Department of Computer Science and Engineering, SVNIT, Surat B. Tech.- II (CSE) Sem-4th, 2020-21 Course: Database Management System

Exam Date: 8 May 2021
Exam Time: 2:00 PM to 3:00 PM.

Instructions:
1. The question paper consists of 70 Multiple Choice Questions.
2. It is preferable to have a pen, pencil, rough pages, calculator, water bottle, smart phone/laptop etc handy.
3. Before the end-time, you have to submit question paper. The late submission is not allowed.
4. If you are not visible in the Google meet, then you will be considered as ABSENT. Those who are using the mobile phones, must check that they are visible in the Google meet when they attempt the question paper.

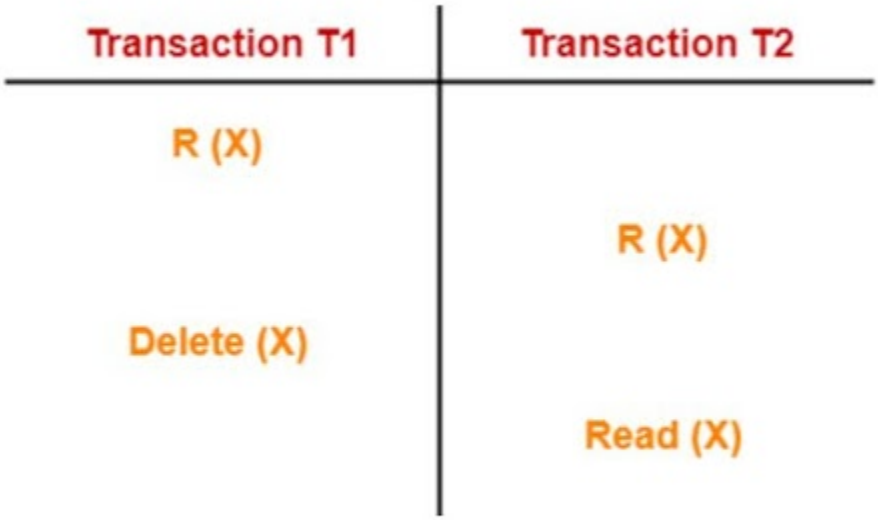
Your email will be recorded when you submit this form.

Not **u19cs012@coed.svnit.ac.in**? Switch account

* Required

*

Identify the phenomenon that will occur in the following scenario:



A) Dirty Read
B) Phantom Read
C) Non-repeatable Read
D) Committed Read

- A
- B
- C
- D

*

Estimate the cost of r ⋈ s using a sort-merge join where r has 1,000 tuples, 20 tuples per page; s has 2,000 tuples, 4 tuples per page; and the main memory buffer for this operation is 22 pages long.

- ≈ 3000 Page Transfers
- ≈ 3200 Page Transfers
- ≈ 2500 Page Transfers
- ≈ 4500 Page Transfers

*

Determine the following schedule is recoverable or not:

R1(A), W1(A), R2(A), R1(B), R2(B), W2(A), W1(B), C1, C2;

A) YES
B) NO
C) CANNOT BE DETERMINED

Note: R1(A) means reading data item A by TransactionT1

C1 means commit operation performed by Transaction T1

- A
- B
- C

Which file/s is/are used during the operation of the DBMS? *

- [ ] DML
- [x] Transaction log
- [x] Data dictionary
- [ ] ReQuery log

Suppose relation R (A, B, C, D, E) has the following functional dependencies: A --> C, B --> D, AB --> E. This table is in which normal form? *

- [ ] None of these
- [ ] 2NF
- [x] 1NF
- [ ] 4NF
- [ ] 3NF
- [ ] BCNF

What is/are the correct statement/s for the following code? *

```
DECLARE
n NUMBER;
avg NUMBER :=0 ;
sum NUMBER :=0 ;
count NUMBER :=0 ;
BEGIN
n := &enter_a_number;
WHILE(n<>0)
LOOP
count := count+1;
sum := sum+n;
n := &enter_a_number;
END LOOP;
avg := sum/count;
DBMS_OUTPUT.PUT_LINE('the average is'||avg);
END;
```

