Question & Response Results

* Question: Create six multiple choice question and answer of the question with the Isolation concept

Response: LEVEL: 1 (Remember)  
PAGE SOURCE: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, page 771  
Question: Define the level of isolation for a transaction that does not overwrite the dirty reads of higher-level transactions.  
A) Level 0  
B) Level 1  
C) Level 2  
D) Level 3  
Answer: A) Level 0  
  
LEVEL: 2 (Understand)  
PAGE SOURCE: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, page 771  
Question: Explain what level 1 isolation has in terms of transactions.  
A) Level 1 isolation ensures no lost updates and no dirty reads.  
B) Level 1 isolation ensures no lost upgrades.  
C) Level 1 isolation ensures that a transaction does not overwrite the dirty reads of higher-level transactions.  
D) Level 1 isolation has no phantom record problem.  
Answer: A) Level 1 isolation ensures no lost updates and no dirty reads.  
  
LEVEL: 3 (Apply)  
PAGE SOURCE: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, page 771  
Question: Solve the scenario where a transaction needs level 2 isolation. What properties does it have?  
A) Level 2 isolation ensures no lost updates, no dirty reads, and repeatable reads.  
B) Level 2 isolation ensures no lost upgrades, no dirty reads, and repeatable reads.  
C) Level 2 isolation ensures that a transaction does not overwrite the dirty reads of higher-level transactions, but it may have phantom record problems.  
D) Level 2 isolation has, in addition to level 1 properties, phantom record problems.  
Answer: A) Level 2 isolation ensures no lost updates, no dirty reads, and repeatable reads.  
  
LEVEL: 4 (Analyze)  
PAGE SOURCE: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, page 771-772  
Question: Compare level 0 isolation and level 2 isolation.  
A) Level 0 isolation ensures no lost updates and no dirty reads while level 2 isolation has, in addition to level 0 properties, repeatable reads.  
B) Level 0 isolation has phantom record problems while level 2 isolation ensures no lost updates and no dirty reads.  
C) Level 0 isolation may have phantom record problems while level 2 isolation ensures no lost upgrades and no dirty reads.  
D) Level 0 isolation does not overwrite the dirty reads of higher-level transactions, but it may have phantom record problems; on the other hand, level 2 isolation has, in addition to level 0 properties, repeatable reads.  
Answer: D) Level 0 isolation does not overwrite the dirty reads of higher-level transactions, but it may have phantom record problems; on the other hand, level 2 isolation has, in addition to level 0 properties, repeatable reads.  
  
LEVEL: 5 (Evaluate)  
PAGE SOURCE: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, page 794-795  
Question: Determine whether the protocol based on snapshot isolation can utilize techniques similar to those proposed in validation-based and multiversion methods.  
A) Yes, it can.  
B) No, it cannot.  
Answer: A) Yes, it can.  
  
LEVEL: 6 (Create)  
PAGE SOURCE: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, page 788-789  
Question: Develop a SQL query using snapshot isolation to avoid the phantom record problem based on Table 20.1 in the document.  
A) SELECT \* FROM Table\_Name WHERE Isolation\_Level = 'Snapshot Isolation'  
B) SELECT \* FROM Table\_Name WHERE Isolation\_Level IS NOT NULL AND Dirty\_Reads IS FALSE AND Nonrepeatable\_Reads IS FALSE AND Phantom IS FALSE  
C) SELECT \* FROM Table\_Name WHERE Isolation\_Level IN ('Snapshot Isolation', 'Read Committed', 'Repeatable Read', 'Serializable')  
D) SELECT \* FROM Table\_Name WHERE Isolation\_Level = 'Snapshot Isolation' AND Dirty\_Reads IS FALSE AND Nonrepeatable\_Reads IS FALSE AND Phantom IS FALSE  
Answer: D) SELECT \* FROM Table\_Name WHERE Isolation\_Level = 'Snapshot Isolation' AND Dirty\_Reads IS FALSE AND Nonrepeatable\_Reads IS FALSE AND Phantom IS FALSE

* Question: Create six multiple choice question and answer of the question with the Join concept

Response: Level: Remember  
Question: Define EQUIJOIN (or NATURAL JOIN) in the context of databases.  
A) A type of SQL command used to insert a single tuple into a relation.  
B) A technique for implementing multiway joins involving more than two files.  
C) A comparison operator used in some systems to specify outer joins.  
D) An operation that generates all possible tuple combinations.  
Answer: A join on two files.  
LEVEL: 1  
PAGE SOURCE: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf - page 681  
  
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Level: Understand  
Question: Explain how EQUIJOIN is performed between two tables.  
A) By comparing the primary keys of both tables and returning matching rows.  
B) By performing the CARTESIAN PRODUCT operation on both tables.  
C) By using the comparison operators + =, = +, and + = + for left, right, and full outer join respectively.  
D) By generating all possible tuple combinations from both tables.  
Answer: By comparing the join attributes of both tables and returning matching rows.  
LEVEL: 2  
PAGE SOURCE: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf - page 681  
  
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Level: Apply  
Question: Solve the following join operation: EMPLOYEE Dno=Dnumber DEPARTMENT  
A) Using the CARTESIAN PRODUCT operation on both tables and then filtering out the matching rows.  
B) By using comparison operators to perform a full outer join between the two tables.  
C) By comparing the join attributes (Dno and Dnumber) of the EMPLOYEE and DEPARTMENT tables respectively.  
D) By generating all possible tuple combinations from both tables and then filtering out the matching rows.  
Answer: C) By comparing the join attributes (Dno and Dnumber) of the EMPLOYEE and DEPARTMENT tables respectively.  
LEVEL: 3  
PAGE SOURCE: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf - page 681  
  
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Level: Analyze  
Question: Compare and contrast EQUIJOIN with the CARTESIAN PRODUCT operation.  
A) Both operations generate all possible tuple combinations, but EQUIJOIN filters out matching rows while the CARTESIAN PRODUCT does not.  
B) EQUIJOIN is used only for two-way joins while the CARTESIAN PRODUCT can be used for more than two tables.  
C) The CARTESIAN PRODUCT is used only with the utmost care because it generates all possible tuple combinations, but EQUIJOIN does not.  
D) Both operations are identical and can be used interchangeably in SQL queries.  
Answer: A) Both operations generate all possible tuple combinations, but EQUIJOIN filters out matching rows while the CARTESIAN PRODUCT does not.  
LEVEL: 4  
PAGE SOURCE: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf - page 681  
  
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Level: Evaluate  
Question: Determine which of the following statements about SQL JOIN is correct.  
A) SELECT \* FROM EMPLOYEE INNER JOIN DEPARTMENT ON Dno = Dnumber WHERE Salary > 5000; will return all rows from both tables where the Dno column in EMPLOYEE matches the Dnumber column in DEPARTMENT and the salary is greater than 5000.  
B) SELECT \* FROM EMPLOYEE INNER JOIN DEPARTMENT ON Dno = Dnumber WHERE Salary < 5000; will return all rows from both tables where the Dno column in EMPLOYEE does not match the Dnumber column in DEPARTMENT and the salary is less than 5000.  
C) SELECT \* FROM EMPLOYEE INNER JOIN DEPARTMENT ON Dno = Dnumber WHERE Salary >= 5000; will return all rows from both tables where the Dno column in EMPLOYEE matches the Dnumber column in DEPARTMENT and the salary is greater than or equal to 5000.  
D) SELECT \* FROM EMPLOYEE INNER JOIN DEPARTMENT ON Dno = Dnumber WHERE Salary <= 5000; will return all rows from both tables where the Dno column in EMPLOYEE does not match the Dnumber column in DEPARTMENT and the salary is less than or equal to 5000.  
Answer: C) SELECT \* FROM EMPLOYEE INNER JOIN DEPARTMENT ON Dno = Dnumber WHERE Salary >= 5000; will return all rows from both tables where the Dno column in EMPLOYEE matches the Dnumber column in DEPARTMENT and the salary is greater than or equal to 5000.  
LEVEL: 5  
PAGE SOURCE: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf - page 681  
  
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Level: Create  
Question: Generate a SQL query to find the employee's name, department name, and project number where the employee is working on a project in Stafford location.  
A) SELECT Ename, Dname, Pnumber FROM EMPLOYEE JOIN DEPARTMENT ON Mgr\_ssn = Ssn JOIN PROJECT ON Project\_dno = Dnumber WHERE Plocation = 'Stafford';  
B) SELECT Ename, Dname, Pnumber FROM EMPLOYEE INNER JOIN DEPARTMENT ON Mgr\_ssn = Ssn INNER JOIN PROJECT ON Project\_dno = Dnumber WHERE Plocation = 'Stafford';  
C) SELECT E.Ename, D.Dname, P.Pnumber FROM (EMPLOYEE JOIN DEPARTMENT ON Mgr\_ssn = Ssn) AS J1 JOIN PROJECT AS J2 ON J1.Project\_dno = J2.Dnumber WHERE Plocation = 'Stafford';  
D) SELECT Ename, Dname, Pnumber FROM (EMPLOYEE INNER JOIN DEPARTMENT ON Mgr\_ssn = Ssn) AS J1 INNER JOIN PROJECT AS J2 ON J1.Project\_dno = J2.Dnumber WHERE Plocation = 'Stafford';  
Answer: D) SELECT Ename, Dname, Pnumber FROM (EMPLOYEE INNER JOIN DEPARTMENT ON Mgr\_ssn = Ssn) AS J1 INNER JOIN PROJECT AS J2 ON J1.Project\_dno = J2.Dnumber WHERE Plocation = 'Stafford';  
LEVEL: 6  
PAGE SOURCE: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf - page 681

* Question: Create six multiple choice question and answer of the question with the Key attributes concept

Response: Level: Remember (Level 1)  
Question: Define "Composite key" in the context of databases.  
A) A single attribute used as a key  
B) An index on a search key field that is a combination of multiple attributes  
C) A multi-valued attribute that requires some analysis of the meaning of its component attributes  
D) A unique key specified in the CREATE TABLE statement for a relation.  
Answer: B) An index on a search key field that is a combination of multiple attributes. (Source: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, Page 645)  
  
Level: Remember (Level 1)  
Question: What is the purpose of an ordered index on multiple attributes in databases?  
A) To provide efficient access by a key value that is a combination of those attributes  
B) To analyze the meaning of the component attributes of a multi-valued attribute  
C) To determine the primary or secondary keys for files  
D) To map a composite, multivalued attribute.  
Answer: A) To provide efficient access by a key value that is a combination of those attributes. (Source: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, Page 645)  
  
Level: Understand (Level 2)  
Question: Explain the process of setting up an access structure to provide efficient access by a key value that is a combination of multiple attributes in databases.  
A) By creating a single attribute index on multiple search keys  
B) By using the UNIQUE clause within the CREATE TABLE statement  
C) By analyzing the meaning of the component attributes of multi-valued attributes  
D) By implementing an ordered index on multiple attributes.  
Answer: D) By implementing an ordered index on multiple attributes. (Source: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, Page 645)  
  
Level: Apply (Level 3)  
Question: Solve the given problem using the concepts learned about composite keys and indexes on multiple attributes: List the employees in department number 4 whose age is 59 in an EMPLOYEE file with attributes Dno, Age, Street, City, Zip\_code, Salary, and Skill\_code.  
A) Create a single attribute index on Dno or Age fields  
B) Implement an ordered index on (Dno, Age) to efficiently access the required records  
C) Analyze the meaning of the component attributes of the composite key  
D) Use the UNIQUE clause within the CREATE TABLE statement to specify the composite key.  
Answer: B) Implement an ordered index on (Dno, Age) to efficiently access the required records. (Source: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, Page 645)  
  
Level: Analyze (Level 4)  
Question: Compare and contrast the differences between primary keys and unique keys in databases.  
A) Primary keys are single attributes used as a key, while unique keys can be composite keys or candidate keys  
B) Unique keys can be specified with the UNIQUE clause within the CREATE TABLE statement, while primary keys require additional clauses to specify their components  
C) Primary keys and unique keys both refer to the same set of attributes that make up a relation's key  
D) Composite keys are only applicable for unique keys, not primary keys.  
Answer: A) Primary keys are single attributes used as a key, while unique keys can be composite keys or candidate keys. (Source: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, Pages 199 and 645)  
  
Level: Create (Level 6)  
Question: Generate an example of how to specify a primary key using the PRIMARY KEY clause in SQL for a relation with multiple attributes.  
A) DEPARTMENT(Dnumber INT PRIMARY KEY, Age INT PRIMARY KEY)  
B) PROJECT(Dnum INT UNIQUE, Dnumber INT PRIMARY KEY)  
C) EMPLOYEE(Ssn INT PRIMARY KEY, (Dno, Age))  
D) DEPARTMENT(Dnumber INT PRIMARY KEY, (Dno, Age))  
Answer: D) DEPARTMENT(Dnumber INT PRIMARY KEY, (Dno, Age)) (Source: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, Page 199)

* Question: Create six multiple choice question and answer of the question with the Left Join concept

Response: I have created six questions following the criteria for different difficulty levels, based on the context provided. Each question includes the content of the question, four choices, and the correct answer.  
  
LEVEL | Question | A) Choice 1 | B) Choice 2 | C) Choice 3 | D) Choice 4 | Answer | PAGE SOURCE  
------|---------------------------------------------------------------------------------------------------|----------------------------------------------------|-----------------------------------------------------|-----------------------------------------------|-----------------------|-------------|  
Remember | What does LEFT OUTER JOIN return when an employee has no associated department? | A) The same results as a regular (inner) join | B) Employees name and the department name | C) Only department name | D) No results | A | 694  
Remember | What is the result of a left outer join operation in SQL? | A) A table containing only employee names | B) A table containing only department names | C) A table with the same results as a regular (inner) join| D) A table that includes tuples for all employees and departments | C | 694  
Understand | Which type of tree is typically chosen by query optimizers to estimate the cost of join trees? | A) Bushy join trees | B) Left-deep join trees | C) Right-deep join trees | D) Cartesian product join trees | B | 735  
Analyze | Which join algorithms can be used to compute a left outer join? | A) Only nested-loop join or single-loop join| B) Index-based nested-loop, merge-join, and hash-join | C) Inner join, anti-join, and outer join | D) Nested-loop join, single-loop join, and sort-merge join | A | 693  
Evaluate | Why are left-deep trees preferred over bushy or right-deep trees? | A) They work well with common algorithms for join, including nested-loop, index-based nested-loop, and other one-pass algorithms. | B) They can generate fully pipelined plans (i.e., plans where all joins can be evaluated using pipelining). | C) They provide a more efficient way to estimate the cost of join trees. | D) All of the above | D | 735, 738  
Create | Write an SQL query that performs a left outer join between EMPLOYEE and DEPARTMENT tables based on the given context. | A) SELECT E.Lname , E.Fname, D.Dname FROM DEPARTMENT E LEFT OUTER JOIN EMPLOYEE D ON E.Dno = E.Dnumber; | B) SELECT E.Lname , E.Fname, D.Dnumber FROM EMPLOYEE E LEFT OUTER JOIN DEPARTMENT D ON E.Dno = D.Dnumber; | C) SELECT D.Dname , E.Lname, E.Fname FROM DEPARTMENT D LEFT OUTER JOIN EMPLOYEE E ON E.Dno = D.Dnumber ; | D) SELECT E.Lname , E.Fname, E.Dno FROM EMPLOYEE E LEFT OUTER JOIN DEPARTMENT D ON E.Dno = D.Dnumber ; | A | 694

* Question: Create six multiple choice question and answer of the question with the Locking concept

Response: Level: Remember  
Question: What is a binary lock associated with each database item X?  
A) A distinct lock that can have two states or values: locked and unlocked  
B) A distinct lock that can have three states: read-locked, write-locked, and unlocked  
C) A distinct lock that can have four states: read-locked, write-locked, locked, and unlocked  
D) A distinct lock that can have one state: locked or unlocked  
Answer: A) A distinct lock that can have two states or values: locked and unlocked (PAGE SOURCE: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, page 795)  
  
Level: Understand  
Question: What are the two operations used with binary locking?  
A) read\_item and write\_item  
B) lock\_item and unlock\_item  
C) read\_lock and write\_lock  
D) read and write  
Answer: B) lock\_item and unlock\_item (PAGE SOURCE: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, page 795)  
  
Level: Apply  
Question: A transaction T requests access to an item X by first issuing a lock\_item(X) operation. What can we infer about the state of the lock on X?  
A) The value of the lock on X is changed to 0  
B) The value of the lock on X remains as it is  
C) The transaction T holds the lock on item X  
D) Item X cannot be accessed by a database operation that requests the item  
Answer: C) The transaction T holds the lock on item X (PAGE SOURCE: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, page 795)  
  
Level: Analyze  
Question: Compare binary locking and shared/exclusive (or read/write) locks in terms of the number of transactions that can hold a lock on a given item.  
A) Binary locking allows more transactions to hold a lock on a given item than shared/exclusive locks  
B) Shared/exclusive locks allow more transactions to hold a lock on a given item than binary locks  
C) Both allow the same number of transactions to hold a lock on a given item  
D) Neither allows multiple transactions to hold a lock on a given item  
Answer: B) Shared/exclusive locks allow more transactions to hold a lock on a given item than binary locks (PAGE SOURCE: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, page 797, 798)  
  
Level: Evaluate  
Question: Justify the need for the rules enforced by the lock manager module of the DBMS in two-phase locking techniques.  
A) To ensure that at most one transaction can hold the lock on a particular item  
B) To allow multiple transactions to access the same item concurrently  
C) To enforce read\_lock and write\_lock operations before any read\_item or write\_item operation is performed in a transaction  
D) To enable faster processing of transactions  
Answer: A) To ensure that at most one transaction can hold the lock on a particular item (PAGE SOURCE: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, page 797)  
  
Level: Create  
Question: Develop an algorithm for read\_lock(X) and write\_lock(X) operations in shared/exclusive locking scheme.  
Answer: [Here is a simplified version of the algorithms, assuming that LOCK(X) represents the state of the lock associated with item X, no\_of\_reads(X) keeps track of the number of current read locks on X, and wait\_queue is a data structure to manage waiting transactions.  
  
1. read\_lock(X):  
 A: if LOCK( X) = unlocked  
 then begin LOCK(X) read-locked;  
 no\_of\_reads(X) 1;  
 end  
 else if LOCK(X) = read-locked  
 then no\_of\_reads(X) no\_of\_reads(X) + 1  
 else begin  
 add transaction to wait\_queue;  
 wait (until LOCK(X) = unlocked);  
 go to A;  
 end  
  
2. write\_lock(X):  
 A: if LOCK( X) = unlocked  
 then LOCK(X) write-locked;]  
(PAGE SOURCE: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, page 798)

* Question: Create six multiple choice question and answer of the question with the Logging concept

Response: Level: Remember (Define)  
Question: What is a log in the context of databases?  
A) A collection of data items where each item has a key that allows direct access to it  
B) A sequence of fields, each of which can be of any permissible type  
C) A summary tuple from a table  
D) A file that is kept on disk and used to recover from failures that affect transactions  
Answer: D) A file that is kept on disk and used to recover from failures that affect transactions (Page Source: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, page 768)  
  
Level: Understand (Explain)  
Question: How does a log work in a database system?  
A) The log is a sequential, append-only file that is kept on disk and affected by any type of failure except for disk or catastrophic failure.  
B) The log maintains all transaction operations that affect the values of database items and other transaction information needed to permit recovery from failures.  
C) The log serves as a backup of the database to guard against catastrophic failures.  
D) All of the above.  
Answer: D) All of the above (Page Source: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, page 768)  
  
Level: Apply (Solve)  
Question: Given a database system failure, how can the log help in recovery?  
A) The log can be used to rollback transactions that were not committed before the failure occurred.  
B) The log can provide information needed for data consistency checks after the failure is resolved.  
C) The log can help identify the root cause of the failure.  
D) All of the above.  
Answer: D) All of the above (Page Source: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, page 768)  
  
Level: Analyze (Compare)  
Question: Compare and contrast logs in databases and system logs in operating systems.  
A) Both types of logs are sequential, append-only files that help recover from failures. However, database logs only focus on transaction operations, while system logs contain a broader range of system events.  
B) Database logs help maintain data consistency by keeping track of all changes to the database items, whereas system logs do not have this capability.  
C) System logs are typically used for debugging and troubleshooting, while database logs are used for data recovery purposes only.  
D) Both types of logs can be used for debugging and troubleshooting, as well as for data consistency checks and recovery from failures.  
Answer: A) Both types of logs are sequential, append-only files that help recover from failures. However, database logs only focus on transaction operations, while system logs contain a broader range of system events. (Page Source: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, page 768 and not explicitly mentioned in the context)  
  
Level: Evaluate (Justify)  
Question: Justify why a log buffer is used in database systems.  
A) The log buffer holds the last part of the log file, so that log entries are first added to the log main memory buffer before being appended to the end of the log file on disk. This ensures efficient logging and minimizes the need for disk access.  
B) The log buffer serves as a backup of the database to guard against catastrophic failures.  
C) The log buffer helps in debugging and troubleshooting by providing detailed information about transactions that affect the values of database items.  
D) All of the above.  
Answer: A) The log buffer holds the last part of the log file, so that log entries are first added to the log main memory buffer before being appended to the end of the log file on disk. This ensures efficient logging and minimizes the need for disk access. (Page Source: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, page 768)  
  
Level: Create (Generate)  
Question: Develop a scenario where using a log in a database system can be beneficial.  
A) A bank is experiencing a high volume of transactions during a busy period. Without a log, it would be difficult to recover from any failures that might occur and ensure the integrity of the transactions. However, with a log, the bank can easily rollback transactions that were not committed before the failure occurred, ensuring data consistency and preventing financial losses.  
Answer: A) Correct (Page Source: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, page 768 and not explicitly mentioned in the context, but it is a realistic scenario that can be inferred from the text)

* Question: Create six multiple choice question and answer of the question with the Lossless Join concept

Response: LEVEL: 1 - Remember  
Question: Define Lossless Join concept. (page source: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, page: 739)  
A) A type of join that ensures all combinations of tuples from two or more tables are generated without repetition.  
B) A type of join that allows the specification of the join of three or more tables as a single joined table.  
C) A concept used to ensure efficient use of resources in database queries.  
D) A concept used to guarantee the integrity of data during the joining process.  
Answer: A) A type of join that ensures all combinations of tuples from two or more tables are generated without repetition.  
  
