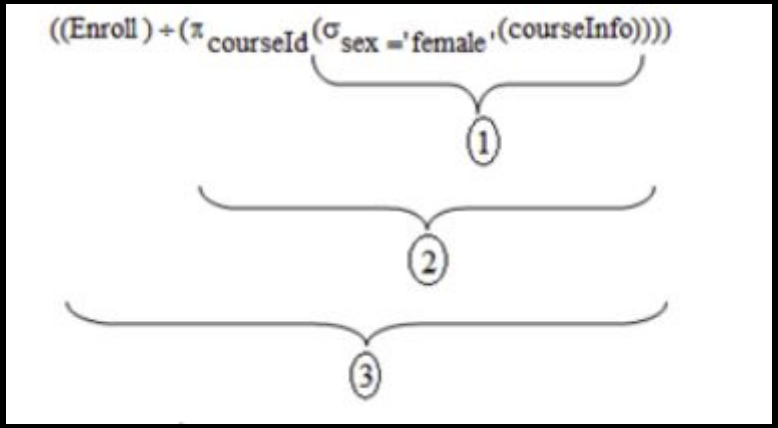
Answer: D

Explanation: Here DeptNo in Employee is foreign key referring to the primary key Dno of Department and also mentioned there is no violation of referential integrity constraint. It means every DeptNo in employee should be present in DeptNo of Department. Therefore, option(d) produces an empty relation.

Solution-35

Answer: D

Explanation:



Result of (1) is the relation which contains the courses that are lead by female instructor.

Result of (2) is the relation which contains the courseId's of all courses that are lead by female instructor

Result of (3) is the relation which contains the studId's of all students that have taken all courses lead by female instructor.

Solution-36

Answer: C

Explanation:

a. All the values of C in r1 are also available in X of r2 so πC(r1)-πX(r2)=ϕ is always true.

b. All the values of X in r2 may available in C of r1 so πX(r2)-πC(r1)=ϕ is sometimes true.

c. All the values of C in r1 are also available in X of r2 so πC(r1)-πX(r2)≠ ϕ is always false.

d. All the values of X in r2 may not be available in C of r1 so πX(r2)-πC(r1)≠ϕ is sometimes true.

Solution-37

Answer: D

Explanation: We should roll back those transactions that will incur the minimum cost.

Solution-38

Answer: C

Explanation: In order to retrieve the “Sid’s of students enrolled for every course” we have to do πSid (Enroll / CourseInfo)

we know that R ÷ S is equivalent to R ÷ S = Π_{R-S} - Π_{R-S}((Π_{R-S}(R) * S) - ΠR-S(R)) πSid (Enroll / CourseInfo) = πSid (Enroll) - πSid (πSid (Enroll) × CourseInfo - Enroll).

Solution-39

Answer C

Explanation: CROSS JOIN and JOIN and ‘,’ are just syntactic variation in MySQL giving the same results..

Solution-40

Answer D

Both the given statements are true.

S_1: Participation of the weak entity set in identifying relationship should be total because primary key of weak entity set gets defined only by relating it to strong entity and its primary key value.

S2: Multivalued attributes in E-R diagram require separate tables along with key attribute when converted into relational model.

Solution-41

Answer A

Explanation: The required question have requirement of inner join. The INNER JOIN selects all rows from both participating tables as long as there is a match between the columns. Whereas, SQL LEFT JOIN keyword returns all records from the left table and the matched records from the right table. The result is NULL from the right side, if there is no match. The FULL JOIN keyword return all records when there is a match in either left or right table records.

Solution-42

Answer C

Explanation: Aggregate operations like sum,avg., min., max., can’t be expressed in terms of basic relational algebra operations. Aggregate function requires extended relational algebra.

Solution-43

. Answer B

Subquery finds budget of projects located in DELHI if that project has a larger budget than what is found in outer query not exist says subquery to return an empty result. In that case projects found in the outer relation have budgets greater than all projects located in DELHI

Solution-44

Answer A

Explanation: There are three relations. Select distinct name, select the name of students and then there are three predicates Course.instructor = Verma specify the courses taught by Verma. The other two predicates specify that student can earn a grade A or B or C but not D(fail) from courses so the SQL query compute. Name of students who haven’t got an D grade (passed students) in at least one of the courses taught by Verma.