- [x] Calculates the average of user entered numbers
- [x] Entry of more numbers are stopped by entering number 0
- [ ] None of these

Let Relation X (P, Q, R, S, T, U, V) be a relational schema which holds the following FDs. Then the relation schema R is *

$$PQ \rightarrow RS$$
$$Q \rightarrow V$$
$$R \rightarrow T$$
$$ST \rightarrow U$$
$$U \rightarrow R$$

- (●) not in 2NF
- ( ) in 2NF, but not in 3NF
- ( ) in 3NF, but not in BCNF
- ( ) in BCNF

What will be the output of following program *

```
SET SERVER OUTPUT ON
DECLARE
BEGIN
FOR i IN REVERSE 1..99
LOOP
IF Mod(i,3) = 0 THEN
DBMS_OUTPUT.PUT_LINE(i);
END IF;
END LOOP;
END;
/
```

- ○ Display series of numbers: 3, 6, 9, ..., 93, 96, 99.
- ○ Display series of numbers: 99, 66, 33……, 3
- ○ None of these
- ○ Display series of numbers: 3, 6, 9 ... ... ,93, 96, 99
- ◉ Display series of numbers: 99, 96, 93…… ,9, 6, 3

What can be said about Triggers? *

- ☑ Only affect those rows added after the trigger is enabled.
- ☑ Triggers are used to implement complex business rules which cannot be implemented using integrity constraints.
- ☐ Affect all rows of the table including that already exist when the constraint is enabled.
- ☐ None of these

*

What is the sequence of Leaf nodes in a B+ Tree for the bellowed given keys? (Consider the Degree or Order (m) = 3)

Keys: 34, 66, 8, 3, 276, 198, 699

- (●) 3, 8, 34, 66, 198, 276, 699
- ( ) 699, 276, 198, 66, 34, 8, 3
- ( ) None of these
- ( ) 34, 8, 3, 66, 699, 198, 276
- ( ) 34, 66, 8, 3, 276, 198, 699

Relational algebra is/are *

- [ ] Non procedural language
- [ ] None of these
- [ ] Meta Language
- [x] Procedural language
- [x] having a basic set of operations for manipulating relational data

Suppose relation R (A, B, C, D, E) has the following functional dependencies: A --> B, B --> C, B --> A, A --> D, E --> A. Which of the following is a key? *

- [ ] A
- [ ] B
- [ ] C
- [ ] D
- [x] E
- [ ] None of these

B-tree of order n is a order-q multiway tree in which each non-root node contains keys equal to *

- ( ) MIN 2*q
- ( ) MAX (q – 1)/2
- ( ) EQUAL TO (q – 1)/2
- (•) MIN (q – 1)/2

*

Given below is set of log records in a file; that implements check pointing:
< T1 start>
<T1, write, A ,2, 3>
<T2 start>
<T1 commit>
<T2, WRITE, B, 5, 7>
<CHECKPOINT L>
< T3 start>
<T3, C, 1, 9>
<T3 Commit>
<T4 start>
<T4, write, D, 7, 2>
If a crash happens now and the system tries to recover using both undo and redo operations, what are the contents of the undo list and the redo list?

a) Undo: none; Redo: T3, T1, T4; T2

b) Undo: T4, T2; Redo: T3

c) Undo: T4, T2, T1; Redo: T3

d) Undo: T4, T2; Redo: T3, T1

- ○ a
- ◉ b
- ○ c
- ○ d

*

Πcustomer_name, loan_number, amount (borrower ⋈loan)
What does the above expression perform?
(A) It finds the customer_name, loan_number and amount from borrower
(B) It finds the customer_name, loan_number and amount from loan
(C) It finds the customer_name, loan_number and amount from the full outer join of borrower and loan
(D) It finds the customer_name, loan_number and amount from the natural join of borrower and loan

- ○ A
- ○ B
- ○ C
- ◉ D

*

Which of the following does not ensure freedom from deadlock?

a) Graph based protocol

b) Time stamp based protocol

c) Two phase locking protocol

d) All of the above

- ○ a
- ◉ b
- ○ c
- ○ d

*

Two operations are said to be conflicting operations if:

i) They belong to same transaction
ii) They operate on same data item
iii) At least one of them is a write operation.