LEVEL: 2 - Understand  
Question: Explain the importance of Lossless Join in database systems. (page source: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, page: 739)  
A) It helps in efficient use of resources during database queries and ensures all combinations of tuples from two or more tables are generated without repetition.  
B) It is used to guarantee the integrity of data during the joining process but may not be essential for all types of queries.  
C) It allows the specification of the join of three or more tables as a single joined table, which simplifies complex queries.  
D) It ensures that only required combinations of tuples from two or more tables are generated, thus reducing unnecessary data.  
Answer: A) It helps in efficient use of resources during database queries and ensures all combinations of tuples from two or more tables are generated without repetition.  
  
LEVEL: 3 - Apply  
Question: Solve the following join operation using Lossless Join concept. (page source: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, page: 681)  
OP1: EMPLOYEE Dnumber = Dnumber DEPARTMENT  
A) Execute a left outer join operation on the EMPLOYEE and DEPARTMENT tables using Lossless Join concept to obtain all employees and their corresponding department details.  
B) Execute a right outer join operation on the EMPLOYEE and DEPARTMENT tables using Lossless Join concept to obtain all departments and their corresponding employee details.  
C) Execute a full outer join operation on the EMPLOYEE and DEPARTMENT tables using Lossless Join concept to obtain all employees, all departments, and their mutual relationships.  
D) Execute an inner join operation on the EMPLOYEE and DEPARTMENT tables without using Lossless Join concept as it is not required for inner joins.  
Answer: C) Execute a full outer join operation on the EMPLOYEE and DEPARTMENT tables using Lossless Join concept to obtain all employees, all departments, and their mutual relationships.  
  
LEVEL: 4 - Analyze  
Question: Compare Lossless Join with other types of joins like Inner Join, Outer Join, or Full Outer Join. (page source: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, page: 739)  
A) Lossless Join is a more efficient method for all types of join operations compared to Inner Join, Outer Join, or Full Outer Join.  
B) Lossless Join can only be used for Inner Joins and may not be suitable for other types of joins like Outer Join or Full Outer Join.  
C) Lossless Join is a specific type of Inner Join that ensures all combinations of tuples from two or more tables are generated without repetition.  
D) Lossless Join can be used to generate all possible tuple combinations, making it suitable for both Inner Joins and Outer Joins.  
Answer: C) Lossless Join is a specific type of Inner Join that ensures all combinations of tuples from two or more tables are generated without repetition.  
  
LEVEL: 5 - Evaluate  
Question: Justify the use of Lossless Join in complex database queries with multiple joins and large datasets. (page source: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, page: 739)  
A) Lossless Join helps in efficient resource utilization by reducing the number of possible join orderings and minimizing the generation of unnecessary data combinations.  
B) Lossless Join is not recommended for complex database queries with multiple joins and large datasets as it may lead to performance degradation due to the combinatorial explosion of possible join orderings.  
C) Lossless Join ensures the integrity of data during the joining process, making it essential for all types of queries.  
D) Lossless Join simplifies complex queries by allowing the specification of multiway joins as single joined tables, thus reducing query complexity.  
Answer: A) Lossless Join helps in efficient resource utilization by reducing the number of possible join orderings and minimizing the generation of unnecessary data combinations.  
  
LEVEL: 6 - Create  
Question: Generate a multiple table SQL query using the Lossless Join concept for combining EMPLOYEE, DEPARTMENT, and PROJECT tables. (page source: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, page: 681)  
A) SELECT \* FROM EMPLOYEE INNER JOIN DEPARTMENT ON Dnumber = Dnumber;  
B) SELECT \* FROM EMPLOYEE FULL OUTER JOIN DEPARTMENT ON Dnumber = Dnumber;  
C) SELECT \* FROM (EMPLOYEE INNER JOIN DEPARTMENT ON Dnumber = Dnumber) AS combined\_table JOIN PROJECT ON Mgr\_ssn = Ssn;  
D) SELECT \* FROM EMPLOYEE LEFT OUTER JOIN DEPARTMENT ON Dnumber = Dnumber RIGHT OUTER JOIN PROJECT ON Mgr\_ssn = Ssn;  
Answer: C) SELECT \* FROM (EMPLOYEE INNER JOIN DEPARTMENT ON Dnumber = Dnumber) AS combined\_table JOIN PROJECT ON Mgr\_ssn = Ssn;

* Question: Create six multiple choice question and answer of the question with the Mandatory Access Control (MAC) concept

Response: Question Level: Remember  
Question: Define Mandatory Access Control (MAC)?  
A) A security policy that controls access to files based on roles  
B) A security policy that uses labels for row-level access control  
C) A security policy that ensures a high degree of protection for military and high-security types of applications  
D) A security policy that allows the propagation and use of information once accessed by authorized users  
Answer: C) A security policy that ensures a high degree of protection for military and high-security types of applications  
  
Question Level: Understand  
Question: Explain how Mandatory Access Control (MAC) prevents illegal flow of information?  
A) By imposing control on the propagation of information once it has been accessed by users authorized to do so  
B) By using labels for row-level access control  
C) By allowing the propagation and use of information once accessed by authorized users  
D) By ensuring a high degree of protectionin a way, they prevent any unauthorized flow of information  
Answer: D) By ensuring a high degree of protectionin a way, they prevent any unauthorized flow of information  
  
Question Level: Apply  
Question: Solve the following scenario using MAC: A military organization needs to protect sensitive data from unauthorized access.  
A) Implement Discretionary Access Control (DAC) policies  
B) Implement Role-Based Access Control (RBAC) models  
C) Implement Mandatory Access Control (MAC) policies  
D) Implement Label-Based Security and Row-Level Access Control  
Answer: C) Implement Mandatory Access Control (MAC) policies  
  
Question Level: Analyze  
Question: Compare MAC with DAC in terms of security vulnerability.  
A) Both have the same level of security vulnerability  
B) MAC is more vulnerable to malicious attacks than DAC  
C) DAC is more vulnerable to malicious attacks than MAC  
D) Both are equally secure but serve different application domains  
Answer: C) DAC is more vulnerable to malicious attacks than MAC  
  
Question Level: Evaluate  
Question: Justify the suitability of Mandatory Access Control (MAC) for military and high-security types of applications.  
A) MAC does not provide mechanisms for addressing security issues related to execution of tasks and workflows  
B) MAC policies are too rigid and require a strict classification of subjects and objects into security levels  
C) MAC ensures a high degree of protection, preventing any illegal flow of information  
D) MAC is not suitable for military and high-security types of applications as it does not have desirable features like flexibility and policy neutrality  
Answer: C) MAC ensures a high degree of protection, preventing any illegal flow of information  
  
Question Level: Create  
Question: Develop a scenario where Mandatory Access Control (MAC) is needed for securing sensitive data.  
A) A software development company is working on a project that does not require any security measures  
B) A healthcare organization needs to store patient records securely but uses Discretionary Access Control (DAC) policies  
C) A military organization needs to protect sensitive data from unauthorized access using Role-Based Access Control (RBAC) models  
D) A financial institution is storing classified information that requires a high level of protection, and Mandatory Access Control (MAC) should be implemented.  
Answer: D) A financial institution is storing classified information that requires a high level of protection, and Mandatory Access Control (MAC) should be implemented.

* Question: Create six multiple choice question and answer of the question with the Many-To-Many concept

Response: LEVEL: Understand, Analyze, Evaluate  
PAGE SOURCE: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf (various pages)  
  
Question 1 (Remember): Define the Many-To-Many concept in the context of databases.  
A) A one-to-one relationship where each record in one table corresponds to a single record in another table.  
B) A one-to-many relationship where each record in one table may correspond to multiple records in another table.  
C) A many-to-many relationship where multiple records in one table can correspond to multiple records in another table.  
D) A many-to-one relationship where multiple records in one table correspond to a single record in another table.  
Answer: C) A many-to-many relationship where multiple records in one table can correspond to multiple records in another table.  
  
Question 2 (Understand): Explain how the Many-To-Many concept is resolved in databases.  
A) By creating a new table that contains foreign keys from both related tables.  
B) By adding a column with an ID in each table, which can be used to join them.  
C) By using subqueries and joins to combine records from both tables.  
D) By normalizing the database structure to eliminate redundancy.  
Answer: A) By creating a new table that contains foreign keys from both related tables.  
  
Question 3 (Analyze): Compare and contrast Many-To-Many relationships with One-To-Many relationships.  
A) They are similar in that each record in one table can correspond to multiple records in another table, but the difference lies in how they handle the relationship.  
B) In a One-To-Many relationship, each record in one table may correspond to multiple records in another table, while in Many-To-Many relationships there is no such restriction.  
C) They are the same, as both types allow for multiple records from one table to be associated with multiple records from another table.  
D) One-To-Many relationships involve only one primary key, whereas Many-To-Many relationships can have multiple foreign keys.  
Answer: A) They are similar in that each record in one table can correspond to multiple records in another table, but the difference lies in how they handle the relationship.  
  
Question 4 (Evaluate): Determine if the following statement is true or false: "Many-To-Many relationships can always be resolved by adding a column with an ID in each table."  
A) True  
B) False  
Answer: B) False, while this method may work for some Many-To-Many relationships, it does not resolve all cases and usually creates redundancy.  
  
Question 5 (Create): Generate an example of a Many-To-Many relationship between the tables 'Course' and 'Student'.  
A) Course (id, name), Student (id, name), Enrollment (student\_id, course\_id)  
B) Course (id, name, student\_ids), Student (id, name, courses)  
C) Course (id, name), Student (id, name, course)  
D) Course (id, name), Student (id, name, course\_id)  
Answer: A) Course (id, name), Student (id, name), Enrollment (student\_id, course\_id)  
  
Question 6 (Create): Develop a SQL statement that retrieves all courses and their enrolled students for a specific semester using the above example.  
A) SELECT C.name, S.name FROM Course AS C JOIN Student AS S ON C.id = S.course\_id WHERE C.semester = 'Spring';  
B) SELECT C.name, S.name FROM Course AS C, Enrollment AS E, Student AS S WHERE C.id = E.course\_id AND S.id = E.student\_id AND C.semester = 'Spring';  
C) SELECT C.name, S.name FROM Course AS C, Student AS S WHERE C.id IN (SELECT course\_id FROM Enrollment WHERE semester = 'Spring') AND S.id IN (SELECT student\_id FROM Enrollment WHERE semester = 'Spring');  
D) SELECT C.name, S.name FROM Course AS C JOIN Student AS S ON C.semester = S.semester WHERE C.semester = 'Spring';  
Answer: B) SELECT C.name, S.name FROM Course AS C, Enrollment AS E, Student AS S WHERE C.id = E.course\_id AND S.id = E.student\_id AND C.semester = 'Spring';

* Question: Create six multiple choice question and answer of the question with the MIN command

Response: Question 1 (Remember): Define the term "MIN" in the context given.  
A) Minimum Wage  
B) Maximum Value  
C) Minimum Index  
D) Minimum Query  
Answer: C) Minimum Index  
Level: Remember  
PAGE SOURCE: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf (Page 899)  
  
Question 2 (Understand): Explain the purpose of range partitioned indexes as described in the context.  
A) To increase query speed for non-range queries  
B) To decrease query speed for range queries  
C) To improve data storage efficiency by reducing disk space  
D) To enhance data retrieval based on attribute conditions  
Answer: D) To enhance data retrieval based on attribute conditions  
Level: Understand  
PAGE SOURCE: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf (Page 899)  
  
Question 3 (Apply): Solve the problem of multiple options considered in the nonheuristic exhaustive approach mentioned in the context, using the concept of dynamic programming.  
A) Reduce the total number of options from 120 to 36  
B) Reduce the total number of options from 120 to 24  
C) Reduce the total number of options from 36 to 18  
D) Reduce the total number of options from 24 to 12  
Answer: A) Reduce the total number of options from 120 to 36  
Level: Apply  
PAGE SOURCE: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf (Page 739)  
  
Question 4 (Analyze): Compare and contrast the join attributes of later joins in System R with grouping attributes of a later GROUP BY or a sort order at the root of the tree.  
A) They are the same but named differently  
B) They are similar but have different purposes  
C) They are completely unrelated  
D) They share some properties but can also be very different  
Answer: B) They are similar but have different purposes  
Level: Analyze  
PAGE SOURCE: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf (Page 1088)  
  
Question 5 (Evaluate): Determine if the antimonotonicity property helps to reduce the search space of possible solutions, as described in the context.  
A) Yes, it does help to reduce the search space  
B) No, it does not help to reduce the search space  
C) Sometimes it helps and sometimes it doesn't  
D) It depends on the problem being solved  
Answer: A) Yes, it does help to reduce the search space  
Level: Evaluate  
PAGE SOURCE: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf (Page 1076)  
  
Question 6 (Create): Generate a question that requires developing an example using the Apriori Algorithm, as described in the context.  
A) In what scenario would you apply the Apriori Algorithm and why?  
B) Develop an example to illustrate how the Apriori Algorithm works with a dataset containing transactions.  
Answer: B) Develop an example to illustrate how the Apriori Algorithm works with a dataset containing transactions.  
Level: Create  
PAGE SOURCE: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf (Page 1076)

* Question: Create six multiple choice question and answer of the question with the Minimal Cover concept

Response: Level: Remember  
Question: What is the definition of a minimal cover in the context of Functional Dependencies?  
A) A minimal cover is a set of functional dependencies that satisfies the property that every dependency in E is in the closure F+.  
B) A minimal cover is a set of functional dependencies with no redundancies and in standard form, where each dependency from the set F is required to be present.  
C) A minimal cover is a set of functional dependencies that have the smallest number of dependencies or with the smallest total length.  
D) A minimal cover is a set of functional dependencies E, that can be shrunk to its minimal form so that it is equivalent to the original set F.  
Answer: D) A minimal cover is a set of functional dependencies E, that can be shrunk to its minimal form so that it is equivalent to the original set F. (Source: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, page 524)  
  
Level: Understand  
Question: Explain the concept of an extraneous attribute in a functional dependency for defining the minimum cover?  
A) An extraneous attribute is an attribute that is not required to be present in a minimal set of functional dependencies.  
B) An extraneous attribute is an attribute in a functional dependency that can be removed without affecting the closure F.  
C) An extraneous attribute is an attribute that is not part of the original set of functional dependencies E.  
D) An extraneous attribute is an attribute in a functional dependency that can be replaced by another attribute without affecting the closure F.  
Answer: B) An extraneous attribute is an attribute in a functional dependency that can be removed without affecting the closure F. (Source: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, page 524)  
  
Level: Apply  
Question: Solve for the minimal cover of the set E = {A -> BCD, B -> ACDE, C -> AE}  
A) {A -> B, A -> C, A -> D, B -> A, C -> A, E -> A}  
B) {A -> BCDE, B -> AC, C -> AE}  
C) {A -> BCD, B -> AC, C -> A}  
D) {A -> B, B -> AC, C -> AE}  
Answer: C) {A -> BCD, B -> AC, C -> A} (Source: Not directly provided in the text, but can be solved using the definition and rules of minimal covers.)  
  
Level: Analyze  
Question: Compare and justify the following two methods for selecting a minimal cover when multiple sets qualify as minimal covers by the definition: choosing the minimal set with the smallest number of dependencies versus choosing the minimal set with the smallest total length.  
A) Both methods are equivalent, and either can be used interchangeably to select a minimal cover without affecting the results.  
B) The method of choosing the minimal set with the smallest number of dependencies is generally preferred over the method of choosing the minimal set with the smallest total length.  
C) The method of choosing the minimal set with the smallest total length is generally preferred over the method of choosing the minimal set with the smallest number of dependencies.  
D) Both methods have their own advantages and disadvantages, and the choice between them depends on the specific application and context.  
Answer: D) Both methods have their own advantages and disadvantages, and the choice between them depends on the specific application and context. (Source: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, page 524)  
  
Level: Evaluate  
Question: Determine whether the following functional dependency X -> YZ is redundant in the set of functional dependencies F = {A -> BCD, B -> ACDE, C -> AE} (Assume that there are no additional attributes apart from A, B, C, D, and Y, Z).  
A) Yes, it is redundant because it can be derived from other dependencies in the set.  
B) No, it is not redundant because it cannot be derived from other dependencies in the set.  
C) It is unclear whether it is redundant as more information about the attributes and functional dependencies is needed.  
Answer: A) Yes, it is redundant because it can be derived from other dependencies in the set. (Source: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, page 524)  
  
Level: Create  
Question: Generate a new functional dependency that can potentially be an extraneous attribute in the following set of functional dependencies F = {A -> BCDE, B -> AC, C -> AE} (Assume that there are no additional attributes apart from A, B, C, D, E).  
A) A -> DE  
B) E -> AB  
C) A -> CD  
D) C -> BE  
Answer: A) A -> DE (Source: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, page 524)

* Question: Create six multiple choice question and answer of the question with the Natural Join concept

Response: LEVEL: Remember  
Question: Define what is Natural Join?  
A) A type of multiway join that involves more than two files.  
B) A join operation used to combine two tables based on matching column names without explicitly specifying the columns.  
C) The Cartesian Product operation that generates all possible tuple combinations.  
D) An EQUIJOIN followed by the removal of the superfluous attributes.  
Answer: B) A join operation used to combine two tables based on matching column names without explicitly specifying the columns. (SOURCE: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, PAGE: 267)  
  
LEVEL: Understand  
Question: Explain the condition for NATURAL JOIN.  
A) The join attributes must be identical in both relations.  
B) The join attributes should have the same data type but not necessarily the same name.  
C) The number of possible ways to execute multiway joins grows rapidly because of the combinatorial explosion of possible join orderings.  
D) The two tables to be joined are always sorted in ascending order.  
Answer: A) The join attributes must be identical in both relations. (SOURCE: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, PAGE: 267)  
  
LEVEL: Apply  
Question: Solve the following NATURAL JOIN operation between PROJECT and DEPARTMENT tables where the join attribute is Dnum.  
A) PROJ\_DEPT PROJECT \* (Dname, Dnum, Mgr\_ssn, Mgr\_start\_date)(DEPARTMENT)  
B) PROJ\_DEPT PROJECT \* DEPARTMENT WHERE Dnumber = Dnum  
C) PROJ\_DEPT PROJECT \* DEPARTMENT ON Dnumber = Dnumber  
D) None of the above.  
Answer: C) PROJ\_DEPT PROJECT \* DEPARTMENT ON Dnumber = Dnumber (SOURCE: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, PAGE: 267)  
  
LEVEL: Analyze  
Question: Compare and justify the difference between NATURAL JOIN and EQUIJOIN.  
A) Both are the same operation with different syntaxes in various SQL implementations.  
B) EQUIJOIN is a more general form of join, while NATURAL JOIN is a specific case of EQUIJOIN where the join attributes have the same name in both relations.  
C) NATURAL JOIN involves only two tables, whereas EQUIJOIN can involve more than two tables.  
D) The standard definition of NATURAL JOIN requires that the two join attributes must not have the same name in both relations.  
Answer: B) EQUIJOIN is a more general form of join, while NATURAL JOIN is a specific case of EQUIJOIN where the join attributes have the same name in both relations. (SOURCE: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, PAGE: 267)  
  
LEVEL: Evaluate  
Question: Determine if the following query uses NATURAL JOIN or not.  
Q1: SELECT Pnumber, Dnumber, Lname, Address, Bdate FROM (PROJECT JOIN DEPARTMENT ON Dnum = Dnumber) WHERE Plocation = Stafford;  
A) Yes, it uses NATURAL JOIN because the join attributes (Dnum and Dnumber) have the same name in both relations.  
B) No, it does not use NATURAL JOIN because it explicitly specifies the join condition (ON Dnum = Dnumber).  
C) It is impossible to determine without additional information about the database schema.  
Answer: B) No, it does not use NATURAL JOIN because it explicitly specifies the join condition (ON Dnum = Dnumber). (SOURCE: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, PAGE: 267)  
  
LEVEL: Create  
Question: Generate a query that performs NATURAL JOIN on the EMPLOYEE and DEPARTMENT tables to find all employees who work in the department with Dname 'Research' and Dlocation 'New York'.  
A) EMP\_DEPT EMPLOYEE \* DEPARTMENT WHERE Dname = 'Research' AND Dlocation = 'New York';  
B) EMP\_DEPT EMPLOYEE \* DEPARTMENT ON Dname = 'Research' AND Dlocation = 'New York';  
C) EMP\_DEPT NATURAL JOIN (EMPLOYEE, DEPARTMENT) WHERE Dname = 'Research' AND Dlocation = 'New York';  
D) None of the above.  
Answer: C) EMP\_DEPT NATURAL JOIN (EMPLOYEE, DEPARTMENT) WHERE Dname = 'Research' AND Dlocation = 'New York'. (SOURCE: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, PAGE: N/A)

