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.

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* Required

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*

A schedule which is view serializable is _____ conflict serializable.

    a) always

    b) never

    c) May or may not be

○ a

○ b

○ c

*

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
```

○ Secondary B+ tree index with search key "salary"

○ Secondary B+ tree index with search key "Id"

○ Primary B+ tree index with search key "salary"

○ Primary B+ tree index with search key "Id"

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

○ 127

○ 63

○ 188

◉ 624

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

☐ None of these

☐ NOT NULL constraints

☑ UNIQUE constraints

☑ Primary keys

☑ Foreign keys

*

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

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

☑ E

☐ None of these

*

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

O   a

O   b

O   c

O   d

---

*

Πcustomer_name, loan_number, amount (borrower $\bowtie$ 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

O   A

O   B

O   C

O   D

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 → RS
Q → V
R → T
ST → U
U → R

○ in 2NF, but not in 3NF

◉ not in 2NF

○ in 3NF, but not in BCNF

○ in BCNF

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

☐ None of these

☑ full outer join

☑ left outer join

☐ inner join

☑ right outer join

*

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

*

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.

○ 4500

○ 3000

○ 3200

○ 3500

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
```

☐ Dept_name is mismatched

☐ Reference relation is not mentioned

☐ Return type missing

☐ All of the mentioned

*

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).

- ● 0.02
- ○ 0.04
- ○ 0.01
- ○ 0.03

*

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

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

*

Identify the phenomenon that will occur in the following scenario:

Transaction T1	Transaction T2
R (X)	
	R (X)
Delete (X)	
	Read (X)

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

○ A

◉ B

○ C

○ D

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

Relational algebra is/are *

☐ Non procedural language

☐ Meta Language

☐ None of these

☑ Procedural language

☑ having a basic set of operations for manipulating relational data

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

○ single record

○ unpredicted

○ no record

◉ multiple records

*

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

○ B

○ C

*

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

○ 34, 8, 3, 66, 699, 198, 276

○ None of these

○ 699, 276, 198, 66, 34, 8, 3

○ 34, 66, 8, 3, 276, 198, 699

*

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.