Choose one:

a) i) and ii) are true
b) ii) and iii) are true
c) i) and iii) are true
d) all three of them are true.

- [ ] a
- [x] b
- [ ] c
- [ ] d

_____(a)_____ locking suggests that the schedule which follows it, are both _____(b)_____ and _____(c)_____. *

- [ ] (a) Strict two phase locking, (b) non-conflict serializable, (c) recoverable
- [ ] (a) Strict two phase locking, (b) non-conflict serializable, (c) non-recoverable
- [ ] (a) Two phase locking, (b) conflict serializable, (c) recoverable
- [x] (a) Strict two phase locking, (b) conflict serializable, (c) recoverable

*

What is true about view?

(A) Database views are created using the CREATE VIEW statement.
(B) To create a view, a user must have the appropriate system privilege according to the specific implementation.
(C) Both A and B are true
(D) Both A and B are false

- ○ A
- ○ B
- ◉ C
- ○ D

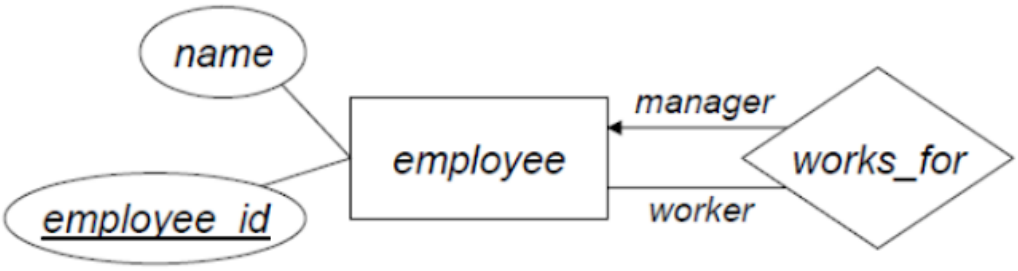
*

Transaction T1 holds a lock on a data item and it is having a time stamp 10 seconds and Transaction T2 arrives at 15 seconds and requests lock on the same data item. Suppose that wound-wait scheme is applied, choose the appropriate scenario:

a) T2 will kill T1
b) T1 will kill T2
c) T2 will be asked to wait
d) T2 will be aborted

- ○ a
- ○ b
- ◉ c
- ○ d

For the given ER model design, the equivalent Relational model design will be *



A. employee (**employee_id**, name) works_for (**employee_id**, manager_id)

B. employee (**employee_id**, name) works_for (employee_id, **manager_id**)

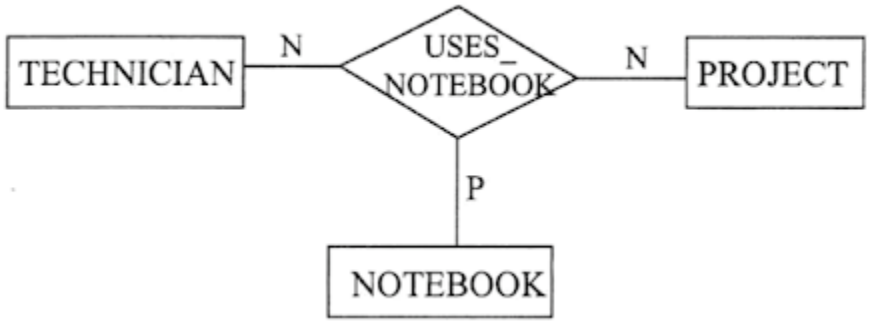
C. employee (**employee_id**, name) works_for (**employee_id**, **manager_id**)

- ○ A
- ○ B
- ◉ C
- ○ None of these

Optimization focuses on *

- ◉ Resource Consumption
- ○ Indices Length
- ○ Response Time
- ○ None of these

If you convert this Ternary relationship into multiple binary relationship without loosing any information, it will be resulted in how many Entities and Relationships? *



- (●) 3, 4
- ( ) 4, 3
- ( ) 3, 3
- ( ) None of these
- ( ) All correct

*

Consider these relations with the following properties:

r(A, B, C)	s(C, D, E)
30,000 tuples	60,000 tuples
25 tuples fit on 1 block	30 tuples fit on 1 block

Estimate the number of disk block accesses required for a natural join of r and s using a nested-loop join if r is used as the outer relation.