* Question: Create six multiple choice question and answer of the question with the Normalisation concept

Response: Level: Remember (Define)  
Question: What is the normal form of a relation?  
A) The lowest normal form condition it meets  
B) The highest normal form condition it meets  
C) A series of normal form tests that can be carried out on individual relation schemas  
D) A "filtering" or "purification" process to make the design have successively better quality  
Answer: B) The highest normal form condition it meets  
  
Level: Remember (Define)  
Question: What does the normalization procedure provide database designers with?  
A) A formal framework for analyzing relation schemas based on their keys and functional dependencies among their attributes  
B) A series of normal form tests that can be carried out on individual relation schemas so that the relational database can be normalized to any desired degree  
C) A "filtering" or "purification" process to make the design have successively better quality  
D) All of the above  
Answer: D) All of the above  
  
Level: Understand (Explain)  
Question: What are the two properties that normalization of data aims to minimize?  
A) Redundancy and integrity  
B) Insertion, deletion, and update anomalies  
C) Minimizing the size and complexity of the database  
D) Maximizing the performance and speed of the database  
Answer: A) Redundancy and integrity  
  
Level: Apply (Solve)  
Question: Given a relation R(A, B, C, D) with the extension ABCD, identify if it meets the first normal form (1NF).  
A) Yes, because each attribute value is atomic  
B) No, because there are multiple values for the same attribute  
C) Yes, because there are no repeated rows  
D) No, because there are repeating groups of attributes  
Answer: B) No, because there are multiple values for the same attribute (e.g., column D has two different values for row a1 and a2)  
  
Level: Analyze (Compare)  
Question: Compare and contrast multivalued dependencies and join dependencies in the context of normalization.  
A) Multivalued dependencies allow multiple values for a single attribute, while join dependencies require multiple attributes to share a common value  
B) Join dependencies allow multiple values for a single attribute, while multivalued dependencies require multiple attributes to share a common value  
C) Both multivalued dependencies and join dependencies deal with the relationships between multiple attributes  
D) Multivalued dependencies and join dependencies are not related to normalization  
Answer: A) Multivalued dependencies allow multiple values for a single attribute, while join dependencies require multiple attributes to share a common value  
  
Level: Create (Generate)  
Question: Generate an example of a relation in 3NF that is free from redundancy and anomalies.  
A) R(ID, FirstName, LastName, Address, PhoneNumber) with extension:  
1, John, Doe, 123 Main St, 555-1234  
2, Jane, Smith, 456 Oak Ave, 555-5678  
B) R(StudentID, CourseID, Grade) with extension:  
101, CS101, A  
101, MA202, B+  
102, CS101, C  
C) R(OrderID, ProductID, Quantity, Price) with extension:  
1001, P1, 5, $10.00  
1001, P2, 3, $20.00  
1002, P1, 4, $10.00  
Answer: C) R(OrderID, ProductID, Quantity, Price) with extension:  
1001, P1, 5, $10.00  
1001, P2, 3, $20.00  
1002, P1, 4, $10.00 (This example is in 3NF because it does not violate any transitive dependencies or partial dependencies)

* Question: Create six multiple choice question and answer of the question with the One-To-Many concept

Response: LEVEL: Remember (Define)  
PAGE SOURCE: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf (Page 458)  
Question: What is the purpose of the FOR clause in the context of XPath expressions?  
A) To perform mathematical operations  
B) To filter elements based on a condition  
C) To sort elements in a sequence  
D) To assign a variable to range over individual elements in a sequence  
Answer: D) To assign a variable to range over individual elements in a sequence  
  
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LEVEL: Understand (Describe)  
PAGE SOURCE: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf (Page 740)  
Question: Explain the concept of dynamic programming used for query optimization in databases.  
A) It is a technique that reduces the solution space by revisiting optimal plans and considering fewer options.  
B) It involves generating all possible combinations of queries and selecting the most efficient one.  
C) It uses exhaustive approaches to find the best overall order of joins.  
D) It applies various heuristics to estimate query costs and choose the most promising path for evaluation.  
Answer: A) It is a technique that reduces the solution space by revisiting optimal plans and considering fewer options.  
  
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LEVEL: Apply (Solve)  
PAGE SOURCE: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf (Page 231)  
Question: Solve Query 5 given the EMPLOYEE and DEPENDENT tables.  
A) SELECT Lname, Fname FROM EMPLOYEE WHERE COUNT(\*) >= 2  
B) SELECT Lname, Fname FROM EMPLOYEE WHERE (SELECT COUNT(\*) FROM DEPENDENT WHERE Ssn = Essn) > = 2  
C) SELECT \* FROM EMPLOYEE INNER JOIN DEPENDENT ON COUNT(\*) >= 2  
D) SELECT Lname, Fname FROM EMPLOYEE LEFT JOIN DEPENDENT ON COUNT(\*) >= 2  
Answer: B) SELECT Lname, Fname FROM EMPLOYEE WHERE (SELECT COUNT(\*) FROM DEPENDENT WHERE Ssn = Essn) > = 2  
  
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LEVEL: Analyze (Compare)  
PAGE SOURCE: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf (Page 1076)  
Question: Compare and contrast online search engines like Google or Bing with offline search engines such as Lucene or Indri.  
A) Online search engines are limited to the information available on the internet, while offline search engines can access any source of data. Offline search engines provide more accurate results due to their ability to index and understand the content of documents.  
B) Online search engines use web crawlers to gather data from websites, while offline search engines rely on manually curated databases. Online search engines are typically faster but less precise, while offline search engines may take longer to deliver results but are more accurate.  
C) Online search engines focus on the relevance of search terms in a given document, while offline search engines use natural language processing techniques to understand and interpret the context of a query.  
D) Both online and offline search engines use algorithms to rank search results based on their relevance to the user's query, but online search engines are more prone to spamming due to their reliance on external data sources.  
Answer: A) Online search engines are limited to the information available on the internet, while offline search engines can access any source of data. Offline search engines provide more accurate results due to their ability to index and understand the content of documents.  
  
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LEVEL: Evaluate (Justify)  
PAGE SOURCE: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf (Page 458)  
Question: Justify the use of XPath expressions in querying XML documents.  
A) XPath expressions allow for precise navigation and selection of elements within an XML document using a syntax that closely resembles that of CSS. This makes it easy to extract specific data from complex XML structures.  
B) XPath expressions are more efficient than other methods of querying XML documents due to their ability to use indexes and optimize queries based on the structure of the XML document.  
C) XPath expressions allow for the creation of dynamic queries by using variables, functions, and operators within the expression. This makes it possible to write flexible and powerful queries that can adapt to changing data structures.  
D) All of the above  
Answer: D) All of the above  
  
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LEVEL: Create (Generate)  
PAGE SOURCE: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf (Page 740)  
Question: Generate a SQL query that uses dynamic programming to optimize the order of joins between three tables: employees, departments, and projects, and returns the name of each employee who manages a project with a budget greater than $100,000.  
A) SELECT Ename FROM employees JOIN (SELECT DName, PName FROM departments INNER JOIN projects ON departments.Did = projects.Did WHERE Budget > 100000) AS proj ON employees.Eid = proj.Eid;  
B) WITH joined\_tables AS ( SELECT \* FROM employees INNER JOIN departments ON employees.Eid = departments.Eid INNER JOIN projects ON departments.Did = projects.Did WHERE Budget > 100000 ) SELECT Ename FROM joined\_tables;  
C) WITH proj\_budget AS ( SELECT DName, PName FROM departments INNER JOIN projects ON departments.Did = projects.Did WHERE Budget > 100000 ), employee\_proj AS ( SELECT employees.Eid, Ename FROM employees JOIN proj\_budget ON employees.Eid = proj\_budget.Eid ) SELECT Ename FROM employee\_proj;  
D) SELECT Ename FROM employees INNER JOIN projects ON employees.Eid = projects.Eid WHERE Budget > 100000;  
Answer: C) WITH proj\_budget AS ( SELECT DName, PName FROM departments INNER JOIN projects ON departments.Did = projects.Did WHERE Budget > 100000 ), employee\_proj AS ( SELECT employees.Eid, Ename FROM employees JOIN proj\_budget ON employees.Eid = proj\_budget.Eid ) SELECT Ename FROM employee\_proj;

* Question: Create six multiple choice question and answer of the question with the One-To-One concept

Response: Question Level: Remember (1)  
Question: Define "Distributed Concurrency Control Based on Voting" (Page Source: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, page 869)  
A) A method used to manage concurrent transactions in a distributed database system where no distinguished copy maintains the locks for data items  
B) A method used to manage concurrent transactions in a centralized database system where all copies maintain their own locks and can grant or deny requests  
C) A method used to optimize query execution in a distributed database system  
D) A method used to determine the optimal order of joins in a distributed database system  
Answer: A) A method used to manage concurrent transactions in a distributed database system where no distinguished copy maintains the locks for data items (Page Source: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, page 869)  
  
Question Level: Remember (1)  
Question: What is an example of a Factoid Question? (Page Source: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, page 1074)  
A) A question that asks for an opinion or interpretation  
B) A question that pinpoints the right phrase in a document or database that correctly addresses the question  
C) A question that asks about a hypothetical situation  
D) A question that requires complex reasoning and analysis  
Answer: B) A question that pinpoints the right phrase in a document or database that correctly addresses the question (Page Source: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, page 1074)  
  
Question Level: Understand (2)  
Question: Explain how Distributed Concurrency Control Based on Voting works? (Page Source: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, page 869)  
A) In this method, a lock request is sent to all sites that include a copy of the data item. Each copy maintains its own lock and can grant or deny the request for it. If a transaction that requests a lock is granted that lock by a majority of the copies, it holds the lock and informs all copies that it has been granted the lock. If a transaction does not receive a majority of votes granting it a lock within a certain time-out period, it cancels its request and informs all sites of the cancellation.  
B) In this method, a distinguished copy maintains the locks for replicated items. Each site in the distributed system has access to the same copy, and when a transaction requests a lock, it is granted or denied by the designated copy.  
C) Distributed Concurrency Control Based on Voting is not a true distributed concurrency control method since it uses a distinguished copy to maintain locks for replicated items.  
D) In this method, all sites in the distributed system have their own unique copies of data items and can grant or deny lock requests independently.  
Answer: A) In this method, a lock request is sent to all sites that include a copy of the data item. Each copy maintains its own lock and can grant or deny the request for it. If a transaction that requests a lock is granted that lock by a majority of the copies, it holds the lock and informs all copies that it has been granted the lock. If a transaction does not receive a majority of votes granting it a lock within a certain time-out period, it cancels its request and informs all sites of the cancellation. (Page Source: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, page 869)  
  
Question Level: Analyze (4)  
Question: Compare and contrast Distributed Concurrency Control Based on Voting with other concurrency control methods discussed earlier in the text? (Page Source: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, page 869)  
A) Distributed Concurrency Control Based on Voting is similar to Lock Escalation since both methods use a lock to manage concurrent transactions in a distributed database system. However, while Lock Escalation promotes the usage of coarse-grained locks, the voting method uses fine-grained locks for each copy of the data item.  
B) Distributed Concurrency Control Based on Voting is similar to Multi-Version Concurrency Control (MVCC) since both methods allow multiple versions of the same data item to exist simultaneously in a database system. However, while MVCC uses a write-ahead logging technique to maintain consistency, the voting method uses a voting mechanism to resolve conflicts between concurrent transactions.  
C) Distributed Concurrency Control Based on Voting is similar to Optimistic Concurrency Control (OCC) since both methods assume that conflicts between concurrent transactions are rare and rely on checkpoints to ensure data consistency. However, while OCC checks for conflicts at the end of a transaction, the voting method checks for conflicts as soon as a lock request is made.  
D) Distributed Concurrency Control Based on Voting is different from all other concurrency control methods discussed earlier since it does not use a designated copy to maintain locks for replicated items and instead uses a voting mechanism to resolve conflicts between concurrent transactions.  
Answer: D) Distributed Concurrency Control Based on Voting is different from all other concurrency control methods discussed earlier since it does not use a designated copy to maintain locks for replicated items and instead uses a voting mechanism to resolve conflicts between concurrent transactions. (Page Source: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, page 869)  
  
Question Level: Evaluate (5)  
Question: Justify why Distributed Concurrency Control Based on Voting is considered a truly distributed concurrency control method? (Page Source: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, page 869)  
A) Because Distributed Concurrency Control Based on Voting does not use a designated copy to maintain locks for replicated items, it can be considered a truly distributed concurrency control method since all sites in the distributed system have equal responsibility and authority in managing concurrent transactions.  
B) Because Distributed Concurrency Control Based on Voting uses a voting mechanism to resolve conflicts between concurrent transactions, it can be considered a truly distributed concurrency control method since it ensures that no single site has ultimate control over the database system.  
C) Distributed Concurrency Control Based on Voting is not a truly distributed concurrency control method because it still relies on a centralized mechanism to manage concurrent transactions in the distributed database system.  
D) Distributed Concurrency Control Based on Voting is considered a truly distributed concurrency control method because it allows multiple copies of data items to exist simultaneously in the distributed database system and uses fine-grained locks for each copy to manage concurrent transactions efficiently.  
Answer: A) Because Distributed Concurrency Control Based on Voting does not use a designated copy to maintain locks for replicated items, it can be considered a truly distributed concurrency control method since all sites in the distributed system have equal responsibility and authority in managing concurrent transactions. (Page Source: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, page 869)  
  
Question Level: Create (6)  
Question: Develop a scenario where Distributed Concurrency Control Based on Voting can be useful in a distributed database system? (Page Source: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, page 869)  
A) In a distributed database system where multiple sites have replicated copies of the same data item and need to manage concurrent transactions efficiently without using a designated copy to maintain locks for all data items, Distributed Concurrency Control Based on Voting can be useful since it allows each site to maintain its own lock for that particular copy and uses a voting mechanism to resolve conflicts between concurrent transactions.  
B) In a distributed database system where multiple sites have different copies of the same data item and need to manage concurrent transactions efficiently without using a centralized mechanism to coordinate locks across all sites, Distributed Concurrency Control Based on Voting can be useful since it allows each site to maintain its own lock for that particular copy and uses a voting mechanism to resolve conflicts between concurrent transactions.  
C) In a distributed database system where multiple sites have replicated copies of the same data item but need to use a centralized mechanism to manage locks across all sites, Distributed Concurrency Control Based on Voting is not useful since it does not support a designated copy to maintain locks for all data items.  
D) In a distributed database system where multiple sites have different copies of the same data item and need to use a centralized mechanism to coordinate locks across all sites, Distributed Concurrency Control Based on Voting is not useful since it does not support a centralized mechanism to manage locks across all sites.  
Answer: A) In a distributed database system where multiple sites have replicated copies of the same data item and need to manage concurrent transactions efficiently without using a designated copy to maintain locks for all data items, Distributed Concurrency Control Based on Voting can be useful since it allows each site to maintain its own lock for that particular copy and uses a voting mechanism to resolve conflicts between concurrent transactions. (Page Source: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, page 869)

* Question: Create six multiple choice question and answer of the question with the Partial concept

Response: Question Level: Remember - L1  
Question: Define Factoid Questions (FQ) as described in the context.  
A) A type of question asking about opinions on a subject.  
B) A type of question seeking different views on a subject.  
C) A type of question that asks about the definition and meaning of a concept.  
D) A type of question that pinpoints the right phrase in a document or a database that correctly addresses the question.  
Answer: D) A type of question that pinpoints the right phrase in a document or a database that correctly addresses the question.  
LEVEL: L1  
PAGE SOURCE: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, page 1075  
  
Question Level: Understand - L2  
Question: Explain the meaning of Inert Gas as given in the context.  
A) A type of gas used for cooling purposes.  
B) A type of gas used for illumination purposes.  
C) A type of gas that does not react chemically with other substances.  
D) A type of gas used for propulsion purposes.  
Answer: C) A type of gas that does not react chemically with other substances.  
LEVEL: L2  
PAGE SOURCE: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, page not specified (contextual inference)  
  
Question Level: Apply - L3  
Question: Solve the following FQ: Who is Alexander the Great?  
A) A scientist who made significant contributions to the field of physics.  
B) A mathematician known for his work on geometry.  
C) A military general and king of Macedon, famous for conquering a large empire.  
D) A philosopher who wrote extensively on ethics and politics.  
Answer: C) A military general and king of Macedon, famous for conquering a large empire.  
LEVEL: L3  
PAGE SOURCE: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, page not specified (contextual inference)  
  
Question Level: Analyze - L4  
Question: Compare and contrast Factoid Questions (FQ) and Definition Questions (DQ).  
A) Both are types of questions that ask about opinions on a subject.  
B) Both are types of questions seeking different views on a subject.  
C) FQ asks about the definition and meaning of the concept, while DQ pinpoints the right phrase in a document or a database that correctly addresses the question.  
D) DQ asks about the definition and meaning of the concept, while FQ seeks different views on a subject.  
Answer: C) FQ asks about the definition and meaning of the concept, while DQ pinpoints the right phrase in a document or a database that correctly addresses the question.  
LEVEL: L4  
PAGE SOURCE: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, page 1075 and 1076  
  
Question Level: Evaluate - L5  
Question: Determine if "What countries should be allowed to test nuclear weapons?" is a Factoid Question or Opinion Question (OQ).  
A) It's a Factoid Question.  
B) It's an Opinion Question.  
C) It cannot be determined based on the given context.  
D) It's a Definition Question.  
Answer: B) It's an Opinion Question.  
LEVEL: L5  
PAGE SOURCE: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, page 1076  
  
Question Level: Create - L6  
Question: Generate a question about Topic Modeling that can be answered by referring to the context.  
A) What is the importance of topic modeling in information retrieval?  
B) How does topic modeling help improve search engine performance?  
C) Define the role of topic modeling in big data analysis.  
D) Develop a question on the history of topic modeling and its evolution over time.  
Answer: C) Define the role of topic modeling in big data analysis.  
LEVEL: L6  
PAGE SOURCE: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, page 1079

* Question: Create six multiple choice question and answer of the question with the Participation constraints concept

Response: Level: Remember  
Question: Define total participation in a relationship?  
A) A relationship where only some entities participate  
B) A relationship where all entities participate  
C) A relationship where entities can exist without participating  
D) A relationship where no entities participate  
Answer: B) A relationship where all entities participate  
Source: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf - Page 91  
  
Level: Understand  
Question: Explain partial participation in a relationship?  
A) A relationship where only some entities participate  
B) A relationship where all entities participate  
C) A relationship where entities can exist without participating  
D) A relationship where no entities participate  
Answer: A) A relationship where only some entities participate  
Source: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf - Page 92  
  
Level: Apply  
Question: Solve the example given in Figure 3.12 to determine the participation of EMPLOYEE in MANAGES. Is it total or partial?  
A) Total Participation  
B) Partial Participation  
C) None of the above  
D) It's not mentioned in the figure  
Answer: B) Partial Participipation  
Source: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf - Page 91  
  
Level: Analyze  
Question: Compare total participation and partial participation, focusing on their differences.  
A) Total participation requires a minimum of one entity, while partial participation has no minimum requirement.  
B) Partial participation is the opposite of total participation, where all entities participate.  
C) Total participation allows some entities to exist without participating, while partial participation does not.  
D) Both total and partial participation allow entities to exist without participating.  
Answer: A) Total participation requires a minimum of one entity, while partial participation has no minimum requirement.  
Source: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf - Multiple Sources  
  
Level: Evaluate  
Question: Determine the cardinality ratio of the WORKS\_ON relationship type given in Figure 3.13.  
A) 1:N (one-to-many)  
B) M:N (many-to-many)  
C) N:1 (many-to-one)  
D) 1:1 (one-to-one)  
Answer: B) M:N (many-to-many)  
Source: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf - Page 90  
  
Level: Create  
Question: Generate an example of a relationship with total participation and specify the minimum cardinality constraint for each entity involved in the relationship.  
A) RELATIONSHIP\_TYPE: HAS\_OWNER; ENTITY1: HOUSE, ENTITY2: OWNER; Minimum Cardinality Constraint: at least one house must be owned by one owner and one owner can own multiple houses.  
B) RELATIONSHIP\_TYPE: IS\_EMPLOYED\_BY; ENTITY1: COMPANY, ENTITY2: EMPLOYEE; Minimum Cardinality Constraint: at least one company can employ multiple employees and each employee must work for a single company.  
C) RELATIONSHIP\_TYPE: HAS\_PARENT; ENTITY1: CHILDREN, ENTITY2: PARENTS; Minimum Cardinality Constraint: at least one child must have two parents and each parent can have multiple children.  
D) RELATIONSHIP\_TYPE: IS\_FRIENDS\_WITH; ENTITY1: FRIEND, ENTITY2: FRIEND; Minimum Cardinality Constraint: at least one friend can be friends with multiple friends and each friend must have at least one friend.  
Answer: A) RELATIONSHIP\_TYPE: HAS\_OWNER; ENTITY1: HOUSE, ENTITY2: OWNER; Minimum Cardinality Constraint: at least one house must be owned by one owner and one owner can own multiple houses.  
Source: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf - Multiple Sources (Inspired by the given context, but no specific example is mentioned in the document)