○ 18,001,200

○ 18,075,000

○ 60,001,200

○ 60,075,000

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

○ EQUAL TO (q − 1)/2

○ MIN (q − 1)/2

○ MAX (q − 1)/2

○ MIN 2*q

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

○ File blocks

○ File operators

○ None of these

◉ File headers

*

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

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

☐ data redundancy increases

☐ data is dependent on programs

☑ data is integrated and can be accessed by multiple programs

☐ none of these

Select the correctness of the following statement: *

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

○ False

◉ True

*
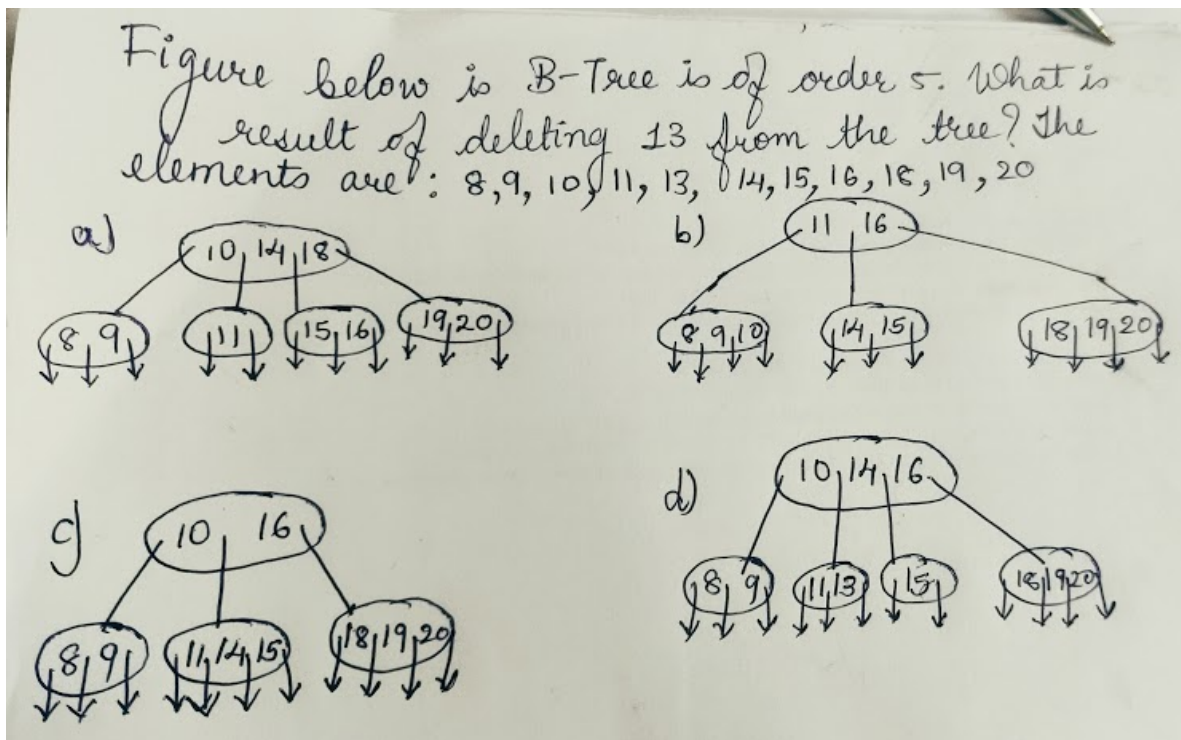
In which of the following tree Deletion operation is easy?

◉ B+Tree

○ B Tree

○ Other:

Select the correct option *

○ Option a

○ Option b

○ Option c

○ Option d

Optimization focuses on *

○ Resource Consumption

○ Indices Length

○ Response Time

○ None of these

*

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

○ Scanner

○ Query Graph

◉ Parser

○ Query Tree

*

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

○ b

○ c

○ d

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)

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

○ None of these

◉ False, because the implicit cursor is opened for a DML statement and is closed immediately after the execution of the DML statement

*

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

☑ UNION

☑ INTERSECTION

☐ None of these

☑ DIFFERENCE

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

○ FOR EACH ROW trigger on the EMP table.

○ Statement level trigger on the EMP table.

◉ FOR EACH ROW Statement trigger on the EMP table.

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

○ (a) Strict two phase locking, (b) non-conflict serializable, (c) non-recoverable

○ (a) Strict two phase locking, (b) non-conflict serializable, (c) recoverable

◉ (a) Strict two phase locking, (b) conflict serializable, (c) recoverable

○ (a) Two phase locking, (b) conflict serializable, (c) recoverable

*

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

For the given ER model design, the equivalent Relational model design will be *
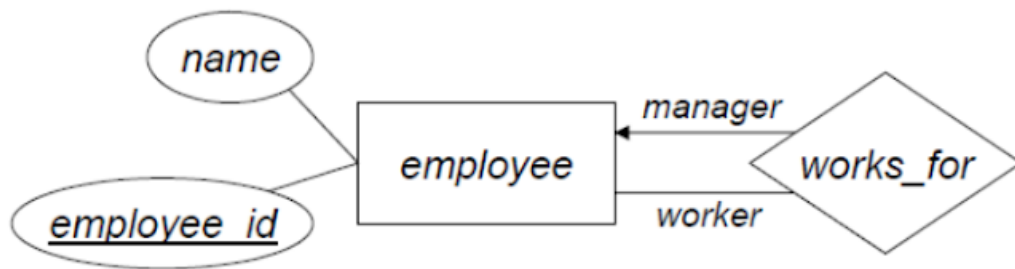
A. employee (**employee id**, name)   works for (**employee id**, manager id)