- ( ) 60,075,000
- ( ) 18,075,000
- ( ) 18,001,200
- (●) 60,001,200

Which of the following operation/s does/do not need the participating relations to be union compatible? *

- [ ] UNION
- [ ] INTERSECTION
- [x] None of these
- [ ] DIFFERENCE

*

Choose the correct option regarding the following query:

```
WITH max_marks (VALUE) AS
(SELECT MAX(marks)
FROM student)
SELECT studentID
FROM student,max_marks
WHERE student.marks = max_marks.value;
```

(A)The query is syntactically wrong
(B)The query gives the studentID of the student with the maximum marks
(C)The query gives the maximum marks amongst all the students
(D)The query gives all the studentID values except the student with the maximum marks

- ( ) A
- (•) B
- ( ) C
- ( ) D

Which one is NOT an advantage/are NOT advantages of trigger? *

- [x] Event logging and storing information on table access
- [ ] Deriving columns automatially
- [x] Allowing invalid transactions
- [ ] Referential integrity constraints ensuring

Which of the following is/are not correct. *

- [x] a SQL query automatically eliminates duplicates.
- [x] SQL permits attribute names to be repeated in the same relation.
- [x] a SQL query will not work if there are no indexes on the relations.
- [ ] None of these

*

An instance of relational schema R (A, B, C) has distinct values of A including NULL values. Which one of the following is true?
(A) A is a candidate key
(B) A is not a candidate key
(C) A is a primary key
(D) Both (A) and (C)

- (●) A
- ( ) B
- ( ) C
- ( ) D

Create a trigger on the EMP table that monitors every row that is changed *

- ○ FOR EACH ROW Statement trigger on the EMP table.
- ◉ FOR EACH ROW trigger on the EMP table.
- ○ Statement level trigger on the EMP table.

Select the correctness of the following statement: *

B+ Tree is more space efficient than the B Tree.

- ○ False
- ◉ True

The OLD and NEW qualifiers can be used in which type of trigger? *

- ☑ ROW LEVEL DML TRIGGERS
- ☐ ROW LEVEL SYSTEM TRIGGERS
- ☐ STATEMENT LEVEL DML TRIGGERS

In SQL the statement Select * from P cross join Q is equivalent to *

- ☑ Select * from P natural join Q
- ☐ Select * from P inner join Q
- ☑ Select * from P, Q
- ☐ Select * from P union join Q

If the objective is to create a trigger so that updated salary of employee must be greater than his/her previous salary. What should be filled at dotted line *

```
CREATE OR REPLACE TRIGGER UPDATE_CHECK
BEFORE UPDATE ON EMP
BEGIN
      ----------?----------
    RAISE_APPLICATION_ERROR (-20003,'NEW SALARY CAN NOT BE
    LESS THAN OLD SALARY');
    END IF;
END;
```

- (●) IF :NEW.SAL < :OLD.SAL THEN
- ( ) IF :NEW.SAL > :OLD.SAL THEN
- ( ) IF :NEW.SAL <> :OLD.SAL THEN
- ( ) None of these

Which statement/s is/are true? (a) A row level trigger is fired each time a row in the table affected by the triggering statement. (b) Row level triggers are created by using FOR EACH ROW clause in the CREATE TRIGGER command. (c) A statement trigger is fired once on behalf of the triggering statement, depending of the number of rows the triggering statement affects. (d) Statement level triggers are the default types of triggers created by the CREATE TRIGGER command. *

- [x] (a)
- [x] (c)
- [x] (d)
- [ ] None of these
- [x] (b)