* Question: Create six multiple choice question and answer of the question with the Primary Key concept

Response: Level: Remember  
Question: What is a primary key according to the context?  
A) A scrambled message produced as output  
B) An encrypted message  
C) A pair of attributes used for ordering records with the same value  
D) A unique attribute that makes up the primary key of a relation  
Answer: D) A unique attribute that makes up the primary key of a relation (PAGE SOURCE: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, page 909)  
  
Level: Understand  
Question: How is the primary key specified for a relation in the context?  
A) By using the UNIQUE clause  
B) By using the PRIMARY KEY clause  
C) By encrypting it using public and private keys  
D) By using the HASH and RANGE type primary key  
Answer: B) By using the PRIMARY KEY clause (PAGE SOURCE: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, page 199)  
  
Level: Apply  
Question: If we have a relation named DEPARTMENT with Dnumber as its attribute, how would you specify the primary key using the PRIMARY KEY clause?  
A) DEPARTMENT Dnumber UNIQUE  
B) DEPARTMENT Dnumber INT PRIMARY KEY  
C) DEPARTMENT Dnumber HASH and RANGE  
D) DEPARTMENT Dnumber PUBLIC KEY  
Answer: B) DEPARTMENT Dnumber INT PRIMARY KEY (PAGE SOURCE: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, page 199)  
  
Level: Analyze  
Question: What is the difference between a primary key and an alternate key according to the context?  
A) A primary key can only have a single attribute, while an alternate key can have multiple attributes  
B) A primary key can be encrypted using public and private keys, while an alternate key cannot  
C) An alternate key is used for ordering records with the same value, while a primary key is not  
D) An alternate key is specified using the UNIQUE clause, while a primary key is specified using the PRIMARY KEY clause  
Answer: A) A primary key can only have a single attribute, while an alternate key can have multiple attributes (PAGE SOURCE: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, page 199)  
  
Level: Evaluate  
Question: In the context, why is it important to specify keys and referential integrity constraints?  
A) It ensures data consistency and eliminates duplicate records  
B) It improves the performance of database operations  
C) It makes the database more secure by encrypting the primary key  
D) It allows for easier data manipulation and querying  
Answer: A) It ensures data consistency and eliminates duplicate records (PAGE SOURCE: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, page 199)  
  
Level: Create  
Question: Generate an example of a relation with a hash type primary key and a pair of attributes as the primary key.  
A) R(ItemID INT PRIMARY KEY, Version DATE RANGE)  
B) S(StudentID INT PRIMARY KEY, Classroom INT PRIMARY KEY)  
C) P(ProductCode INT PRIMARY KEY, Manufacturer INT HASH)  
D) E(EmployeeID INT PRIMARY KEY, DepartmentName STRING RANGE)  
Answer: A) R(ItemID INT PRIMARY KEY, Version DATE) (PAGE SOURCE: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, page 909)

* Question: Create six multiple choice question and answer of the question with the Prime Attribute concept

Response: 1. LEVEL: Remember  
 Question: Define Prime Attribute in the context of databases.  
 A) An attribute that can be used to uniquely identify an entity.  
 B) An attribute that is used to sort data.  
 C) An attribute that has a range of values from a predefined set.  
 D) An attribute that represents a complex value.  
 Answer: A) An attribute that can be used to uniquely identify an entity.  
 SOURCE: '/content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf' (Page 83)  
  
2. LEVEL: Understand  
 Question: Explain the importance of Prime Attribute in a database system.  
 A) It is used to define the key for each relation.  
 B) It helps to improve the performance of queries.  
 C) It determines the order of attributes in a table.  
 D) It defines the data type of each attribute.  
 Answer: A) It is used to define the key for each relation.  
 SOURCE: '/content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf' (Page 83, 150, 420)  
  
3. LEVEL: Apply  
 Question: Solve the problem where a multivalued attribute is composite, only some of the component attributes are required for identification. What should be done to the key of R when mapping this composite, multivalued attribute?  
 A) Ignore the unnecessary component attributes and use the remaining ones as the key.  
 B) Use all component attributes as the key even if some are not necessary for identification.  
 C) Define a new primary key that includes only the necessary component attributes.  
 D) Treat this situation as an exception and consult with users to decide on the key attributes.  
 Answer: C) Define a new primary key that includes only the necessary component attributes.  
 SOURCE: '/content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf' (Page 83)  
  
4. LEVEL: Analyze  
 Question: Compare and contrast Prime Attribute, Composite Attributes, and Multivalued Attributes in a database system.  
 A) All three are the same and represent the same concept.  
 B) Prime Attribute is a subset of both Composite and Multivalued Attributes.  
 C) Prime Attribute can be considered as a special case of both Composite and Multivalued Attributes.  
 D) They are distinct types of attributes with different characteristics.  
 Answer: D) They are distinct types of attributes with different characteristics.  
 SOURCE: '/content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf' (Multiple pages)  
  
5. LEVEL: Evaluate  
 Question: Justify the use of a bag constructor for multivalued attributes that allow duplicates compared to a set constructor that does not allow duplicates.  
 A) The bag constructor provides more flexibility and can better represent real-world data.  
 B) The set constructor is faster in terms of query performance.  
 C) The bag constructor is easier to implement in the database schema.  
 D) Both the bag constructor and set constructor have equal advantages, and the choice depends on the specific application requirements.  
 Answer: A) The bag constructor provides more flexibility and can better represent real-world data.  
 SOURCE: '/content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf' (Page 420)  
  
6. LEVEL: Create  
 Question: Generate an example of a complex attribute in a database system that requires careful consideration when defining its key.  
 A) An address attribute consisting of Street, City, State, and Zip Code.  
 B) An employee attribute consisting of First\_name, Middle\_initial, Last\_name, Department, and Supervisor.  
 C) A product attribute consisting of Name, Category, Brand, Manufacturer, and Price.  
 D) An account attribute consisting of Username, Password, Email, Phone number, and Address.  
 Answer: B) An employee attribute consisting of First\_name, Middle\_initial, Last\_name, Department, and Supervisor.  
 SOURCE: '/content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf' (Page 83)

* Question: Create six multiple choice question and answer of the question with the Projection concept

Response: LEVEL: Remember  
QUESTION: Define the term "Projection" in the context of databases.  
A) A type of video transformation  
B) A technique used for video indexing  
C) The estimation of size for some operations in databases  
D) A named entity extractor used in candidate answer generation  
ANSWER: C) The estimation of size for some operations in databases  
  
LEVEL: Understand  
QUESTION: Explain how the Projection operation works in SQL.  
A) It calculates the number of tuples in a result by considering the DISTINCT option.  
B) It treats a multiset as a single tuple.  
C) It changes one images cells to match another image.  
D) It is used for video segment division.  
ANSWER: A) It calculates the number of tuples in a result by considering the DISTINCT option.  
  
LEVEL: Apply  
QUESTION: Solve the following projection problem: List (R) = {A, B} from relation R. If |R| = 10 and NDV(A, R) = 5 and NDV(B, R) = 4, what is the size of List (R)?  
A) 9  
B) 13  
C) 14  
D) 15  
ANSWER: C) 14  
  
LEVEL: Analyze  
QUESTION: Compare Projection and Selection operations in databases.  
A) They are identical in function but differ in their application.  
B) They have the same syntax but different semantics.  
C) They are used for video segment division.  
D) They calculate the same number of tuples in a result.  
ANSWER: A) They are identical in function but differ in their application.  
  
LEVEL: Evaluate  
QUESTION: Determine if the following statement is true or false: In SQL, Projection (List (R)) expressed as SELECT <attribute-list> FROM R returns the same number of tuples as the original relation R.  
A) True  
B) False  
ANSWER: B) False  
  
LEVEL: Create  
QUESTION: Generate a complex projection problem with multiple attributes and distinct values.  
A) {Student\_ID, Course} (Students) from Students where Student\_ID in {101, 102, 103} and Course is DISTINCT  
B) {City, Population} (Countries) from Countries where City = 'New York' and Population > 8000000  
C) {Title, Author} (Books) from Books where Title contains the word "Harry" and Author is DISTINCT  
D) {Director, Actor} (Movies) from Movies where Director = 'Steven Spielberg' and Actor is NOT DISTINCT  
ANSWER: C) {Title, Author} (Books) from Books where Title contains the word "Harry" and Author is DISTINCT

* Question: Create six multiple choice question and answer of the question with the Query command

Response: Level: Remember  
Question: What does the $d->query function do in the context?  
A) Sends an SQL command to a printer  
B) Updates the database schema  
C) Extracts data from the database  
D) Generates a new database connection  
Answer: C) Extracts data from the database  
  
Level: Understand  
Question: Explain what happens after executing a query in the context?  
A) The result is assigned to a variable called $q and checked for errors  
B) The result is sent to a printer  
C) The database schema is updated  
D) A new database connection is generated  
Answer: A) The result is assigned to a variable called $q and checked for errors  
  
Level: Apply  
Question: Solve the query in Q16A given in the context.  
A) SELECT E.Fname, E.Lname FROM EMPLOYEE AS E WHERE E.Ssn = D.Essn AND E.Sex = D.Sex  
B) CREATE TABLE EMPLOYEE (Fname TEXT, Lname TEXT)  
C) INSERT INTO EMPLOYEE (Fname, Lname) VALUES ('John', 'Doe')  
D) SELECT \* FROM EMPLOYEE WHERE Fname = 'John' AND Lname = 'Doe'  
Answer: A) SELECT E.Fname, E.Lname FROM EMPLOYEE AS E WHERE E.Ssn = D.Essn AND E.Sex = D.Sex  
  
Level: Analyze  
Question: Compare the EXISTS and UNIQUE functions in SQL.  
A) Both are Boolean functions that return TRUE or FALSE, but UNIQUE can be used in a SELECT clause while EXISTS cannot  
B) EXISTS can be used to check whether the result of a nested query is empty or not, while UNIQUE checks for uniqueness in a table  
C) EXISTS and UNIQUE are interchangeable, they can be used in both WHERE and SELECT clauses  
D) Both EXISTS and UNIQUE can only be used in the WHERE clause condition  
Answer: B) EXISTS can be used to check whether the result of a nested query is empty or not, while UNIQUE checks for uniqueness in a table  
  
Level: Evaluate  
Question: Justify when we would use cursors in SQL.  
A) To loop through multiple records in the result of a query  
B) To create new tables in the database  
C) To check for errors after every database command  
D) To send an SQL command to a printer  
Answer: A) To loop through multiple records in the result of a query  
  
Level: Create  
Question: Develop a SQL query that uses EXISTS function to find employees who have no dependents.  
A) SELECT \* FROM EMPLOYEE WHERE NOT EXISTS (SELECT \* FROM DEPENDENT WHERE E.Ssn = D.Essn)  
B) SELECT \* FROM EMPLOYEE WHERE COUNT(DEPENDENT) = 0  
C) SELECT \* FROM EMPLOYEE WHERE DEPENDENT IS NULL  
D) SELECT \* FROM EMPLOYEE WHERE DEPENDENT\_name IS NULL  
Answer: A) SELECT \* FROM EMPLOYEE WHERE NOT EXISTS (SELECT \* FROM DEPENDENT WHERE E.Ssn = D.Essn)

* Question: Create six multiple choice question and answer of the question with the Read Committed concept

Response: Question Level: Remember  
Question: What is the access mode for a transaction with the READ COMMITTED isolation level? (Fundamentals of Database Systems Seventh Edition, Page 788)  
A) READ ONLY  
B) READ WRITE  
C) UNCOMMITTED  
D) UPDATE ONLY  
Answer: A) READ ONLY  
  
Question Level: Understand  
Question: Explain the access mode in a transaction with the READ COMMITTED isolation level. (Fundamentals of Database Systems Seventh Edition, Page 788)  
A) It allows select, update, insert, delete, and create commands to be executed.  
B) It is for data retrieval only.  
C) It allows read operations on the same item by different transactions that are not conflicting.  
D) It does not allow any SQL statements.  
Answer: A) It allows select, update, insert, delete, and create commands to be executed.  
  
Question Level: Apply  
Question: Solve an example of a transaction with READ COMMITTED isolation level in the context provided. (Fundamentals of Database Systems Seventh Edition, Page 788)  
A) A transaction reading data from multiple items without conflicts due to other transactions writing on those items.  
B) A transaction that can update and commit its changes only after all read locks are released by any reading transactions.  
C) A transaction that does not allow concurrent writes with a single write operation.  
D) A transaction that keeps multiple versions of data items.  
Answer: A) A transaction reading data from multiple items without conflicts due to other transactions writing on those items.  
  
Question Level: Analyze  
Question: Compare the READ COMMITTED isolation level with the READ WRITE access mode. (Fundamentals of Database Systems Seventh Edition, Page 788)  
A) They are the same; there is no difference between them.  
B) The READ COMMITTED isolation level allows only data retrieval, while the READ WRITE access mode allows updates as well.  
C) The READ COMMITTED isolation level does not allow any SQL statements, while the READ WRITE access mode allows all SQL statements except for write operations.  
D) The READ COMMITTED isolation level is a specific type of lock, while the READ WRITE access mode is a concurrency control method.  
Answer: B) The READ COMMITTED isolation level allows only data retrieval, while the READ WRITE access mode allows updates as well.  
  
Question Level: Evaluate  
Question: Determine the advantages and disadvantages of using the READ COMMITTED isolation level in a database system. (Fundamentals of Database Systems Seventh Edition, Page 788)  
A) Advantages: It allows concurrent read operations without conflicts; Disadvantages: It may lead to inconsistent data if a transaction reads an uncommitted version of the same item written by another transaction.  
B) Advantages: It ensures that a transaction only reads committed data items; Disadvantages: It can cause lock contention and slow performance due to waiting for locks to be released.  
C) Advantages: It keeps multiple versions of data items; Disadvantages: It may lead to increased storage requirements and complexity.  
D) Advantages: It does not allow any SQL statements; Disadvantages: It cannot handle concurrent transactions effectively.  
Answer: A) Advantages: It allows concurrent read operations without conflicts; Disadvantages: It may lead to inconsistent data if a transaction reads an uncommitted version of the same item written by another transaction.  
  
Question Level: Create  
Question: Generate an example SQL statement for a transaction with READ COMMITTED isolation level that retrieves data from multiple items without conflicts due to other transactions writing on those items. (Fundamentals of Database Systems Seventh Edition, Page 788)  
A) BEGIN TRANSACTION ISOLATION READ COMMITTED; SELECT \* FROM item1, item2, item3; COMMIT;  
B) BEGIN TRANSACTION ISOLATION READ WRITE; SELECT \* FROM item1, item2, item3 WHERE item1.id = item2.id AND item2.id = item3.id; COMMIT;  
C) BEGIN TRANSACTION ISOLATION READ UNCOMMITTED; SELECT \* FROM item1, item2, item3 WHERE item1.id <> item2.id AND item2.id <> item3.id; COMMIT;  
D) BEGIN TRANSACTION ISOLATION READ COMMITTED; SELECT \* FROM item1, item2, item3 WHERE item1.id > item2.id AND item2.id > item3.id; COMMIT;  
Answer: A) BEGIN TRANSACTION ISOLATION READ COMMITTED; SELECT \* FROM item1, item2, item3; COMMIT;

* Question: Create six multiple choice question and answer of the question with the Read Uncommitted concept

Response: Question 1 (Remember - Level 1): Define the Isolation Level READ UNCOMMITTED.  
A) A mode of access that allows multiple transactions to modify the same item at the same time.  
B) A mode of access that prevents multiple transactions from modifying the same item at the same time.  
C) A mode of access that allows a transaction to read uncommitted changes made by other transactions.  
D) A mode of access that forces a transaction to wait until all other transactions are committed before it can start.  
Answer: C) A mode of access that allows a transaction to read uncommitted changes made by other transactions. (page 788)  
  
Question 2 (Understand - Level 2): Explain the concept of READ UNCOMMITTED isolation level.  
A) It ensures that all transactions have exclusive access to the same item and prevents conflicts.  
B) It allows a transaction to read uncommitted changes made by other transactions, leading to possible inconsistencies and anomalies.  
C) It guarantees that all transactions are committed before any of them can start executing.  
D) It ensures that every transaction has an explicit end statement, either COMMIT or ROLLBACK.  
Answer: B) It allows a transaction to read uncommitted changes made by other transactions, leading to possible inconsistencies and anomalies. (page 788)  
  
Question 3 (Apply - Level 3): Solve the following scenario using READ UNCOMMITTED isolation level:  
Two transactions T1 and T2 access a shared bank account. T1 reads the current balance, and immediately after that, T2 deposits some money into the account. The isolation level is set to READ UNCOMMITTED. What will be the result?  
A) T1 will read the updated balance after T2's deposit.  
B) T1 will read the original balance before T2's deposit.  
C) T1 may or may not read the updated balance after T2's deposit, depending on the database system implementation.  
D) An error will occur because READ UNCOMMITTED does not allow concurrent writes.  
Answer: C) T1 may or may not read the updated balance after T2's deposit, depending on the database system implementation. (page 788)  
  
Question 4 (Analyze - Level 4): Compare READ UNCOMMITTED and READ COMMITTED isolation levels in terms of data consistency.  
A) READ UNCOMMITTED allows for higher data consistency but may result in slower performance due to locks.  
B) READ COMMITTED provides lower data consistency, as it allows reading uncommitted changes made by other transactions.  
C) Both isolation levels provide the same level of data consistency and are suitable for different situations.  
D) READ UNCOMMITTED is a stricter version of READ COMMITTED in terms of data consistency.  
Answer: B) READ COMMITTED provides lower data consistency, as it allows reading uncommitted changes made by other transactions. (page 788)  
  
Question 5 (Evaluate - Level 5): Justify the use of the READ UNCOMMITTED isolation level in specific scenarios.  
A) It can be used when quick reads are essential and consistency is not a concern, such as in real-time systems or high-frequency trading applications.  
B) It should never be used because it leads to inconsistent data and potential anomalies.  
C) It is always the best choice for all database transactions due to its simplicity and efficiency.  
D) It is suitable for situations that require multiple concurrent writes without any locking mechanism.  
Answer: A) It can be used when quick reads are essential and consistency is not a concern, such as in real-time systems or high-frequency trading applications. (page 788)  
  
Question 6 (Create - Level 6): Develop an example query that demonstrates the READ UNCOMMITTED isolation level using SQL.  
A) SELECT \* FROM table\_name WHERE READ UNCOMMITTED;  
B) SET TRANSACTION ISOLATION LEVEL READ UNCOMMITTED; UPDATE table\_name SET column1 = new\_value WHERE condition;  
C) BEGIN TRANSACTION; SET TRANSACTION ISOLATION LEVEL READ UNCOMMITTED; SELECT \* FROM table\_name; COMMIT;  
D) SELECT \* FROM table\_name WHERE isolation\_level = 'READ UNCOMMITTED';  
Answer: B) SET TRANSACTION ISOLATION LEVEL READ UNCOMMITTED; UPDATE table\_name SET column1 = new\_value WHERE condition; (page 788)  
  
LEVEL: The level varies from Remember to Create.  
PAGE SOURCE: '/content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf'

* Question: Create six multiple choice question and answer of the question with the Relation concept

Response: Level: Remember, LEVEL 1  
Question: Define a relation as per the context provided?  
A) A set of records  
B) A specific order among tuples  
C) A logical or abstract level representation of facts  
D) An implementation (or physical storage) level  
Answer: C) A logical or abstract level representation of facts  
  
Level: Understand, LEVEL 2  
Question: Explain how ordering of tuples in a relation is treated?  
A) Tuples have no order among them  
B) Tuples are always physically stored in the same order  
C) Tuples can be displayed in any order but their order does not matter for the relation definition  
D) Tuples should be sorted by values of Name, Ssn, Age  
Answer: A) Tuples have no order among them  
  
Level: Apply, LEVEL 3  
Question: Solve this scenario to find the relation that includes the employee name, project name, and hours that the employee works on each project.  
A) Connect each EMPLOYEE tuple to the related PROJECT tuples via the WORKS\_ON attribute using a join operation  
B) Sort the tuples in both EMPLOYEE and PROJECT relations by values of Name, Project, Hours worked  
C) Combine all pairs of related tuples from EMPLOYEE and PROJECT and materialize the relationship  
D) Both A and C are correct  
Answer: D) Both A and C are correct  
  
Level: Analyze, LEVEL 4  
Question: Compare binary 1:1 or 1:N relationships with a ternary relationship type in terms of join operations needed to fully materialize the relationship instances.  
A) Ternary requires fewer join operations  
B) Binary requires more join operations  
C) Ternary and binary require the same number of join operations  
D) It depends on the specific situation  
Answer: D) It depends on the specific situation  
  
Level: Evaluate, LEVEL 5  
Question: Justify why three binary relationships cannot replace a ternary relationship in general?  
A) Because the meaning of each specific situation must be analyzed to decide which relationship types are needed  
B) Ternary relationships can always be replaced by three binary relationships  
C) Binary relationships are more flexible and easier to implement than ternary relationships  
D) A ternary relationship is always redundant compared to three binary relationships  
Answer: A) Because the meaning of each specific situation must be analyzed to decide which relationship types are needed  
  
Level: Create, LEVEL 6  
Question: Generate a ternary relation schema for the scenario of students taking courses taught by instructors. Consider that a student can take multiple courses, an instructor can teach multiple courses, and a course can have multiple instructors.  
A) STUDENT(Ssn, Name, Age), INSTRUCTOR(Ssn, Name, Age), COURSE(Course\_ID, Instructor\_ID, Student\_ID)  
B) STUDENT(Ssn, Name, Age), INSTRUCTOR(Ssn, Name, Age), COURSE(Course\_Name, Instructor\_ID, Student\_ID)  
C) STUDENT(Ssn, Name, Age), INSTRUCTOR(Instructor\_ID, Course\_ID), COURSE(Course\_ID, Student\_ID, Instructor\_ID)  
D) STUDENT(Ssn, Name, Age), INSTRUCTOR(Instructor\_ID, Name), COURSE(Course\_ID, Ssn, Instructor\_ID)  
Answer: C) STUDENT(Ssn, Name, Age), INSTRUCTOR(Instructor\_ID, Course\_ID), COURSE(Course\_ID, Student\_ID, Instructor\_ID)

* Question: Create six multiple choice question and answer of the question with the Relational Algebra concept

Response: Level: Remember  
Question: Define the set of relational algebra operations that forms a complete set according to the document?  
A) , , , ,   
B) , , , , ,   
C) , , , ,   
D) , , , , ,   
Answer: A) , , , ,   
  
Level: Understand  
Question: Explain the concept of Cartesian Product followed by SELECT that leads to the JOIN operation in the context of Relational Algebra?  
A) Cartesian Product is an operation that combines two relations into a single relation where each pair of corresponding tuples are matched. SELECT is used to filter out unwanted tuples from this combined relation, resulting in the JOIN operation.  
B) Cartesian Product is an operation that combines two relations into a single relation where each tuple in the first relation is repeated for every tuple in the second relation. SELECT is not involved in the JOIN operation.  
C) Cartesian Product is an operation that combines two relations into a single relation where each pair of corresponding tuples are matched and all attributes from both tuples are concatenated. SELECT is used to filter out unwanted tuples from this combined relation, but it does not lead to the JOIN operation.  
D) Cartesian Product is an operation that combines two relations into a single relation where each pair of corresponding tuples are matched and all attributes from both tuples are averaged. SELECT is used to filter out unwanted tuples from this combined relation, but it does not lead to the JOIN operation.  
Answer: A) Cartesian Product is an operation that combines two relations into a single relation where each pair of corresponding tuples are matched. SELECT is used to filter out unwanted tuples from this combined relation, resulting in the JOIN operation.  
  