Solution-45

Answer. B

Q1 is slower than Q2 because Q1 groups the department no. without filtering. Whereas Q2 filters the data first that is it removes all those tuples where department No .=10 and then groups them

Solution-46

Answer.B

The inner most query returns P# of those parts whose color is red.
The outer query returns all those suppliers who supply atleast one red part "Atleast" is used because of IN operator.

Solution-47

Answer . B

The query gives the names of those classes whose room number is 'R128" or have 5 or more students enrolled

Solution-48

Answer D

Explanation: When a subquery uses values from outer query, the subquery is called correlated subquery. The correlated subquery is evaluated once for each row processed by the outer query. The outer query selects all tags from vegetable table. For every selected vegetable, the subquery returns count of those vegetables which are more expensive than the selected vegetable. The where clause of outer query will be true for 5 most expensive vegetable. For example count (*) will be 0 for the most expensive vegetable and count(*) will be 1 for second most expensive vegetable..

Solution-49

Answer B

Internal node in B+ contains tree pointer and search key. $(P + 1) * 7 + P * 9 <= 512$

$7P + 7 + 9P <= 512$ $P \leq 31.5$

$16P <= 50$ ^ F

order (P) = 31

Solution-50

Answer D

The possible orders:

T1 -> T2 -> T3 -> T4

$T_1 \longrightarrow$ T3 $\longrightarrow$ T4 $\longrightarrow$ T2

T1-> T3 -> T2 -> T4

T1 -> T2 -> T4 -> T3 is not possible, T4-> T3 is not serializable.

So option (d) is correct.

Solution-51

Answer C

A	B
1	1
2	3
3	7
4	15
5	31
6	63
7	127

Solution-52

Answer B

Recoverable but not cascadesless. For cascadeless T1 should read the value of x only after commit operation of T2 . Recoverable because T2commits first.

Solution-53

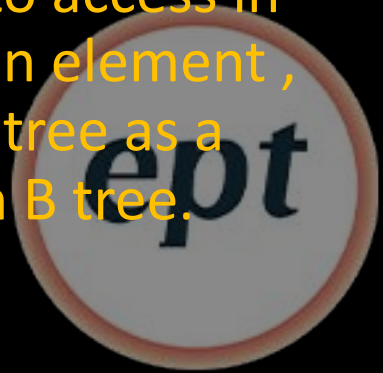
Answer D

Explanation: The given transaction follows conservative 2PL as before stating the transaction, we obtained all the locks that we require and then we released all the locks after we used. It does not follow strict 2PL, as in strict 2PL we release all exclusive locks after committing transaction. But here ‘A” which is exclusive lock is unlocked after we commit the transaction. As it does not follow strict 2PL, it does not follow rigorous 2PL also.

Solution-54

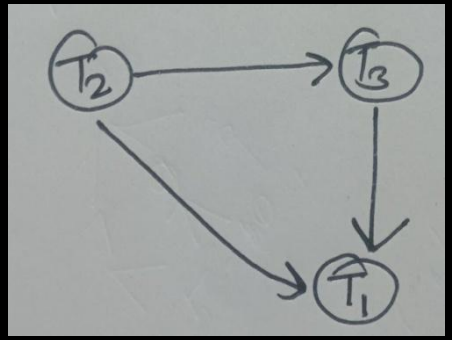
Answer B

Explanation: In order to search for a key, in BST on an average we have to search the nodes equal to the height of tree. The height of BST is large since each node has only 2 children unlike B+ tree which has more children and so height of B+ tree is small compared to B tree and no. of nodes to access is small compared to BST tree to search an element. We know that in B+ tree each node is accommodated in to one disc block. In BST also it may be possible that each node is in one disc block. As number of nodes to access in BST is more compared to B tree or B+ tree to search for an element , disk block accesses in BST are more compared to B or B+ tree as a result searching takes less time in B or B+tree rather than B tree.