Which integrity constraints automatically does create an index when defined? *

- [ ] NOT NULL constraints
- [ ] Foreign keys
- [x] UNIQUE constraints
- [x] Primary keys
- [ ] None of these

*

```
Which of the following is false about actual parameters

A. The actual parameter must be implicitly converted to the
data type of the formal parameter.
B. The actual parameter is the element of a collection.
C. The actual parameter is a scalar variable with
the NULL constraint.
D. The actual parameter is a scalar numeric variable with a
range, size, scale, or precision constraint.
```

- ( ) A
- ( ) B
- (•) C
- ( ) D

An advantage/ Advantages of the database management approach is/are not *

- [x] data redundancy increases
- [ ] none of these
- [ ] data is integrated and can be accessed by multiple programs
- [x] data is dependent on programs

Which of the following is true? *

- ( ) smaller the order of B-tree, less frequently the split occurs
- (•) larger the order of B-tree, less frequently the split occurs
- ( ) smaller the order of B-tree, more frequently the split occurs
- ( ) larger the order of B-tree, more frequently the split occurs

To access file records, _____ contains information about a file needed by system programs. *

- ( ) File operators
- ( ) File headers
- ( ) None of these
- (•) File blocks

How many Entities and Relationships are involved in standard recursive relationship? *

- ○ None of these
- ○ All correct
- ◉ 2, 1
- ○ 1, 1
- ○ 1, 2

If two relations R and S are joined, then the non-matching tuples of both R and S are not ignored in *

- ☑ left outer join
- ☐ None of these
- ☐ inner join
- ☑ full outer join
- ☑ right outer join

Which of the following manager is/are part/s of Storage Manager? *

- ☑ File Manager
- ☑ Buffer Manager
- ☑ Transaction Manager
- ☐ Logical Manager

Which of the following has schema for each of the related entity set in addition to the schema for the relationship set? *

- ○ A one-to-many relationship set
- ○ A multivalued attribute of an entity set
- ◉ A many-to-many relationship set
- ○ None of the mentioned

*

What is the height of a B+ Tree for the bellowed given keys?

(Consider the Degree or Order (m) = 3)

Keys: 34, 66, 8, 3, 276, 198, 699

- ◉ 3
- ○ 2
- ○ None of these
- ○ 5
- ○ 4

*

If the size of a block is 4 KB, and the transfer rate is 200 MB/s, calculate the approximate block transfer time (in ms).

- 0.03
- 0.01
- 0.04
- (selected) 0.02

*

Consider four transactions T1, T2, T3 and T4 and 3 data items X, Y and Z.

Determine that the following schedule is conflict serializable or not:

R2(X), W3(X), W1(X), W2(Y), R2(Z), R4(X), R4(Y)

A) YES
B) NO
C) CANNOT BE DETERMINED

- A
- (selected) B
- C

*

Consider a selection in EMPLOYEE file

$$\sigma_{\text{DeptId}=1}(\text{EMPLOYEE})$$

The file EMPLOYEE has the following statistical information:
f = 20 (there are 20 tuples can fit in one block)
V(DeptID, EMPLOYEE) = 10 (there are 10 different departments)
n = 1000 (there are 1000 tuples in the file)
Find number of blocks of Employee?
A)50
B)100
C)10
D)2

- (●) A
- ( ) B
- ( ) C
- ( ) D

A B-tree of order 5 and of height 3 will have a maximum of _____ keys. *

- ( ) 188
- ( ) 127
- ( ) 63
- (●) 624

SQL%ISOPEN attribute in an implicit cursor, is always *

- ○ %ISOPEN is not a valid attribute in an implicit cursor
- ○ True, because the implicit cursor is opened for a DML statement and is closed immediately after the execution of the DML statement
- ◉ False, because the implicit cursor is opened for a DML statement and is closed immediately after the execution of the DML statement
- ○ None of these

*

Consider these relations with the following properties:

r(A, B, C)	s(C, D, E)
30,000 tuples	60,000 tuples
25 tuples fit on 1 block	30 tuples fit on 1 block

Estimate the number of disk block accesses required for a natural join of r and s using a block nested-loop join if s is used as the outer relation. Assume that there are more than 2000 memory buffers available to facilitate this operation, where each memory buffer can buffer one disk block.