Level: Apply  
Question: Solve the expression R S using UNION and MINUS as per the document?  
A) (R S) ((R S) (S R))  
B) (R S) ((R S) (S R))  
C) (R S) (R S) (S R)  
D) (R S) (S R)  
Answer: A) (R S) ((R S) (S R))  
  
Level: Analyze  
Question: Compare and contrast the Relational Algebra and the Relational Calculus in terms of their use for querying a database?  
A) The Relational Algebra is a procedural language that specifies how to retrieve the query result, while the Relational Calculus is a declarative language that only specifies what information the result should contain.  
B) The Relational Algebra is a declarative language that specifies what information the result should contain, while the Relational Calculus is a procedural language that specifies how to retrieve the query result.  
C) Both the Relational Algebra and the Relational Calculus are procedural languages that specify how to retrieve the query result.  
D) Both the Relational Algebra and the Relational Calculus are declarative languages that only specify what information the result should contain.  
Answer: A) The Relational Algebra is a procedural language that specifies how to retrieve the query result, while the Relational Calculus is a declarative language that only specifies what information the result should contain.  
  
Level: Evaluate  
Question: Determine whether the statement "The INTERSECTION operation is not required in relational algebra" is true or false according to the document?  
A) True  
B) False  
Answer: B) False  
  
Level: Create  
Question: Generate an example of a complete set of relational algebra operations that can be used to express any other original relational algebra operation?  
A) { , , , , , , INTERSECTION}  
B) { , , , , , MINUS, INTERSECTION}  
C) { , , , , , , UNION, INTERSECTION}  
D) { , , , , , UNION, MINUS, INTERSECTION}  
Answer: C) { , , , , , , UNION, INTERSECTION}

* Question: Create six multiple choice question and answer of the question with the Relational data model concept

Response: Level: Remember (Define)  
PAGE SOURCE: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, page 160-161  
Question: What is the basic building block of the relational data model?  
A) Relational Algebra Operations  
B) Conceptual Schema in the ER or EER model  
C) SQL standard for commercial relational DBMSs  
D) Mathematical relation  
Answer: D) Mathematical relation  
  
Level: Understand (Explain)  
PAGE SOURCE: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, page 160-164  
Question: Describe the theoretical basis of the relational data model.  
A) Set theory and first-order predicate logic  
B) Relational Algebra Operations  
C) SQL standard for commercial relational DBMSs  
D) Conceptual Schema in the ER or EER model  
Answer: A) Set theory and first-order predicate logic  
  
Level: Apply (Solve)  
PAGE SOURCE: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, page 164  
Question: What was the first commercial implementation of the relational model?  
A) SQL/DS system on the MVS operating system by IBM  
B) Oracle DBMS  
C) Conceptual Schema in the ER or EER model  
D) Mathematical relation  
Answer: A) SQL/DS system on the MVS operating system by IBM  
  
Level: Analyze (Compare)  
PAGE SOURCE: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, page 162-164  
Question: Compare the practical relational model and the formal relational data model.  
A) The practical relational model is based on the SQL standard for commercial relational DBMSs while the formal relational data model presents the most important concepts underlying it.  
B) The practical relational model is a mathematical relation while the formal relational data model is based on Set theory and first-order predicate logic.  
C) The practical relational model was introduced by Ted Codd of IBM Research in 1970, while the formal relational data model became available in the early 1980s.  
D) The practical relational model uses a conceptual schema in the ER or EER model while the formal relational data model uses relational algebra operations.  
Answer: A) The practical relational model is based on the SQL standard for commercial relational DBMSs while the formal relational data model presents the most important concepts underlying it.  
  
Level: Evaluate (Justify)  
PAGE SOURCE: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, page 164  
Question: Determine why having a standard for relational DBMSs is important.  
A) Simplified conversion between two systems  
B) Allows users to write statements in a database application program that can access data stored in multiple relational DBMSs without changing the database sublanguage (SQL).  
C) Both A and B  
D) None of the above  
Answer: C) Both A and B  
  
Level: Create (Generate)  
PAGE SOURCE: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, page 190-191  
Question: Generate a question about the Relational Algebra Operations discussed in chapter 8 of the book.  
A) What are the relational algebra operations and why are they important for understanding requests on a relational database?  
B) Describe the types of requests that may be specified on a relational database using relational algebra operations.  
C) Explain how relational algebra operations contribute to query processing and optimization in a relational database system.  
D) Determine the role of relational algebra operations in the practical relational model.  
Answer: A) What are the relational algebra operations and why are they important for understanding requests on a relational database?

* Question: Create six multiple choice question and answer of the question with the Relationship concept

Response: LEVEL: Remember  
Question: Define ternary relationship types.  
A) Three binary relationships  
B) One relationship of degree higher than two  
C) Single-valued or collection types of binary relationships  
D) Relationships that can represent multiple meanings  
Answer: B) One relationship of degree higher than two  
  
LEVEL: Understand  
Question: Explain the typical solution for broken down ternary relationship types.  
A) Include only the ternary relationship plus one or more binary relationships if they all are needed by the application.  
B) Break down the ternary relationship into several binary relationships of smaller degrees.  
C) Use only ternary relationships in any situation being represented.  
D) Ignore ternary relationships and focus on binary relationships only.  
Answer: A) Include only the ternary relationship plus one or more binary relationships if they all are needed by the application.  
  
LEVEL: Apply  
Question: Solve for the Relationship type in the given schema: CAN\_TEACH, TAUGHT\_DURING, and OFFERED\_DURING.  
A) Binary relationship  
B) Ternary relationship of degree 3  
C) Weak entity type with a ternary identifying relationship type  
D) None of the above  
Answer: C) Weak entity type with a ternary identifying relationship type  
  
LEVEL: Analyze  
Question: Compare and justify the usage of binary and ternary relationship types.  
A) Binary relationships are used to represent multiple meanings while ternary relationships are only used for specific situations.  
B) Ternary relationships can be inferred from three binary relationships under certain additional constraints.  
C) Both binary and ternary relationships can only represent a single meaning.  
D) Ternary relationships are always more complex than binary relationships.  
Answer: B) Ternary relationships can be inferred from three binary relationships under certain additional constraints.  
  
LEVEL: Evaluate  
Question: Determine if the SUPPLY relationship in Figure 3.17 is a binary or ternary relationship.  
A) Binary relationship represented by a reference in only one direction.  
B) Ternary relationship of degree 3.  
C) Weak entity type with a ternary identifying relationship type.  
D) None of the above.  
Answer: A) Binary relationship represented by a reference in only one direction.  
  
LEVEL: Create  
Question: Generate three binary relationships that are not equivalent to SUPPLY (Figure 3.17).  
A) CAN\_SUPPLY, N, Sname, SUPPLIER, PROJECT, PART, PROJECT, USES, PART, M, N  
B) SUPPLYN1, Part\_no, PART, N, Sname, SUPPLIER, Proj\_name, PROJECT, Quantity, N  
C) SUPPLIES, SP, SPJSS 1, 1, Figure 3.17, Ternary relationship types. (a) The SUPPLY relationship.  
D) None of the above.  
Answer: D) None of the above. (Correct answer should be created by generating three binary relationships that are not equivalent to SUPPLY.)

* Question: Create six multiple choice question and answer of the question with the Renaming concept

Response: Level: Remember  
Question: What should be a unique name among all named objects in a schema for a named query?  
A) Class names  
B) Method names  
C) Function names  
D) Relation names  
Answer: D) Relation names  
  
Level: Understand  
Question: Explain the concept of renaming in the context of a PROJECT operation with no renaming.  
A) Changing the attribute names of a relation  
B) Renaming the relational schema  
C) Modifying the order of attributes in a relation  
D) Applying no changes to the attribute names or order in a relation  
Answer: D) Applying no changes to the attribute names or order in a relation  
  
Level: Apply  
Question: Solve the following problem: Rename the relation 'Employee' to 'Staff' using the general RENAME operation.  
A) S('Employee')('Staff')  
B) (Employee)('Staff')  
C) S('Staff', 'Employee')  
D) (Staff, Employee)  
Answer: A) S('Employee')('Staff')  
  
Level: Analyze  
Question: Compare the formal RENAME operation with a PROJECT operation without renaming.  
A) The PROJECT operation changes attribute names or order while the RENAME operation does not  
B) The RENAME operation changes attribute names or order while the PROJECT operation does not  
C) Both PROJECT and RENAME operations can change attribute names or order  
D) Neither PROJECT nor RENAME operations can change attribute names or order  
Answer: C) Both PROJECT and RENAME operations can change attribute names or order  
  
Level: Evaluate  
Question: Determine if the following expression S('Employee')('Staff') is a valid use of the general RENAME operation.  
A) Yes, it is a valid use of the general RENAME operation to rename relation 'Employee' to 'Staff'  
B) No, it is not a valid use of the general RENAME operation because there are no attribute names mentioned  
C) Yes, it is a valid use of the general RENAME operation but with no effect since the renamed relation has the same attribute names as the original one  
D) No, it is not a valid use of the general RENAME operation because it does not rename any attribute  
Answer: A) Yes, it is a valid use of the general RENAME operation to rename relation 'Employee' to 'Staff'  
  
Level: Create  
Question: Generate an example of the RENAME operation renaming both the relation name and attribute names.  
A) S(B1, B2)(Rename('Relation', 'NewRelation')(B1, B2))  
B) Rename('Relation', 'NewRelation')(S(B1, B2)('Relation'))  
C) S(B1, B2)(Rename('Relation.B1', 'NewB1')(Rename('Relation.B2', 'NewB2')('Relation')))  
D) Rename('Relation', 'NewRelation')(S(NewB1, NewB2)('NewRelation'))  
Answer: D) Rename('Relation', 'NewRelation')(S(NewB1, NewB2)('NewRelation'))

* Question: Create six multiple choice question and answer of the question with the REVOKE command

Response: Level: Evaluate (Determine)  
PAGE SOURCE: '/content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf' (page 1144)  
Question: What command is included in SQL for canceling privileges?  
A) GRANT  
B) SELECT  
C) CREATE  
D) REVOKE  
Answer: D) REVOKE  
  
Level: Understand (Explain)  
PAGE SOURCE: '/content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf' (page 1144)  
Question: How is the REVOKE command used in SQL?  
A) To grant privileges temporarily  
B) To limit access to certain tuples of a relation  
C) To revoke privileges once they are no longer needed  
D) To create a new view based on a query  
Answer: C) To revoke privileges once they are no longer needed  
  
Level: Remember (Define)  
PAGE SOURCE: '/content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf' (page 1144)  
Question: What is the purpose of the REVOKE command in SQL?  
A) To limit access to certain attributes of a relation  
B) To grant privileges temporarily  
C) To revoke privileges once they are no longer needed  
D) To create a new view based on a query  
Answer: C) To revoke privileges once they are no longer needed  
  
Level: Create (Generate)  
PAGE SOURCE: '/content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf' (page 1144)  
Question: In a hypothetical scenario, if a user has been granted the SELECT privilege for a relation but no longer needs it, what command should be used to revoke that privilege?  
A) GRANT REVOKE  
B) REVOKE SELECT  
C) CREATE REVOKE  
D) DROP SELECT  
Answer: B) REVOKE SELECT  
  
Level: Analyze (Compare)  
PAGE SOURCE: '/content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf' (page 1144)  
Question: Compare the GRANT and REVOKE commands in SQL with respect to their purpose and functionality.  
A) Both commands grant privileges; they are interchangeable.  
B) The GRANT command grants privileges, while the REVOKE command revokes them once they are no longer needed.  
C) The REVOKE command grants privileges, while the GRANT command revokes them once they are no longer needed.  
D) Both commands are used to modify the structure of a database.  
Answer: B) The GRANT command grants privileges, while the REVOKE command revokes them once they are no longer needed.  
  
Level: Apply (Solve)  
PAGE SOURCE: '/content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf' (page 1144)  
Question: A user has been granted all privileges on a relation. However, you want to limit their access to only the SELECT privilege. How can this be achieved using the REVOKE command?  
A) REVOKE ALL PRIVILEGES from the user on the relation and then GRANT SELECT privilege.  
B) REVOKE SELECT, INSERT, UPDATE, DELETE privileges from the user on the relation, but keep ALL PRIVILEGES.  
C) REVOKE all privileges except SELECT from the user on the relation using a single command.  
D) You cannot limit access to only the SELECT privilege using the REVOKE command; you must create a new view with only the desired data.  
Answer: C) REVOKE all privileges except SELECT from the user on the relation using a single command.

* Question: Create six multiple choice question and answer of the question with the Role-Based Access Control (RBAC)

Response: Level: Remember  
Question: Define Role-Based Access Control (RBAC)?  
A) A system that allows user roles and permissions to be defined in an organizational context  
B) A security mechanism used for managing access to resources based on a user's role within the organization  
C) A method of granting database privileges to organizational roles rather than individual users  
D) A software application used for managing a company's customer service managers and sales account managers  
Answer: B) A security mechanism used for managing access to resources based on a user's role within the organization (PAGE SOURCE: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, page 1152)  
  
Level: Understand  
Question: Explain how RBAC works in Web-based applications?  
A) By assigning roles to workflow tasks so that a user with any of the roles related to a task may be authorized to execute it and may play a certain role only for a certain duration.  
B) By using traditional discretionary access controls along with RBAC, ensuring that only authorized users in their specified roles are given access to certain data or resources.  
C) By managing the schema of identities and making the complete name unique, addressing how organizations can effectively authenticate people and manage their access to confidential information.  
D) By increasing IT efficiency and satisfying application owners while keeping expenses under control.  
Answer: A) By assigning roles to workflow tasks so that a user with any of the roles related to a task may be authorized to execute it and may play a certain role only for a certain duration. (PAGE SOURCE: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, page 1152)  
  
Level: Apply  
Question: Solve the scenario: A company wants to implement RBAC to ensure that only authorized users in their specified roles can access certain data or resources. Which of the following actions will help them achieve this goal?  
A) Creating roles using CREATE ROLE and DESTROY ROLE commands, granting privileges from roles, and assigning individuals to appropriate roles.  
B) Increasing IT efficiency and satisfying application owners while keeping expenses under control.  
C) Using traditional discretionary access controls along with RBAC for managing the schema of identities and making the complete name unique.  
D) Managing the schema of identities and making the complete name unique, addressing how organizations can effectively authenticate people and manage their access to confidential information.  
Answer: A) Creating roles using CREATE ROLE and DESTROY ROLE commands, granting privileges from roles, and assigning individuals to appropriate roles. (PAGE SOURCE: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, page 1152)  
  
Level: Analyze  
Question: Compare RBAC with DAC and MAC models in terms of flexibility, policy neutrality, better support for security management and administration, and natural enforcement of the hierarchical organization structure within organizations.  
A) RBAC offers better flexibility, policy neutrality, and better support for security management and administration compared to both DAC and MAC models but lacks in natural enforcement of the hierarchical organization structure.  
B) Both RBAC and DAC offer similar levels of flexibility, policy neutrality, and support for security management and administration, but RBAC has a more natural enforcement of the hierarchical organization structure compared to MAC models.  
C) RBAC offers better flexibility and policy neutrality than both DAC and MAC models but lacks in better support for security management and administration and a natural enforcement of the hierarchical organization structure.  
D) Both DAC and MAC offer better flexibility, policy neutrality, and support for security management and administration compared to RBAC but lack in a natural enforcement of the hierarchical organization structure.  
Answer: A) RBAC offers better flexibility, policy neutrality, and better support for security management and administration compared to both DAC and MAC models but lacks in natural enforcement of the hierarchical organization structure. (PAGE SOURCE: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, page 1152)  
  
Level: Evaluate  
Question: Determine if the statement "RBAC systems have several desirable features, such as flexibility, policy neutrality, better support for security management and administration, and a natural enforce-ment of the hierarchical organization structure within organizations. They also have other aspects that make them attractive candidates for developing secure Web-based applications" is accurate based on the provided context.  
A) True - The statement accurately describes the desirable features of RBAC systems as presented in the given context.  
B) False - The statement does not accurately describe the features of RBAC systems as they lack natural enforcement of the hierarchical organization structure within organizations, according to the given context.  
C) Cannot say - There is no information provided in the context to determine whether or not the statement is accurate.  
Answer: A) True - The statement accurately describes the desirable features of RBAC systems as presented in the given context. (PAGE SOURCE: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, page 1152)  
  
Level: Create  
Question: Generate a scenario where mutual exclusion of roles can be successfully implemented in RBAC systems.  
A) A company has two roles: sales account manager and purchasing agent. The sales account manager is responsible for managing sales-related activities while the purchasing agent is responsible for managing purchasing-related activities. To prevent collusion, the sales account manager and purchasing agent should not have access to each other's data or resources simultaneously. By implementing mutual exclusion of roles in RBAC systems, it ensures that both roles cannot be used at the same time by the user, thus preventing collusion.  
Answer: A) A company has two roles: sales account manager and purchasing agent. The sales account manager is responsible for managing sales-related activities while the purchasing agent is responsible for managing purchasing-related activities. To prevent collusion, the sales account manager and purchasing agent should not have access to each other's data or resources simultaneously. By implementing mutual exclusion of roles in RBAC systems, it ensures that both roles cannot be used at the same time by the user, thus preventing collusion. (PAGE SOURCE: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, page 1151)

* Question: Create six multiple choice question and answer of the question with the Schema

Response: Level: Remember  
Question: What does the acronym SQL stand for?  
A) Simple Query Language  
B) Structured Query Language  
C) Statistical Query Language  
D) Sequential Query Language  
Answer: B) Structured Query Language (PAGE SOURCE: '/content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf', 'page': 192, 'page\_label': '193')  
  
Level: Remember  
Question: What does a schema refer to in SQL?  
A) A collection of tables and other constructs  
B) The largest database that can be created  
C) A single table within a database  
D) The system administrator or DBA's user account  
Answer: A) A collection of tables and other constructs (PAGE SOURCE: '/content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf', 'page': 192, 'page\_label': '193')  
  
Level: Understand  
Question: Explain the purpose of a schema in SQL.  
A) It is used to create tables, types, domains, and other constructs like views, assertions, and triggers.  
B) It is used to manage the largest database that can be created.  
C) It is used to manage a single table within a database.  
D) It is used to represent the system administrator or DBA's user account.  
Answer: A) It is used to create tables, types, domains, and other constructs like views, assertions, and triggers. (PAGE SOURCE: '/content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf', 'page': 192, 'page\_label': '193')  
  
Level: Apply  
Question: Solve the following statement: Create a schema called COMPANY owned by the user with authorization identifier Jsmith.  
A) CREATE SCHEMA COMPANY AUTHORIZATION Jsmith;  
B) CREATE USER COMPANY WITH IDENTIFIER Jsmith;  
C) GRANT SCHEMA COMPANY TO USER Jsmith;  
D) DROP SCHEMA COMPANY;  
Answer: A) CREATE SCHEMA COMPANY AUTHORIZATION Jsmith; (PAGE SOURCE: '/content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf', 'page': 193, 'page\_label': '194')  
  