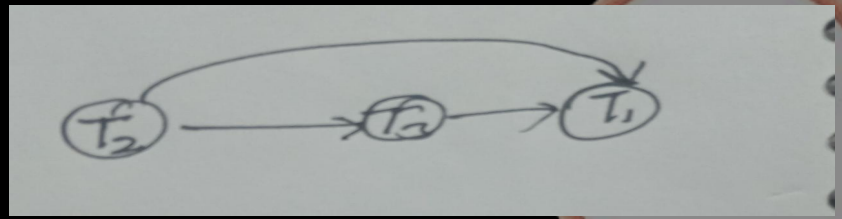
Solution-55

S_1: r1(X) ;r3(Y); r3(X); r2(Y); r2(Z); w3(Y) w2(Z) r1(Z) w1(X); w1(Z)



No cycle S1 is conflict serializable.

S_2:r1(X); r3(Y); r2(Y); r3(X); w2(Z) r1(Z); r 2(Z) w3(Y) w1(X); w1(Z)



No cycle S_2 is conflict serializable.

Solution-56

Answer D

After unlock over A, it locks again on A. Hence it is not in 2PL.

not conflict serializable.

Solution-57

Answer A

Explanation: Correct statements are B & C.

A. Cascading schedules can be recoverable

B. Cascadless schedules are recoverable

C. Dirty read may lead to non recoverability

D. No dirty read implies cascadeless schedules

Solution-58

Answer B

No unlock operation can precede a lock operation in the same transaction.

Solution-59

Answer D

Time	Op	rts (a)	wts (a)	rts (b)	wts (b)
1	S_1	-	-	-	-
2	$r_1(a)$	1	-	-	-
3	S_2	1	-	-	-
4	$r_2(b)$	1	-	3	-
5	$w_2(b)$	1	-	3	3
6	$w_1(a)$	1	1	3	3
7	S_3	1	1	3	3
8	$w_3(a)$	1	7	3	3
9	$w_3(b)$	1	7	3	7

∴ rts (a) = 1
wts (a) = 7
rts (a) = 3
wts (a) = 7

Solution-60

Answer D

In wound-wait scheme, when transaction Ti requests a data item currently held by Tj then T1 is rolled back if timestamp of Tj, is larger than Ti Thus for the given question, data item will be preempted from T2 and T2 will be rolled back.

Solution-61

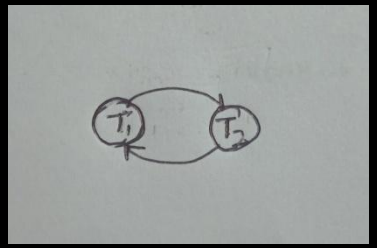
Answer A

Explanation: Take n = be the degree k, key size = 16 byte Disk blocks D = 512 bytes Index pointer p = 4 bytes Degree of tree = if we know the max number of key a internal node can have the formula ⇒ (n – 1) k + n * b = block size(D) (n – 1) 16 + n * 4 = 512 16n – 16 + 4n = 512 20n = 528

Solution-62

Answer C

T1	T2
r1(A)	r2(B)
r4(B)	r2(A)
w1(B)	w2(A)



Cycle present so not conflict serializable

Solution-63

Answer B

According to 2PL, if lock conversion is allowed, then upgrading of locks must be done during expansion phase, and degrading of locks must be done in the shrinking phase. .. S2 is true.

Lock upgradation is not allowed in shrinking phase therefore S_{1} is False

Solution-64

Answer D

For this relation, only following FDs are of consideration

1. Date of Birth $\longrightarrow$ Age 2. Name$\longrightarrow$ Roll_number

3. Roll_number $\longrightarrow$ Name Keys of relation are (name, Date of Birth) and (Roll_number, Date of Birth). The relation is not in 2NF because of partial dependency i.e. Date of Birth$\longrightarrow$ Age. The other two FDs ae not partial bacause their right hand side attributes are prime attributes

Solution-65

Answer D

Explanation: In database transaction system if transaction is commit then it becomes permanent there is no effect of any failure. For that reason, we need not redo log records 2 & 3 as transaction has committed.