- ○ 3000
- ○ 3500
- ○ 4500
- ◉ 3200

*

A schedule which is view serializable is _____ conflict serializable.

a) always
b) never
c) May or may not be

- ○ a
- ○ b
- ◉ c

*

For two transactions T1 and T2, the schedule consisting of both of them will be irrecoverable when

a) T2 is reading the value of a data item modified by T1
b) T1 is reading the value of a data item modified by T2
c) T2 commits before T1
d) Both a) and c)
e) Both b) and c)

- ○ a
- ○ b
- ○ c
- ○ d
- ◉ e

What is the Error in the below syntax for droping stored procedure ? *

- ○ procedure name is not written
- ○ after drop, no need to write procedure. we can directly write procedure name
- ○ semicolon at the end is not required
- ◉ given syntax is error free

*

Rigorous two phase locking protocols has which of the following advantages:

1) Ensures serializability
2) Prevents cascade rollback
3) Prevents deadlock

- ☑ 1
- ☑ 2
- ☐ 3
- ☐ None of these

*

The concept which checks the syntax of query whether is written according to the rules of grammer is classified as

- ○ Query Graph
- ◉ Parser
- ○ Query Tree
- ○ Scanner

A functional dependency between two or more non-key attributes is called *

- ◉ Transitive dependency
- ○ Functional dependency
- ○ Partial functional dependency
- ○ Partial transitive dependency

*

In which of the following tree Deletion operation is easy?

- ◉ B+Tree
- ○ B Tree
- ○ Other: _____

Which is/are aggregate operator/s? *

- [ ] None of these
- [ ] TOTAL
- [x] AVG
- [x] MIN
- [x] MAX

*

Which of the given conditions would the query optimizer most likely decide to execute first if it wants to generate an optimal query plan for the SQL query given below?
Note: Assume that additional information regarding the statistics of relations R, S and T are not given.

SELECT * FROM R, S, T WHERE R.r = S.s AND S.id = T.id AND R.no = 102 AND S.price > 100;
A) R.r = S.s
B) S.id = T.id
C) S.price > 100
D) R.no = 102

- ( ) A
- ( ) B
- ( ) C
- (•) D

Find the Error in the below statements. Refer d count as d_count. *

```
Create function dept count(dept_name varchar(20))
begin
declare d count integer;
select count(*) into d count
from instructor
where instructor.dept_name= dept_name
return d count;
end
```

- [x] Reference relation is not mentioned
- [x] All of the mentioned
- [x] Dept_name is mismatched
- [x] Return type missing

The height of a B-tree of order m with t keys *

- (•) log m * (t+1) − 1
- ( ) m*t
- ( ) log k (m+1) − 1
- ( ) t*log(m)

Which integrity constraints automatically does create an index when defined? *

Consider a relation R (A, B, C, D) with the following instance;

A	B	C	D
1	1	2	3
1	2	2	3
1	3	2	3
2	4	5	6
5	6	7	8

Which of the following FD not hold in the given Relation?

(A) $A \rightarrow B$

(B) $A \rightarrow CD$

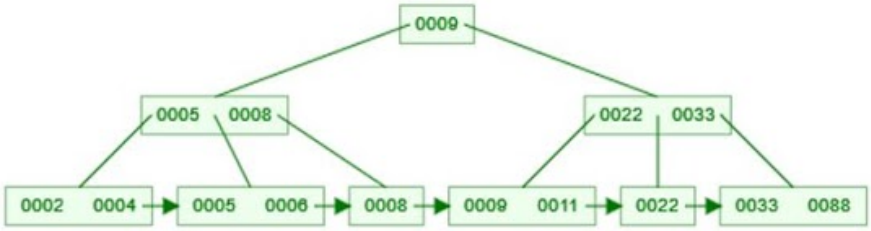
(C) $AB \rightarrow CD$

(D) $BD \rightarrow AC$

- [ ] A
- [ ] B
- [x] C
- [x] D
- [ ] None of these

*

After removing the Key: 0009 from the bellowed B+ Tree, which is/are the Key(s) in the Root Node.