Level: Analyze  
Question: Compare the use of CHECK and CREATE ASSERTION in SQL.  
A) Both are used to enforce constraints on attributes, domains, or tuples but differ in their efficiency. CHECK is more efficient for insertion or updating of tuples, while CREATE ASSERTION is used when it's not possible to use CHECK.  
B) Both are used to create schemas and schema elements, with CHECK being the default option and CREATE ASSERTION requiring explicit granting of privileges.  
C) Both are Boolean functions that return TRUE or FALSE and can be used in a WHERE clause condition.  
D) Both are used to manage databases and tables, with CHECK being used for simple checks and CREATE ASSERTION being used for complex queries.  
Answer: A) Both are used to enforce constraints on attributes, domains, or tuples but differ in their efficiency. CHECK is more efficient for insertion or updating of tuples, while CREATE ASSERTION is used when it's not possible to use CHECK. (PAGE SOURCE: '/content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf', 'page': 193, 'page\_label': '194')  
  
Level: Create  
Question: Develop a SQL statement that creates a table in the COMPANY schema owned by the user 'Jsmith'.  
A) CREATE TABLE TableName (attributes...) IN SCHEMA COMPANY AUTHORIZATION Jsmith;  
B) GRANT TABLE TableName TO SCHEMA COMPANY WITH AUTHORIZATION Jsmith;  
C) ALTER SCHEMA COMPANY OWNER TO 'Jsmith';  
D) CREATE SCHEMA 'Jsmith' WITH TABLE TableName (attributes...);  
Answer: A) CREATE TABLE TableName (attributes...) IN SCHEMA COMPANY AUTHORIZATION Jsmith; (PAGE SOURCE: '/content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf', 'page': 225, 'page\_label': '226')

* Question: Create six multiple choice question and answer of the question with the SELECT command

Response: Level: Remember  
Question: What is the purpose of the SELECT command in SQL?  
A) To declare a new table  
B) To update an existing record  
C) To retrieve data from a database  
D) To delete records from a table  
Answer: C) To retrieve data from a database  
  
Level: Remember  
Question: What is the format of a basic SELECT statement in SQL?  
A) FROM <table list> WHERE <condition>  
B) SELECT <attribute list> FROM <table list>  
C) WHERE <condition> FROM <table list>  
D) <attribute list> FROM <table list>  
Answer: B) SELECT <attribute list> FROM <table list>  
  
Level: Understand  
Question: Explain what the <attribute list> in a SELECT statement means.  
A) A list of table names required to process the query  
B) A list of attribute names whose values are to be retrieved by the query  
C) A list of conditions that identify the tuples to be retrieved by the query  
D) The result of the query  
Answer: B) A list of attribute names whose values are to be retrieved by the query  
  
Level: Analyze  
Question: Compare and contrast the use of 'SELECT ALL' and 'SELECT DISTINCT' in SQL.  
A) Both options retrieve all data from a database, but 'SELECT DISTINCT' eliminates duplicates  
B) Both options eliminate duplicates, but 'SELECT ALL' retrieves all data while 'SELECT DISTINCT' only retrieves distinct values  
C) Both options retrieve distinct values from a database and are used to count the number of unique values in a column  
D) Both options are used for updating records in a database  
Answer: A) Both options retrieve all data from a database, but 'SELECT DISTINCT' eliminates duplicates  
  
Level: Evaluate  
Question: Determine whether the following statement is true or false: A query with SELECT DISTINCT eliminates duplicates whereas a query with SELECT ALL does not.  
A) False  
B) True  
Answer: B) True  
  
Level: Create  
Question: Generate an example of a SQL SELECT command that retrieves the names and salaries of employees who earn more than $50,000 per year from the 'EMPLOYEE' table.  
A) SELECT Name, Salary FROM EMPLOYEE WHERE Salary > 50000  
B) SELECT EMPLOYEE.Name, Salary FROM EMPLOYEE WHERE Salary < 50000  
C) FROM EMPLOYEE SELECT Name, Salary WHERE Salary > 50000  
D) SELECT Name, Salary FROM WHERE Employee > 50000  
Answer: A) SELECT Name, Salary FROM EMPLOYEE WHERE Salary > 50000

* Question: Create six multiple choice question and answer of the question with the SELECT DISTINCT command

Response: Question 1 (Remember - Level 1): Define the purpose of using the keyword `SELECT DISTINCT` in SQL.  
A) To add new distinct tuples to a table  
B) To eliminate duplicate tuples from a query result  
C) To sort tuples alphabetically  
D) To count the number of tuples in a table  
Answer: B) To eliminate duplicate tuples from a query result  
LEVEL: 1, PAGE SOURCE: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf:207  
  
Question 2 (Understand - Level 2): Explain what happens when we use `SELECT ALL` instead of `SELECT DISTINCT`.  
A) All distinct tuples are retrieved from the query result  
B) Duplicate tuples are eliminated from the query result  
C) The SQL table becomes a bag type  
D) The SQL table becomes a set type  
Answer: A) All distinct tuples are retrieved from the query result  
LEVEL: 2, PAGE SOURCE: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf:207  
  
Question 3 (Apply - Level 3): Solve the following SQL query with `SELECT DISTINCT` to find distinct salary values for employees.  
```sql  
SELECT DISTINCT Salary FROM EMPLOYEE;  
```  
A) Retrieves all unique salary values of employees  
B) Retrieves all salary values of employees, duplicates included  
C) Retrieves the average salary value of employees  
D) Retrieves the total number of employees with distinct salaries  
Answer: A) Retrieves all unique salary values of employees  
LEVEL: 3, PAGE SOURCE: Not explicitly mentioned in the context provided  
  
Question 4 (Analyze - Level 4): Compare the result of a query `SELECT ... FROM ...` and `SELECT DISTINCT ... FROM ...`.  
A) The former retrieves all tuples, whereas the latter retrieves distinct tuples  
B) Both retrieve only duplicate tuples from the query result  
C) Both ignore duplicate tuples in the query result  
D) The former counts the total number of tuples, whereas the latter eliminates duplicates  
Answer: A) The former retrieves all tuples, whereas the latter retrieves distinct tuples  
LEVEL: 4, PAGE SOURCE: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf:207  
  
Question 5 (Evaluate - Level 5): Determine if the following SQL query with `SELECT DISTINCT` is valid or invalid, and justify your answer.  
```sql  
SELECT DISTINCT EmployeeName FROM DEPARTMENT;  
```  
A) Invalid, as the EmployeeName attribute does not exist in the DEPARTMENT table  
B) Valid, but it will return an empty result since there are no duplicate department names  
C) Valid, and it will return distinct department names if there are any duplicates  
D) Inapplicable, as the `SELECT DISTINCT` command can only be used with numeric values  
Answer: A) Invalid, as the EmployeeName attribute does not exist in the DEPARTMENT table  
LEVEL: 5, PAGE SOURCE: Not explicitly mentioned in the context provided  
  
Question 6 (Create - Level 6): Generate an SQL query using `SELECT DISTINCT` to retrieve distinct department names and employee count for each department.  
```sql  
SELECT DepartmentName, COUNT(EmployeeSsn) AS EmployeeCount FROM DEPARTMENT JOIN EMPLOYEE ON DEPARTMENT.DepartmentId = EMPLOYEE.DepartmentId GROUP BY DepartmentName;  
```  
A) Retrieves the department name and employee count for each distinct department  
B) Retrieves all employees' names, department, and salary  
C) Counts the total number of employees in each department  
D) Sorts departments alphabetically based on their names  
Answer: A) Retrieves the department name and employee count for each distinct department  
LEVEL: 6, PAGE SOURCE: Not explicitly mentioned in the context provided

* Question: Create six multiple choice question and answer of the question with the Selection concept

Response: LEVEL: 1 (Remember)  
Question: Define Selection in the context of Database Systems?  
A) The process of combining a cascade of SELECT operations into a single operation with a conjunctive condition  
B) The process of retrieving information from a database using the PROJECT Operation  
C) The process of performing the operation in parallel as data is read from each partition during Projection and Duplicate Elimination  
D) The process of sorting tuples and discarding duplicates during Projection and Duplicate Elimination  
Answer: A) The process of combining a cascade of SELECT operations into a single operation with a conjunctive condition  
  
LEVEL: 2 (Understand)  
Question: Explain how Selection works in parallel query processing?  
A) If the selection condition is an equality condition, <A = v>, and the same attribute A has been used for range partitioning, the selection can be performed on only that partition to which the value v belongs. In other cases, the selection would be performed in parallel on all the processors and the results merged  
B) The PROJECT operation selects certain columns from the table and discards the other columns  
C) Selection requires the full power of queries, which are discussed in Sections 6.3 and 7.1  
D) If the selection condition is v1 A v2 and attribute A is used for range partitioning, then the selection operation needs to be performed only in those processors in parallel where the range (v1, v2) overlaps a certain number of partitions  
Answer: A) If the selection condition is an equality condition, <A = v>, and the same attribute A has been used for range partitioning, the selection can be performed on only that partition to which the value v belongs. In other cases, the selection would be performed in parallel on all the processors and the results merged  
  
LEVEL: 3 (Apply)  
Question: Solve the following problem using Selection concept: Retrieve the names of all employees who have a salary greater than 25000 from the EMPLOYEE relation.  
A) SELECT \* FROM EMPLOYEE WHERE Salary <= 25000;  
B) SELECT \* FROM EMPLOYEE WHERE Salary > 25000 AND Dno = 4;  
C) PROJECT EMPLOYEE WHERE Salary > 25000;  
D) SELECT Lname, Fname FROM EMPLOYEE WHERE Salary > 25000;  
Answer: D) SELECT Lname, Fname FROM EMPLOYEE WHERE Salary > 25000;  
  
LEVEL: 4 (Analyze)  
Question: Compare and contrast Selection and PROJECT Operation in the context of Database Systems?  
A) The SELECT operation chooses some of the rows from the table while discarding other rows, while the PROJECT operation selects certain columns from the table and discards the other columns  
B) The SELECT operation requires the full power of queries, which are discussed in Sections 6.3 and 7.1, whereas the PROJECT operation combines a cascade of SELECT operations into a single operation with a conjunctive condition  
C) If we are interested in only certain attributes of a relation, we use the SELECT operation to project the relation over these attributes only, while the PROJECT operation is used for sorting tuples and discarding duplicates during Projection and Duplicate Elimination  
D) The SELECT operation can be performed on only that partition to which the value v belongs if the selection condition is an equality condition, <A = v>, and the same attribute A has been used for range partitioning, while the PROJECT operation can be achieved by performing the operation in parallel as data is read from each partition  
Answer: A) The SELECT operation chooses some of the rows from the table while discarding other rows, while the PROJECT operation selects certain columns from the table and discards the other columns  
  
LEVEL: 5 (Evaluate)  
Question: Justify whether the following SQL query is a good representation of Selection: SELECT \* FROM EMPLOYEE WHERE Dno = 4 AND Salary > 25000;  
A) Yes, because it combines a cascade of SELECT operations into a single operation with a conjunctive condition (AND)  
B) No, because it does not select certain columns from the table and discard the other columns  
C) Yes, because it is performing the operation in parallel as data is read from each partition during Projection and Duplicate Elimination  
D) No, because it is not choosing some of the rows from the table while discarding other rows  
Answer: A) Yes, because it combines a cascade of SELECT operations into a single operation with a conjunctive condition (AND)  
  
LEVEL: 6 (Create)  
Question: Develop an SQL query to retrieve the names and departments of all employees who have two or more dependents using Selection concept.  
A) Q5: SELECT Lname, Department FROM EMPLOYEE WHERE ( SELECT COUNT (\*)\n FROM DEPENDENT\n WHERE Ssn = Essn ) > = 2;  
B) SELECT \* FROM EMPLOYEE WHERE (SELECT COUNT(\*) FROM DEPENDENT WHERE Ssn = Essn > 2);  
C) PROJECT EMPLOYEE, DEPARTMENT WHERE ( SELECT COUNT (\*)\n FROM DEPENDENT\n WHERE Ssn = Essn ) > = 2;  
D) SELECT Lname, Department FROM EMPLOYEE WHERE (COUNT(\*) FROM DEPENDENT WHERE Ssn = Essn > 2);  
Answer: A) Q5: SELECT Lname, Department FROM EMPLOYEE WHERE ( SELECT COUNT (\*)\n FROM DEPENDENT\n WHERE Ssn = Essn ) > = 2;

* Question: Create six multiple choice question and answer of the question with the Serializable concept

Response: Level: Remember  
Question: Define a (conflict) serializable schedule.  
A) A sequence of database operations without conflicts between transactions  
B) An inefficient processing schedule where no interleaving of operations is allowed  
C) A sequence of database operations that can be reordered to produce the same result as a single-transaction execution  
D) A sequence of database operations that guarantees data consistency and integrity  
Answer: D) A sequence of database operations that guarantees data consistency and integrity  
  
Level: Understand  
Question: Explain what it means for a schedule to be serial.  
A) It represents efficient processing with interleaving of operations from different transactions allowed  
B) It is a correct schedule but not necessarily the most efficient one  
C) It guarantees data inconsistency and integrity violation  
D) It represents inefficient processing where no interleaving of operations from different transactions is permitted  
Answer: D) It represents inefficient processing where no interleaving of operations from different transactions is permitted  
  
Level: Apply  
Question: Solve the problem 20.18: What are the total number of possible schedules and how many serial schedules exist for the three transactions in Figure 20.8(a)?  
A) Total number of schedules = 6, serial schedules = 3  
B) Total number of schedules = 9, serial schedules = 6  
C) Total number of schedules = 12, serial schedules = 9  
D) Total number of schedules = 15, serial schedules = 12  
Answer: A) Total number of schedules = 6, serial schedules = 3  
  
Level: Analyze  
Question: Compare and contrast (conflict) serializable and serial schedules.  
A) Both are correct schedules that guarantee data consistency and integrity but a serial schedule is more efficient as it allows interleaving of operations from different transactions  
B) A (conflict) serializable schedule is distinct from being serial, the former is correct but the latter is not  
C) Both represent inefficient processing as no interleaving of operations from different transactions is permitted, but a (conflict) serializable schedule can be corrected to produce the same result as a single-transaction execution  
D) A (conflict) serializable schedule guarantees data consistency and integrity while a serial schedule does not  
Answer: D) A (conflict) serializable schedule guarantees data consistency and integrity while a serial schedule does not  
  
Level: Evaluate  
Question: Determine whether the schedule w1(X); r3(X); r1(Y); w2(Y); w3(X); is (conflict) serializable. If it is, list all equivalent serial schedules.  
A) Yes, equivalent serial schedules are w1(X); w3(X); r1(Y); w2(Y) and w3(X); w1(X); r1(Y); w2(Y)  
B) No, it is not (conflict) serializable as there is a write-write conflict on X between transactions 1 and 3  
C) Yes, equivalent serial schedules are w3(X); w1(X); r1(Y); w2(Y) and w1(X); w3(X); r1(Y); w2(Y)  
D) No, it is not (conflict) serializable as there is a read-write conflict on Y between transactions 1 and 2  
Answer: B) No, it is not (conflict) serializable as there is a write-write conflict on X between transactions 1 and 3  
  
Level: Create  
Question: Generate a schedule for the three transactions in Figure 20.8(a) that is not (conflict) serializable and explain why it is not.  
A) r1(X); w3(Y); r2(X); w1(Y), it is not (conflict) serializable because of a write-write conflict on X between transactions 1 and 3  
B) r1(X); r3(Y); w1(X); r2(Y), it is not (conflict) serializable because of a read-write conflict on Y between transactions 1 and 2  
C) w1(X); w3(Y); r1(X); r2(Y), it is not (conflict) serializable because of a write-write conflict on X between transactions 3 and 1  
D) w1(X); w3(Y); r2(X); r1(Y), it is not (conflict) serializable because of a read-write conflict on Y between transactions 2 and 1  
Answer: A) r1(X); w3(Y); r2(X); w1(Y), it is not (conflict) serializable because of a write-write conflict on X between transactions 1 and 3

* Question: Create six multiple choice question and answer of the question with the Set concept

Response: LEVEL: Remember  
Question: Define a set in the context provided.  
A) A collection that allows duplicate elements  
B) An ordered list where the order of the elements is important  
C) A structured value or object  
D) All basic atomic values such as integers, real numbers, character strings, Booleans, and any other basic data types  
Answer: A) A collection that allows duplicate elements  
  
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LEVEL: Remember  
Question: What does the set(T) type constructor create in the context provided?  
A) An ordered list  
B) A structured value or object  
C) All basic atomic values  
D) A collection that allows duplicate elements  
Answer: D) A collection that allows duplicate elements  
  
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LEVEL: Understand  
Question: Explain how multiple types can be created from the set type constructor.  
A) By specifying different basic data types like integers, real numbers, character strings, Booleans, and any other basic data types that the system supports directly  
B) By using the tuple constructor  
C) By adding elements of different types to a collection  
D) By creating collections with unique values only  
Answer: A) By specifying different basic data types like integers, real numbers, character strings, Booleans, and any other basic data types that the system supports directly  
  
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LEVEL: Understand  
Question: Describe how all elements in a collection value must be of the same type according to the context.  
A) The collection values can be different types but they are considered as one type when created from the set type constructor  
B) All elements in a collection value must be of the same basic data type like integers, real numbers, character strings, Booleans, and any other basic data types that the system supports directly  
C) The collection values can be different types but they are considered as one atomic value  
D) The collection values must be of different types for a proper database functioning  
Answer: B) All elements in a collection value must be of the same basic data type like integers, real numbers, character strings, Booleans, and any other basic data types that the system supports directly  
  
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LEVEL: Analyze  
Question: Compare and contrast sets with lists and bags in the context provided.  
A) Both lists and bags allow duplicate elements but sets do not  
B) Sets are ordered collections while lists and bags are unordered  
C) Lists are used to create collections of objects where the order is important, whereas sets and bags are used when it doesn't matter  
D) Bags can only be created with the bag(T) type constructor, while lists can be created with list(T), but sets can be created with set(T) or any other basic data types  
Answer: A) Both lists and bags allow duplicate elements but sets do not  
  
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LEVEL: Create  
Question: Generate an example of a new object P of type set<T> that is the union of two sets O and S in the context provided.  
A) `P = O.create\_union(S)`  
B) `P = create\_union(O, S)`  
C) `P = new set(create\_union(O, S))`  
D) `P = union(O, S)`  
Answer: A) `P = O.create\_union(S)`

* Question: Create six multiple choice question and answer of the question with the Specifying Privileges - Views concept

Response: Level: Remember  
Question: What does creating a view V for a relation R allow an account to do if only certain attributes of R are desired?  
A) Modify those attributes  
B) Reference those attributes in integrity constraints  
C) Retrieve only some fields of R  
D) Create new relations  
Answer: C) Retrieve only some fields of R  
LEVEL: 1  
PAGE SOURCE: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, page 1144  
  
Level: Understand  
Question: How can the account B retrieve only certain tuples of a relation R using views?  
A) By creating a view V that selects those tuples from R  
B) By granting SELECT privilege on R to B directly  
C) By modifying the integrity constraints of R to include references to V  
D) By revoking privileges from account B temporarily  
Answer: A) By creating a view V that selects those tuples from R  
LEVEL: 2  
PAGE SOURCE: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, page 1144  
  
Level: Apply  
Question: If an account A wants to grant SELECT privilege on a view V to another account B but lacks the necessary privileges on all relations involved in V's definition, what should A do?  
A) Create a new relation that includes only those attributes required for V and grant SELECT privilege on it  
B) Modify the integrity constraints of the existing relations involved in V's definition  
C) Ask the database administrator to grant the necessary privileges  
D) Revoke all privileges from account B temporarily  
Answer: A) Create a new relation that includes only those attributes required for V and grant SELECT privilege on it  
LEVEL: 3  
PAGE SOURCE: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, page 1143 & 1144  
  
Level: Analyze  
Question: Compare and contrast the ability to modify views with the ability to create new relations in terms of account privileges.  
A) Creating new relations requires more privileges than modifying views  
B) Modifying views requires more privileges than creating new relations  
C) Both creating new relations and modifying views require the same level of privileges  
D) Neither creating new relations nor modifying views require any privileges  
Answer: A) Creating new relations requires more privileges than modifying views  
LEVEL: 4  
PAGE SOURCE: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, page 1142 & 1143  
  
Level: Evaluate  
Question: Determine if the following statement is true or false: A user can modify a view that is defined on multiple tables using joins and aggregate functions without adding the WITH CHECK OPTION clause to its definition.  
A) True  
B) False  
Answer: B) False  
LEVEL: 5  
PAGE SOURCE: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, page 246  
  
Level: Create  
Question: Generate a SQL command to create a view V for a relation R that allows the account B to retrieve only certain tuples of R while limiting the attributes accessible.  
A) CREATE V AS SELECT \* FROM R WHERE [restricting condition]; GRANT SELECT ON V TO B;  
B) CREATE V AS SELECT [limited attributes] FROM R WHERE [restricting condition]; GRANT SELECT ON R TO B;  
C) CREATE V AS SELECT [limited attributes] FROM R WHERE [restricting condition]; GRANT SELECT ON V TO ALL;  
D) CREATE V AS SELECT \* FROM R WHERE [restricting condition]; GRANT SELECT ON R TO B WITH CHECK OPTION;  
Answer: B) CREATE V AS SELECT [limited attributes] FROM R WHERE [restricting condition]; GRANT SELECT ON R TO B;  
LEVEL: 6  
PAGE SOURCE: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, page 1144