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

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

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

☐ Select * from P inner join Q

☐ Select * from P, Q

☐ Select * from P natural join Q

☐ Select * from P union join Q

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

*

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

*

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

*

After removing the Key: 0009 from the bellowed B+ Tree, which is/are the Key(s) in the Root Node.
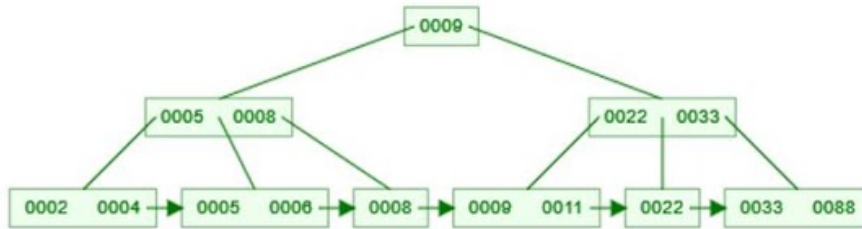
○ 0008

○ None of these

○ 0033

○ 0022

○ 0011

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. *

☐ (c)

☐ (d)

☐ None of these

☐ (b)

☑ (a)

*

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

○ 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

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

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

○ 1, 1

○ All correct

○ 1, 2

○ None of these

○ 2, 1

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.

○ None of these

○ Display series of numbers: 99, 66, 33......, 3

○ Display series of numbers: 3, 6, 9 ... ... ,93, 96, 99

◉ Display series of numbers: 99, 96, 93...... ,9, 6, 3

*

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

Which of the following is true? *

○ smaller the order of B-tree, more frequently the split occurs

○ smaller the order of B-tree, less frequently the split occurs

◉ larger the order of B-tree, less frequently the split occurs

○ larger the order of B-tree, more frequently the split occurs

*

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.

◉ ≈ 3200 Page Transfers

○ ≈ 3000 Page Transfers

○ ≈ 4500 Page Transfers

○ ≈ 2500 Page Transfers

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

☐ ROW LEVEL SYSTEM TRIGGERS

☑ ROW LEVEL DML TRIGGERS

☐ STATEMENT LEVEL DML TRIGGERS

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

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

☐ C

☐ D

☐ None of these

*

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

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? *

☑ 1NF

☐ 2NF

☐ 3NF

☐ None of these

☐ 4NF

☐ BCNF

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

◉ Transitive dependency

○ Partial transitive dependency

○ Partial functional dependency

○ Functional dependency

*

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

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

☐ DML

☐ ReQuery log

☑ Data dictionary

☑ Transaction log

*

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.

○ 1,30,000

○ 3,00,000

◉ 2,60,000

○ 3,25,000

Which of the following is/are not correct. *

☑ a SQL query automatically eliminates duplicates.

☑ SQL permits attribute names to be repeated in the same relation.

☑ a SQL query will not work if there are no indexes on the relations.

☐ 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? *
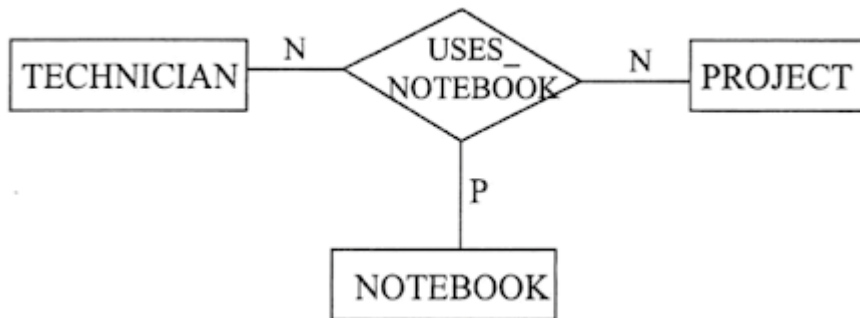
○ 3, 4

○ None of these

○ 3, 3

○ All correct

○ 4, 3

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

☐ Event logging and storing information on table access

☑ Allowing invalid transactions

☐ Referential integrity constraints ensuring

☐ Deriving columns automatially

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

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

Which is/are aggregate operator/s? *

- ☑ AVG
- ☐ None of these
- ☑ MIN
- ☑ MAX
- ☐ TOTAL

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