- None of these
- 0011
- 0033
- 0022
- 0008

*

What will be the total number of page I/Os required for sorting a file (using external sort-merge algorithm) having 10,000 pages and the buffer storage available can store at most three pages.

- 3,25,000
- 1,30,000
- 2,60,000
- 3,00,000

*

Which of the following phenomenon is possible in transaction isolation level serializable?

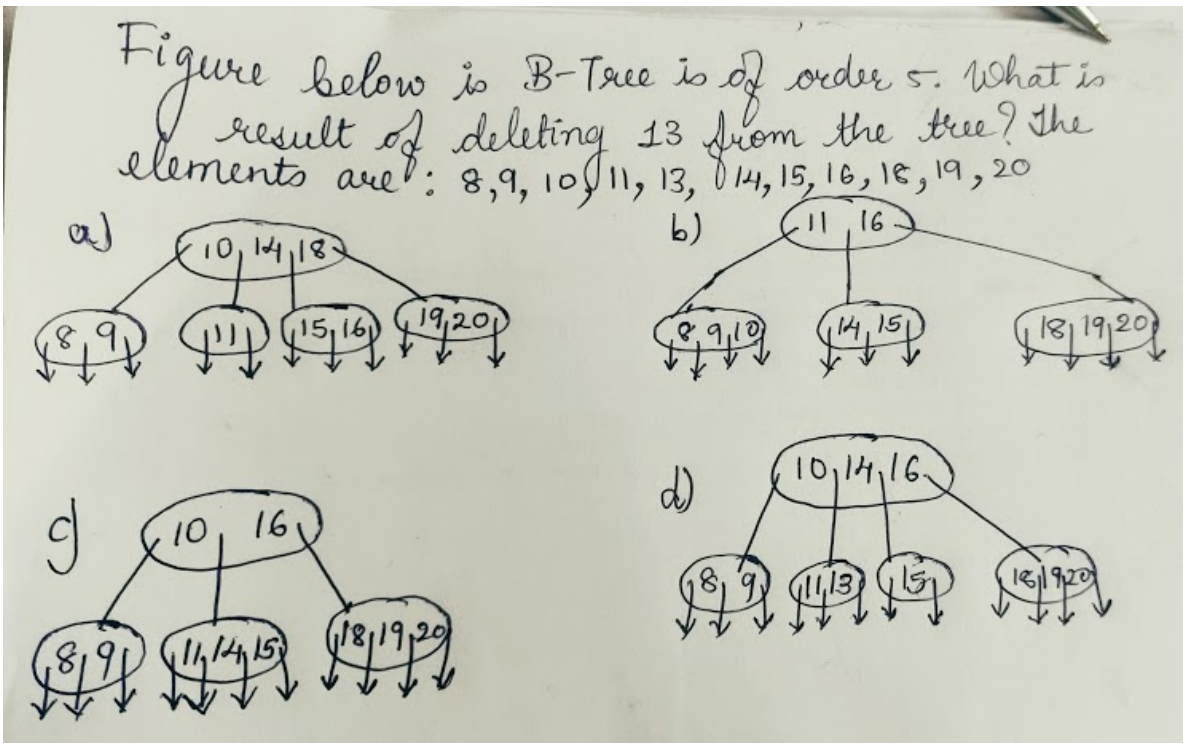
a) Dirty read
b) Non repeatable read
c) Phantom read
d) None of them

- [ ] a
- [ ] b
- [ ] c
- [x] d

In case of linear search based on nested join algorithm, if equality condition is on primary key, the query will surly result in *

- [ ] multiple records
- [ ] no record
- [x] single record
- [ ] unpredicted

Select the correct option *



- (●) Option a
- ( ) Option b
- ( ) Option c
- ( ) Option d

*

What kind of indexing is usually needed to efficiently evaluate the following query?

```
SELECT E.Id
FROM Employee E
WHERE E.salary <= 100000 AND E.salary >= 30000
```

- ( ) Primary B+ tree index with search key "salary"
- (●) Secondary B+ tree index with search key "Id"
- ( ) Primary B+ tree index with search key "Id"
- ( ) Secondary B+ tree index with search key "salary"

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