* Question: Create six multiple choice question and answer of the question with the Structured Query Language concept

Response: LEVEL: Remember  
Question: What does SQL stand for?  
A) Sequential Query Language  
B) Systematic Query Language  
C) Structured English QUEry Language  
D) Simple Query Language  
Answer: C) Structured English QUEry Language  
SOURCE: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf (page 236)  
  
LEVEL: Understand  
Question: How many clauses can a retrieval query in SQL consist of?  
A) Three  
B) Four  
C) Five  
D) Six  
Answer: D) Six  
SOURCE: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf (page 236)  
  
LEVEL: Apply  
Question: Which of the following SQL query clauses are mandatory in a retrieval query?  
A) SELECT, FROM, WHERE  
B) SELECT, FROM, GROUP BY  
C) SELECT, FROM, ORDER BY  
D) SELECT, FROM, HAVING  
Answer: A) SELECT, FROM  
SOURCE: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf (page 236)  
  
LEVEL: Analyze  
Question: What is the purpose of a SQL query optimizer?  
A) To execute the query and return the result  
B) To parse, validate, and scan the query  
C) To generate an execution plan for the query  
D) To store and execute the query later whenever needed  
Answer: C) To generate an execution plan for the query  
SOURCE: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf (page 669)  
  
LEVEL: Evaluate  
Question: Which of the following is NOT a typical step when processing a high-level SQL query?  
A) Query code generator  
B) Runtime database processor  
C) Executing the code directly  
D) Compiling the code for later execution  
Answer: C) Executing the code directly  
SOURCE: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf (page 669)  
  
LEVEL: Create  
Question: Generate a simple SQL query that retrieves all employee names from the EMPLOYEE table and sorts them in alphabetical order.  
A) SELECT \* FROM EMPLOYEE ORDER BY NAME;  
B) SELECT NAME FROM EMPLOYEE ORDER BY \*;  
C) SELECT \* FROM EMPLOYEE ORDER BY;  
D) SELECT NAME FROM EMPLOYEE;  
Answer: A) SELECT \* FROM EMPLOYEE ORDER BY NAME;  
SOURCE: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf (Multiple pages, understanding the format and structure of SQL queries)

* Question: Create six multiple choice question and answer of the question with the SQL Injection concept

Response: LEVEL: Remember  
QUESTION: Define SQL Injection  
A) A technique for embedding SQL statements into a host programming language  
B) An approach to database application programming using recursive queries  
C) A method for inserting malicious code into a SQL query to gain unauthorized access  
D) The process of retrieving multiple tuples from a database table using the SELECT statement  
ANSWER: C) A method for inserting malicious code into a SQL query to gain unauthorized access (Page Source: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, Page 327)  
  
LEVEL: Understand  
QUESTION: Explain the concept of SQL Injection with an example  
A) By inserting malicious code into a SQL query, an attacker can gain unauthorized access to sensitive data  
B) An embedded SQL approach allows for the retrieval of multiple tuples from a database table using the SELECT statement  
C) The use of recursive queries in a SQL query can result in SQL Injection vulnerabilities if not properly secured  
D) SQLJ technique for embedding SQL in Java programs is immune to SQL Injection attacks  
ANSWER: A) By inserting malicious code into a SQL query, an attacker can gain unauthorized access to sensitive data (Page Source: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, No Specific Page Mentioned)  
  
LEVEL: Apply  
QUESTION: Solve the following SQL Injection vulnerability by sanitizing user inputs  
SQL Query: SELECT \* FROM users WHERE username = 'admin' AND password = 'password' OR 1=1 --  
A) SELECT \* FROM users WHERE username = 'admin' AND password = 'password' OR 1=1 #  
B) SELECT \* FROM users WHERE username = 'admin' AND password = 'password' OR 1=1'--  
C) SELECT \* FROM users WHERE username = 'admin' AND password = 'password' OR 1=1 /\*--\*/  
D) SELECT \* FROM users WHERE username = 'admin' AND password = 'password' OR 1=1 -- -  
ANSWER: C) SELECT \* FROM users WHERE username = 'admin' AND password = 'password' OR 1=1 /\*--\*/ (Page Source: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, No Specific Page Mentioned)  
  
LEVEL: Analyze  
QUESTION: Compare and justify the difference between SQL Injection and Cross-Site Scripting (XSS) attacks  
A) Both are a type of web application security vulnerability, but XSS is focused on client-side script injection while SQL Injection targets server-side databases  
B) SQL Injection is a more severe attack than XSS as it can allow an attacker to gain complete control over the database and the web application  
C) Both SQL Injection and XSS are aimed at server-side attacks, with XSS being more complex and difficult to detect  
D) While SQL Injection targets databases, XSS focuses on user interface manipulation and data theft  
ANSWER: A) Both are a type of web application security vulnerability, but XSS is focused on client-side script injection while SQL Injection targets server-side databases (Page Source: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, No Specific Page Mentioned)  
  
LEVEL: Evaluate  
QUESTION: Determine the best practices for preventing SQL Injection attacks  
A) Regularly update and patch database management systems to ensure they are protected against known vulnerabilities  
B) Use prepared statements instead of dynamically constructed queries when interacting with databases  
C) Always validate user inputs before using them in SQL queries  
D) All of the above  
ANSWER: D) All of the above (Page Source: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, No Specific Page Mentioned)  
  
LEVEL: Create  
QUESTION: Generate a SQL query for selecting all columns from the 'users' table while avoiding SQL Injection vulnerabilities  
A) SELECT \* FROM users WHERE username = 'admin' AND password = 'password';  
B) SELECT \* FROM users WHERE username = 'admin' AND password = 'password' OR 1=1;  
C) SELECT \* FROM users WHERE username = 'admin' AND password = 'password' OR 1=1 /\*--\*/;  
D) SELECT \* FROM users WHERE username = 'admin' AND password = 'password'; /\*--\*/;  
ANSWER: D) SELECT \* FROM users WHERE username = 'admin' AND password = 'password'; /\*--\*/; (Page Source: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, No Specific Page Mentioned)

* Question: Create six multiple choice question and answer of the question with the Subclass concept

Response: LEVEL: Remember  
Question: Define a subclass according to the document context.  
A) A class that has no superclasses  
B) A specialized version of another class  
C) A class that inherits attributes from other classes  
D) A class with more than one direct superclass  
Answer: B) A specialized version of another class (Page Source: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, page 131)  
  
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LEVEL: Understand  
Question: Explain what does it mean for a subclass to inherit the attributes not only of its direct superclass but also of all its predecessor superclasses in the hierarchy or lattice.  
A) Only the direct superclass is inherited  
B) Only the predecessor superclasses are inherited  
C) The direct superclass and its predecessors are inherited  
D) None of the above  
Answer: C) The direct superclass and its predecessors are inherited (Page Source: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, page 131)  
  
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LEVEL: Apply  
Question: Solve the following problem: If a member of GRADUATE\_STUDENT is also a member of RESEARCH\_ASSISTANT, which class does this individual belong to according to the document context?  
A) GRADUATE\_STUDENT  
B) RESEARCH\_ASSISTANT  
C) Both GRADUATE\_STUDENT and RESEARCH\_ASSISTANT  
D) A leaf node of the hierarchy  
Answer: C) Both GRADUATE\_STUDENT and RESEARCH\_ASSISTANT (Page Source: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, page 131)  
  
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LEVEL: Analyze  
Question: Compare and contrast top-down conceptual refinement and bottom-up conceptual synthesis as described in the document context.  
A) Top-down is a process that involves generalization while bottom-up is a process that involves specialization  
B) Top-down is a process that involves specialization while bottom-up is a process that involves generalization  
C) Both top-down and bottom-up are processes that involve both generalization and specialization  
D) Top-down is a process of arriving at the same hierarchy or lattice from the other direction  
Answer: A) Top-down is a process that involves generalization while bottom-up is a process that involves specialization (Page Source: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, page 132)  
  
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LEVEL: Evaluate  
Question: Determine if the following statement is true or false based on the document context: A shared subclass can only inherit attributes from one superclass.  
A) True  
B) False  
Answer: B) False (Page Source: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, page 132)  
  
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LEVEL: Create  
Question: Generate a possible shared subclass in the context of the document.  
A) GRADUATE\_STUDENT  
B) FACULTY  
C) STUDENT\_ASSISTANT  
D) ENGINEERING\_MANAGER  
Answer: D) ENGINEERING\_MANAGER (Page Source: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, page 129)

* Question: Create six multiple choice question and answer of the question with the Subset concept

Response: LEVEL: Remember  
Question: Define a subset in the context provided?  
A) A group of employees who work under the same supervisor  
B) An operation that combines two sets O and S  
C) A set of all subsets of another set V  
D) A collection of objects where the order of elements is important  
Answer: C) A set of all subsets of another set V  
  
LEVEL: Understand  
Question: Explain how a subset is defined in the context?  
A) By selecting a group of employees who work under the same supervisor  
B) By combining two sets O and S using operations like union, intersection, or difference  
C) By specifying a correlated nested query with an aggregate function in SQL  
D) A set of all subsets of another set V  
Answer: D) A set of all subsets of another set V  
  
LEVEL: Apply  
Question: Solve for the subset P(V ) of the set V given in the context?  
A) By creating a collection of all possible subsets of V, where V is {Birth\_date , Department , Supervisor }  
B) By finding all employees who work under the same supervisor and assigning them to the subset  
C) By using the create\_union(S), create\_intersection(S), or create\_difference(S) operations on a set S  
D) By applying SQL aggregate functions SOME and ALL to a collection of Boolean values  
Answer: A) By creating a collection of all possible subsets of V, where V is {Birth\_date , Department , Supervisor }  
  
LEVEL: Analyze  
Question: Compare the subset P(V ) with a singleton set in the context?  
A) A singleton set has one element while P(V ) contains multiple elements for each subset  
B) Both are sets that can be used to store data, but P(V ) can store more complex structures  
C) The order of elements is important for both subset P(V ) and singleton sets  
D) A singleton set is a special type of subset  
Answer: A) A singleton set has one element while P(V ) contains multiple elements for each subset  
  
LEVEL: Evaluate  
Question: Determine if the following statement is true or false in the context: All subsets of P(V ) are also members of V?  
A) True, since all subsets of P(V ) are composed of members of V  
B) False, since some subsets of P(V ) may contain elements not present in V  
C) It depends on the specific subset being considered  
D) The information provided does not allow us to determine if this statement is true or false  
Answer: B) False, since some subsets of P(V ) may contain elements not present in V  
  
LEVEL: Create  
Question: Generate an example of a subset S from the set V = {Birth\_date , Department , Supervisor } using the context?  
A) The subset containing only Birth\_date and Department  
B) The subset containing all three elements: Birth\_date, Department, and Supervisor  
C) A singleton set containing only the element Supervisor  
D) The empty set , which contains no elements from V  
Answer: A) The subset containing only Birth\_date and Department

* Question: Create six multiple choice question and answer of the question with the Superclass concept

Response: Level: Remember  
Question: Define what is a superclass?  
A) A subclass that directly inherits attributes and relationships from another class  
B) A class that has no direct subclasses  
C) A class that inherits attributes and relationships from multiple other classes  
D) A class that does not belong to any hierarchy or lattice  
Answer: A) A superclass is a class that directly inherits attributes and relationships from another class.  
  
Level: Understand  
Question: Describe the concept of multiple inheritance in the context provided.  
A) A situation where a subclass has more than one direct superclass  
B) A concept that does not exist in this context  
C) A situation where a subclass inherits attributes and relationships from multiple other classes but they are all different  
D) A concept where a class can have multiple types  
Answer: A) Multiple inheritance is a situation where a subclass has more than one direct superclass.  
  
Level: Apply  
Question: Solve the following scenario: A class STUDENT\_ASSISTANT inherits attributes from EMPLOYEE and STUDENT. If both EMPLOYEE and STUDENT inherit the same attributes from PERSON, according to the rule given in the text, how many times will those attributes be included in the shared subclass (STUDENT\_ASSISTANT)?  
A) Once  
B) Twice  
C) Three times  
D) Infinite number of times  
Answer: A) Those attributes will be included only once in the shared subclass (STUDENT\_ASSISTANT).  
  
Level: Analyze  
Question: Compare and contrast multiple inheritance with single inheritance.  
A) Both are situations where a subclass inherits attributes from another class but multiple inheritance allows more than one direct superclass  
B) Both are concepts that do not exist in this context  
C) Single inheritance allows only one direct superclass while multiple inheritance does not have any restrictions on the number of direct superclasses  
D) Both allow a subclass to inherit attributes from multiple classes but they operate differently depending on the model used.  
Answer: D) Both allow a subclass to inherit attributes from multiple classes, but they operate differently depending on the model used. Single inheritance allows only one direct superclass while multiple inheritance allows more than one direct superclass.  
  
Level: Evaluate  
Question: Determine if the following statement is true or false based on the context provided: An entity can have multiple types in a model that supports multiple inheritance.  
A) True  
B) False  
Answer: B) False, some models do not allow an entity to have multiple types, even in a model that supports multiple inheritance.  
  
Level: Create  
Question: Generate an example of a shared subclass and its direct superclasses in a scenario different from the ones provided in the text.  
A) Engineer (Superclass: Mechanical, Electrical, Civil)  
B) Manager (Superclass: Human Resources, Finance, IT)  
C) Student (Superclass: Undergraduate, Graduate, Research)  
D) Employee (Superclass: Full Time, Part Time, Contractor)  
Answer: A) Engineer (Superclass: Mechanical, Electrical, Civil) is an example of a shared subclass and its direct superclasses in a scenario different from the ones provided in the text.

* Question: Create six multiple choice question and answer of the question with the Superkey concept

Response: LEVEL: 1 (Remember)  
Question: Define a superkey in the context of databases.  
A) A minimal unique set of attributes that identifies each tuple in a relation  
B) An attribute that can be used to retrieve multiple tuples in a relation  
C) A key with redundant attributes  
D) A time-invariant property of a relation schema  
Answer: A) A minimal unique set of attributes that identifies each tuple in a relation  
  
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LEVEL: 2 (Understand)  
Question: Explain the concept of minimality for a superkey.  
A) It ensures that all tuples in a relation have different values for every attribute  
B) It refers to a superkey that includes all attributes of a key  
C) It states that removing any attribute from a superkey will result in a set that is not a superkey anymore  
D) It specifies that a superkey should be formed only from multiple attributes  
Answer: C) It states that removing any attribute from a superkey will result in a set that is not a superkey anymore  
  
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LEVEL: 3 (Apply)  
Question: Solve the following question: Is {Ssn, Name} a key for the STUDENT relation? Justify your answer.  
A) Yes, because no two students have the same Ssn and Name  
B) No, because removing either Ssn or Name from {Ssn, Name} results in a superkey but not a key  
C) Yes, because every relation has at least one default key  
D) No, because there is no uniqueness property for {Ssn, Name}  
Answer: B) No, because removing either Ssn or Name from {Ssn, Name} results in a superkey but not a key  
  
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LEVEL: 4 (Analyze)  
Question: Compare and contrast keys and superkeys.  
A) Keys are minimal unique sets of attributes that identify each tuple, while superkeys are any sets of attributes that can be used to identify tuples  
B) Superkeys are minimal unique sets of attributes, while keys may include redundant attributes  
C) Keys require all their attributes together to have the uniqueness property, while superkeys do not  
D) Both keys and superkeys are time-invariant properties of a relation schema  
Answer: A) Keys are minimal unique sets of attributes that identify each tuple, while superkeys are any sets of attributes that can be used to identify tuples  
  
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LEVEL: 5 (Evaluate)  
Question: Determine whether the statement "A key with multiple attributes must always have redundancy" is correct or incorrect. Justify your answer.  
A) Incorrect, a key with multiple attributes does not necessarily have redundancy  
B) Correct, a key with multiple attributes always has redundancy because it includes more than one attribute  
C) Incorrect, a key with multiple attributes must not include redundant attributes  
D) The statement is neither correct nor incorrect as it depends on the specific relation schema and the attributes chosen for the key  
Answer: D) The statement is neither correct nor incorrect as it depends on the specific relation schema and the attributes chosen for the key  
  
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LEVEL: 6 (Create)  
Question: Generate an example of a minimal superkey for the EMPLOYEE relation that includes multiple attributes.  
A) {EmployeeID, Department}  
B) {EmployeeID, FirstName, LastName}  
C) {Department, Salary}  
D) {FirstName, LastName, Salary}  
Answer: A) {EmployeeID, Department} (Assuming that no two employees have the same EmployeeID and Department combination)

* Question: Create six multiple choice question and answer of the question with the The Dirty Read Problem concept

Response: Level: Remember (1)  
Question: Define The Dirty Read Problem.  
A) A problem occurring when a transaction reads data from an inconsistent state.  
B) An issue arising during the update process of a database item.  
C) A problem that occurs when a system fails to access an updated item before it is changed back.  
D) A situation where one transaction calculates an aggregate summary function on a number of database items while other transactions are updating some of these items.  
Answer: A) A problem occurring when a transaction reads data from an inconsistent state. (source: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, page 763)  
  
Level: Understand (2)  
Question: Explain The Dirty Read Problem with an example.  
A) An example of dirty read problem is when transaction T1 updates item X and then fails before completion, so the system must roll back X to its original value. Before it can do so, however, transaction T2 reads the temporary value of X, which will not be recorded permanently in the database because of the failure of T1.  
B) An example of dirty read problem is when one transaction calculates an aggregate summary function on a number of database items while other transactions are updating some of these items, and the aggregate function may calculate some values before they are updated and others after they are updated.  
C) An example of dirty read problem is when two transactions access the same item at the same time, leading to inconsistent data in the system.  
D) An example of dirty read problem is not provided in the given context.  
Answer: A) An example of dirty read problem is when transaction T1 updates item X and then fails before completion, so the system must roll back X to its original value. Before it can do so, however, transaction T2 reads the temporary value of X, which will not be recorded permanently in the database because of the failure of T1. (source: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, page 763)  
  
Level: Apply (3)  
Question: Solve the following situation of The Dirty Read Problem: Transaction T1 updates item X with value 'A', and before it can commit the update, transaction T2 reads the temporary value of X which is still 'B'.  
A) Roll back transaction T2 to its original state.  
B) Commit both transactions T1 and T2.  
C) Wait for transaction T1 to complete before allowing transaction T2 to read item X.  
D) Update item X with a placeholder value and then allow transaction T2 to read the updated value.  
Answer: C) Wait for transaction T1 to complete before allowing transaction T2 to read item X. (source: /context not provided, question creation based on understanding of The Dirty Read Problem)  
  
Level: Analyze (4)  
Question: Compare and contrast The Dirty Read Problem with The Incorrect Summary Problem.  
A) Both problems are related to inconsistent data in a database due to concurrent transactions. However, while The Dirty Read Problem occurs when a transaction reads data from an inconsistent state, The Incorrect Summary Problem arises during the calculation of aggregate summary functions on database items by multiple transactions.  
B) The Dirty Read Problem is caused when one transaction accesses a temporary value of an item that has been updated by another transaction but not yet committed, while The Incorrect Summary Problem occurs due to inconsistent data in the database.  
C) Both problems are identical and have the same causes and effects.  
D) The Dirty Read Problem is related to transactions reading uncommitted changes, whereas The Incorrect Summary Problem involves incorrect calculation of aggregate functions due to updates during the function's execution.  
Answer: A) Both problems are related to inconsistent data in a database due to concurrent transactions. However, while The Dirty Read Problem occurs when a transaction reads data from an inconsistent state, The Incorrect Summary Problem arises during the calculation of aggregate summary functions on database items by multiple transactions. (source: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, pages 763 and 1074)  
  
Level: Evaluate (5)  
Question: Determine whether the following statement is true or false based on The Dirty Read Problem: A transaction can read consistent data from a database even if other transactions are updating it concurrently.  
A) True  
B) False  
Answer: False (source: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, page 763)  
  
Level: Create (6)  
Question: Generate a question that asks for a situation where The Dirty Read Problem might occur based on the information provided about it in the document.  
A) In what scenario does a transaction read temporary data from an item before another transaction has successfully updated and committed its changes, resulting in inconsistent data being read?  
B) What happens when two transactions attempt to access and update the same item simultaneously in a database system?  
C) Can a transaction correctly read data from a database if another transaction is calculating an aggregate summary function on some of those items?  
D) Under what circumstances can a transaction read inconsistent data that has not been committed yet?  
Answer: A) In what scenario does a transaction read temporary data from an item before another transaction has successfully updated and committed its changes, resulting in inconsistent data being read? (source: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, page 763)

* Question: Create six multiple choice question and answer of the question with the The Lost Update Problem concept

Response: Level: Remember  
Question: Define "The Lost Update Problem"  
A) A problem where a transaction reads a value of an item before another transaction changes it in the database  
B) A problem where two transactions access the same database items but their operations are not interleaved  
C) A problem where a transaction is aborted due to deadlock detection  
D) A problem where a catastrophic disk failure occurs  
Answer: A) A problem where a transaction reads a value of an item before another transaction changes it in the database  
  
Level: Understand  
Question: Explain The Lost Update Problem with an example  
A) An example where transactions T1 and T2 are submitted at approximately the same time, and their operations are interleaved as shown in Figure 20.3(a); then the final value of item X is incorrect because T2 reads the value of X before T1 changes it in the database  
B) An example where transactions T1 and T2 access different database items and their operations are not interleaved  
C) An example where a transaction reads a value of an item after another transaction has already changed it in the database  
D) An example where a transaction is aborted due to deadlock detection  
Answer: A) An example where transactions T1 and T2 are submitted at approximately the same time, and their operations are interleaved as shown in Figure 20.3(a); then the final value of item X is incorrect because T2 reads the value of X before T1 changes it in the database  
  
Level: Apply  
Question: Solve The Lost Update Problem using a solution provided in the document  
A) By making the NO-UNDO/REDO recovery algorithm more efficient, noting that if a data item has been updated multiple times by committed transactions since the last checkpoint, it is only necessary to REDO the last update of X from the log during recovery because the other updates would be overwritten by this last REDO  
B) By providing a variety of user interfaces, including apps for mobile users, query languages for casual users, programming language interfaces for application programmers, forms and command codes for parametric users, menu-driven interfaces and natural language interfaces for standalone users  
C) By using the shadow paging recovery technique, which does not require a log under certain circumstances  
D) By using the ARIES recovery method, which has three phases  
Answer: A) By making the NO-UNDO/REDO recovery algorithm more efficient, noting that if a data item has been updated multiple times by committed transactions since the last checkpoint, it is only necessary to REDO the last update of X from the log during recovery because the other updates would be overwritten by this last REDO  
  
Level: Analyze  
Question: Compare The Lost Update Problem and Deadlock Detection problem  
A) They are the same problem, where a transaction is aborted due to interleaved operations with another transaction  
B) They are different problems; The Lost Update Problem occurs when two transactions access the same database items and read/write values in an incorrect order, while Deadlock Detection problem occurs when transactions wait for resources that are being used by other transactions  
C) They are the same problem, where a transaction is aborted due to a catastrophic disk failure  
D) They are different problems; The Lost Update Problem occurs when a transaction reads a value of an item before another transaction changes it in the database, while Deadlock Detection problem occurs due to resource contention among transactions  
Answer: B) They are different problems; The Lost Update Problem occurs when two transactions access the same database items and read/write values in an incorrect order, while Deadlock Detection problem occurs when transactions wait for resources that are being used by other transactions  
  
Level: Evaluate  
Question: Justify why The Lost Update Problem is a significant issue in concurrent transaction processing  
A) Because it can lead to incorrect values of database items and compromise the integrity of the database  
B) Because it is only a problem when two transactions access different database items  
C) Because it can cause deadlocks among transactions  
D) Because it does not occur in single-user environments  
Answer: A) Because it can lead to incorrect values of database items and compromise the integrity of the database  
  
Level: Create  
Question: Generate an outline for a solution to The Lost Update Problem using the UNDO/NO-REDO algorithm  
A) 1. Develop the outline for an UNDO/NO-REDO algorithm  
 2. In the case of a concurrent transaction, note that if a data item has been updated multiple times by committed transactions since the last checkpoint, it is only necessary to REDO the last update of X from the log during recovery because the other updates would be overwritten by this last REDO  
 3. Start from the end of the log; then, whenever an item is redone, it is added to a list of redone items  
 4. Before REDO is applied to an item, the list is checked; if the item appears on the list, it is not redone again, since its latest value has already been recovered  
B) 1. Implement a system that allows multiple users with varying levels of technical knowledge to access the database  
 2. Provide apps for mobile users, query languages for casual users, programming language interfaces for application programmers, forms and command codes for parametric users, menu-driven interfaces and natural language interfaces for standalone users  
 3. Use a recovery method that does not require a log under certain circumstances  
 4. Implement a deadlock detection mechanism to avoid The Lost Update Problem  
C) 1. Develop a solution that can handle concurrent transactions in a DBMS  
 2. Implement the UNDO/NO-REDO algorithm, which makes the NO-UNDO/REDO recovery algorithm more efficient by noting that if a data item has been updated multiple times by committed transactions since the last checkpoint, it is only necessary to REDO the last update of X from the log during recovery because the other updates would be overwritten by this last REDO  
 3. Implement a deadlock detection mechanism to avoid Deadlock Detection problem among transactions  
D) 1. Define The Lost Update Problem as a problem where two transactions that access the same database items have their operations interleaved in a way that makes the value of some database items incorrect  
 2. Develop a system that allows multiple users with varying levels of technical knowledge to access the database  
 3. Implement a recovery method that does not require a log under certain circumstances  
 4. Provide apps for mobile users, query languages for casual users, programming language interfaces for application programmers, forms and command codes for parametric users, menu-driven interfaces and natural language interfaces for standalone users  
Answer: C) 1. Develop a solution that can handle concurrent transactions in a DBMS  
 2. Implement the UNDO/NO-REDO algorithm, which makes the NO-UNDO/REDO recovery algorithm more efficient by noting that if a data item has been updated multiple times by committed transactions since the last checkpoint, it is only necessary to REDO the last update of X from the log during recovery because the other updates would be overwritten by this last REDO  
 3. Implement a deadlock detection mechanism to avoid Deadlock Detection problem among transactions

* Question: Create six multiple choice question and answer of the question with the The Unrepeatable Read Problem concept

Response: LEVEL: 1 (Remember) - Define The Unrepeatable Read Problem  
A) A problem that occurs in a database system when a transaction is interrupted by another transaction  
B) A problem that arises due to a network error during data transmission  
C) An issue that happens when a query returns inconsistent results because of the order of operations  
D) A situation where a transaction fails due to insufficient resources or memory limitations  
Answer: A) A problem that occurs in a database system when a transaction is interrupted by another transaction  
  
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LEVEL: 2 (Understand) - Explain The Unrepeatable Read Problem with an example  
A) Give an example of how the unrepeatable read problem can occur during an airline reservation transaction  
B) Describe a scenario where a bank transfer is affected due to the unrepeatable read problem  
C) Explain how the unrepeatable read problem can lead to data inconsistencies in a shared database environment  
D) Discuss a situation where the unrepeatable read problem might occur during a stock trading transaction  
Answer: A) Give an example of how the unrepeatable read problem can occur during an airline reservation transaction (Example provided in the context)  
  
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LEVEL: 3 (Apply) - Solve a problem related to The Unrepeatable Read Problem  
A) Consider a banking system where two transactions T1 and T2 are trying to access and update the same account simultaneously. Develop a scenario showing how the unrepeatable read problem can occur in this system  
B) In a shared database environment, explain how isolation levels can help prevent the unrepeatable read problem  
C) Design a solution to handle the unrepeatable read problem in a multi-user database management system  
D) Describe how optimistic locking and pessimistic locking techniques can be used to avoid the unrepeatable read problem  
Answer: C) Design a solution to handle the unrepeatable read problem in a multi-user database management system (No direct answer provided, but a solution could involve implementing locks or versions to prevent simultaneous access of data by multiple transactions)  
  
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LEVEL: 4 (Analyze) - Compare two solutions for The Unrepeatable Read Problem  
A) Compare and contrast optimistic locking and pessimistic locking techniques used to handle the unrepeatable read problem  
B) Analyze the performance trade-offs between using serializable isolation level versus read committed isolation level to prevent the unrepeatable read problem  
C) Discuss how concurrency control mechanisms like two-phase locking (2PL) and multi-versioning can help manage the unrepeatable read problem in database systems  
D) Compare and contrast the effectiveness of deadlock avoidance algorithms versus deadlock detection algorithms in handling the unrepeatable read problem  
Answer: A) Compare and contrast optimistic locking and pessimistic locking techniques used to handle the unrepeatable read problem (Details not provided, but a comparison can be made based on concurrency, performance, overhead, and flexibility)  
  
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LEVEL: 5 (Evaluate) - Justify the importance of handling The Unrepeatable Read Problem in a database system  
A) Justify why handling the unrepeatable read problem is crucial for ensuring data consistency in a shared database environment  
B) Determine the potential consequences of not properly handling the unrepeatable read problem in a concurrent database system  
C) Explain how ignoring the unrepeatable read problem can lead to financial losses, customer dissatisfaction, and loss of credibility for an organization  
D) Discuss the importance of using appropriate isolation levels and locking mechanisms to handle the unrepeatable read problem in a distributed database system  
Answer: C) Explain how ignoring the unrepeatable read problem can lead to financial losses, customer dissatisfaction, and loss of credibility for an organization (Details not provided, but the answer could discuss potential scenarios like incorrect flight reservations, double bookings, or financial transactions errors)  
  
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LEVEL: 6 (Create) - Generate a scenario where The Unrepeatable Read Problem can occur in a modern database system  
A) Develop a hypothetical scenario showing how the unrepeatable read problem can occur in a real-time data processing application like stock trading or social media feeds  
B) Describe a situation involving IoT devices and smart homes where the unrepeatable read problem might occur and its potential consequences  
C) Create an example of a multiplayer online game platform where the unrepeatable read problem can cause issues and propose a solution to mitigate these problems  
D) Generate a scenario in which a self-driving car system experiences the unrepeatable read problem during real-time traffic data processing, affecting its decision-making capabilities  
Answer: A) Develop a hypothetical scenario showing how the unrepeatable read problem can occur in a real-time data processing application like stock trading or social media feeds (Details not provided, but a possible example could involve two transactions trying to update stock prices simultaneously, causing inconsistencies in real-time updates for users)

* Question: Create six multiple choice question and answer of the question with the Third normal form (3NF) concept

Response: Question Level: Remember (1)  
Question: Define the Third Normal Form (3NF) in the context provided.  
A) A relation schema that does not contain multivalued dependencies  
B) A relation schema that follows Boyce-Codd normal form  
C) A relation schema where every non-key attribute is independent of other non-key attributes  
D) A relation schema where every functional dependency meets either condition (a) or (b) in the general definition of 3NF  
Answer: D) A relation schema where every functional dependency meets either condition (a) or (b) in the general definition of 3NF (PAGE SOURCE: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, PAGE: 509)  
  
Question Level: Understand (2)  
Question: Describe the conditions that a relation schema must meet to be in Third Normal Form (3NF).  
A) A functional dependency X A holds in R and LHS is not a superkey  
B) Every non-key attribute depends on the primary key only  
C) The relation schema does not contain multivalued dependencies or partial dependencies  
D) If a functional dependency X A holds in R, then either X is a candidate key or every attribute in X is part of another functional dependency's LHS  
Answer: D) If a functional dependency X A holds in R, then either X is a candidate key or every attribute in X is part of another functional dependency's LHS (PAGE SOURCE: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, PAGE: 509)  
  
Question Level: Apply (3)  
Question: Solve the example of decomposing a relation that violates the Third Normal Form (3NF).  
A) Decompose LOTS into LOTS1A, LOTS1B, and LOTS2 directly if both FD3 and FD4 violate 3NF by the general definition above because the LHS County\_name in FD3 is not a superkey.  
B) Convert any relation that is not in BCNF into a set of BCNF relations using the nonadditive join property test and general algorithm provided in the document.  
C) Create new functional dependencies based on the given example to ensure all dependencies meet either condition (a) or (b) in the general definition of 3NF.  
D) Merge any relation that is in 2NF but not in 3NF with other relations to create a single relation that meets 3NF requirements.  
Answer: A) Decompose LOTS into LOTS1A, LOTS1B, and LOTS2 directly if both FD3 and FD4 violate 3NF by the general definition above because the LHS County\_name in FD3 is not a superkey. (PAGE SOURCE: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, PAGE: 509)  
  
Question Level: Analyze (4)  
Question: Compare Boyce-Codd normal form (BCNF) and Third Normal Form (3NF).  
A) Every relation in BCNF is also in 3NF, but a relation in 3NF is not necessarily in BCNF.  
B) Every relation in BCNF only contains multivalued dependencies whereas a relation in 3NF can contain partial dependencies.  
C) The decomposition of a non-BCNF relation must be done by considering the additive decomposition requirement.  
D) Every relation in BCNF follows the general definition of 3NF and every relation in 3NF follows the Boyce-Codd normal form definition.  
Answer: A) Every relation in BCNF is also in 3NF, but a relation in 3NF is not necessarily in BCNF. (PAGE SOURCE: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, PAGE: 509)  
  
Question Level: Evaluate (5)  
Question: Justify the need for a stronger form of normalization than Third Normal Form (3NF).  
A) To remove transitive and partial dependencies that violate 3NF and 2NF respectively.  
B) To create new functional dependencies based on mixing of independent multivalued attributes into a single attribute.  
C) To ensure that every non-key attribute is independent of other non-key attributes.  
D) To convert any relation not in Boyce-Codd normal form (BCNF) into a set of BCNF relations using the provided algorithm.  
Answer: A) To remove transitive and partial dependencies that violate 3NF and 2NF respectively. (PAGE SOURCE: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, PAGE: 509)  
  
Question Level: Create (6)  
Question: Develop a functional dependency for the university database that might violate Third Normal Form (3NF).  
A) Sc\_phone Sname, Snum, Ssn, Sc\_addr, Sp\_addr, Bdate, Sex, Class  
B) Sname, Snum Social Security number (Ssn), current address (Sc\_addr) and phone (Sc\_phone), permanent address (Sp\_addr) and phone (Sp\_phone)  
C) Snum, Class Sname, Sc\_addr, Sp\_addr, Bdate, Sex  
D) Ssn, Class Sname, Snum, Sc\_addr, Sp\_addr, Bdate, Sex  
Answer: D) Ssn, Class Sname, Snum, Sc\_addr, Sp\_addr, Bdate, Sex (PAGE SOURCE: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, PAGE: 509)

* Question: Create six multiple choice question and answer of the question with the Total concept

Response: Level: Remember  
Question: Define Total in the context of Question Answering Systems?  
A) A specific category of questions in Question Answering systems  
B) The total number of queries a system can handle  
C) The total amount of data processed by a Question Answering system  
D) The final answer provided by a Question Answering system  
Answer: A) A specific category of questions in Question Answering systems (Source: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, Page: 1074)  
  
Level: Understand  
Question: Explain the concept of Total as used in Factoid Questions?  
A) It refers to the total number of documents or databases a system can search  
B) It represents the total amount of data needed to answer a question  
C) It denotes the total accuracy of an answer provided by a system  
D) It signifies a specific category of questions in Question Answering systems that require a precise fact or detail  
Answer: D) It signifies a specific category of questions in Question Answering systems that require a precise fact or detail (Source: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, Page: 1074)  
  
Level: Apply  
Question: Solve the following Factoid question using the concept of Total: Who is the president of the United States in 2022?  
A) The total information about the current U.S. President can be found in a specific category of questions called Total  
B) A search for "current U.S. President" will yield the total information needed to answer this question  
C) The total accuracy of an answer would depend on the accuracy of sources consulted  
D) To find the total, you need to look for the precise fact or detail about the current U.S. President  
Answer: D) To find the total, you need to look for the precise fact or detail about the current U.S. President (Source: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, Page: 1074)  
  
Level: Analyze  
Question: Compare and contrast Total and Complex questions in Question Answering Systems?  
A) Both are specific categories of questions, but Total requires a precise fact or detail while Complex requires an explanation or interpretation  
B) Total questions are always easier to answer than Complex questions due to their simplicity  
C) Total and Complex questions can often be answered using the same techniques in Question Answering systems  
D) Total questions are typically answered with a single, concise response, while Complex questions may require multiple steps or extensive research  
Answer: A) Both are specific categories of questions, but Total requires a precise fact or detail while Complex requires an explanation or interpretation (Source: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, Page: 1074)  
  
Level: Evaluate  
Question: Determine if the following statement is true or false: Question Answering systems only answer Total questions.  
A) True  
B) False  
Answer: B) False (Source: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, Page: 1074)  
  
Level: Create  
Question: Generate a Factoid question using the concept of Total.  
A) What is the current population of Earth?  
B) Who won the last Nobel Prize in Physics?  
C) In which city was the Eiffel Tower built?  
D) Where is the Great Wall of China located?  
Answer: A) What is the current population of Earth? (Source: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, Page: 1074)

* Question: Create six multiple choice question and answer of the question with the Transactions concept

Response: LEVEL: Remember - Define a transaction  
PAGE SOURCE: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, page 758  
Question: What is a transaction in the context of database systems?  
A) A logical unit of work that includes retrievals and updates to the database  
B) A method for describing logical units of database processing  
C) A computer program that executes database commands such as retrievals, insertions, deletions, and  
D) A system with large databases and hundreds of concurrent users executing database transactions  
Answer: B) A logical unit of work that includes retrievals and updates to the database  
  
LEVEL: Understand - Explain the concept of transaction processing systems  
PAGE SOURCE: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, page 758  
Question: What are some examples of transaction processing systems?  
A) Airline reservations, banking, credit card processing, online retail purchases, stock markets, supermarket checkouts, and many other applications  
B) Computer programs that include database commands such as retrievals, insertions, deletions, and  
C) Systems with large databases but fewer than hundred concurrent users executing database transactions  
D) Online transaction processing (OLTP) systems  
Answer: A) Airline reservations, banking, credit card processing, online retail purchases, stock markets, supermarket checkouts, and many other applications  
  
LEVEL: Apply - Solve a problem related to transactions  
PAGE SOURCE: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, page 758  
Question: What must a transaction leave the database in order to be considered successful?  
A) A valid or consistent state that satisfies all the constraints specified on the database schema  
B) Any number of retrieval operations and update operations  
C) Retrievals only without any updates to the database  
D) Updates to the database without any retrieval operations  
Answer: A) A valid or consistent state that satisfies all the constraints specified on the database schema  
  
LEVEL: Analyze - Compare optimistic concurrency control and pessimistic concurrency control  
PAGE SOURCE: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, page 811  
Question: How does optimistic concurrency control differ from pessimistic concurrency control?  
A) Optimistic concurrency control checks for conflicts after the transaction has been completed, while pessimistic concurrency control checks for conflicts before the transaction begins  
B) Optimistic concurrency control does all the checks at once, while pessimistic concurrency control performs checks sequentially  
C) Both optimistic and pessimistic concurrency controls do all the checks at once  
D) Both optimistic and pessimistic concurrency controls perform checks sequentially  
Answer: A) Optimistic concurrency control checks for conflicts after the transaction has been completed, while pessimistic concurrency control checks for conflicts before the transaction begins  
  
LEVEL: Evaluate - Justify the need for transactions in database systems  
PAGE SOURCE: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, page 758  
Question: Why are transactions important in large databases with hundreds of concurrent users?  
A) They provide a mechanism for ensuring data consistency and accuracy  
B) They allow for high availability and fast response times  
C) Both A and B  
D) Neither A nor B  
Answer: C) They provide a mechanism for ensuring data consistency and accuracy, and they allow for high availability and fast response times  
  
LEVEL: Create - Develop an example of a transaction in SQL  
PAGE SOURCE: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, page 182  
Question: What is the basic definition of an SQL transaction?  
A) A logical unit of work and is guaranteed to be atomiceither it completes execution without an error or it fails and leaves the database unchanged  
B) An SQL statement that involves any number of retrieval operations and update operations  
C) Both A and B  
D) Neither A nor B  
Answer: C) A logical unit of work and is guaranteed to be atomiceither it completes execution without an error or it fails and leaves the database unchanged, and an SQL statement that involves any number of retrieval operations and update operations.

* Question: Create six multiple choice question and answer of the question with the Trivial concept

Response: Level: Remember (Difficulty level 1)  
Question: Define Factoid Questions in the context of Question Answering Systems.  
A) A type of question that requires complex analysis to find an answer.  
B) A question type that pinpoints the right phrase in a document or a database.  
C) A question type that asks about opinions, feelings or personal experiences.  
D) A question type that requires statistical analysis to find an answer.  
Answer: B) A question type that pinpoints the right phrase in a document or a database. (Page Source: '/content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf', 'page': 1074, 'page\_label': '1075')  
  
Level: Remember (Difficulty level 1)  
Question: Which database design theory and normalization part is discussed in the document?  
A) Part 2  
B) Part 3  
C) Part 5  
D) Part 6  
Answer: D) Part 6 (Page Source: '/content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf', 'page': 1088, 'page\_label': '1089')  
  
Level: Understand (Difficulty level 2)  
Question: Explain the antimonotonicity property in the context of Database Design Theory and Normalization.  
A) It helps to increase the search space of possible solutions.  
B) It helps to reduce the search space of possible solutions.  
C) It is a property that ensures data consistency during updates.  
D) It is a property that ensures data integrity during transactions.  
Answer: B) It helps to reduce the search space of possible solutions. (Page Source: '/content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf', 'page': 1088, 'page\_label': '1089')  
  
Level: Apply (Difficulty level 3)  
Question: Solve the example given in the document using the Apriori Algorithm, given that the minimum support is 0.5.  
A) The candidate 1-itemsets are {milk, bread, juice, cookies, eggs, coffee} with respective supports of 0.75, 0.4, 0.3, 0.2, 0.1, and 0.1.  
B) The candidate 1-itemsets are {milk, bread, juice, cookies, eggs, coffee} with respective supports of 0.25, 0.5, 0.75, 0.8, 0.6, and 0.9.  
C) The candidate 1-itemsets are {milk, bread, juice, cookies, eggs, coffee} with respective supports of 0.5, 0.25, 0.3, 0.4, 0.75, and 0.6.  
D) The candidate 1-itemsets are {milk, bread, juice, cookies, eggs, coffee} with respective supports of 0.8, 0.9, 0.25, 0.3, 0.4, and 0.1.  
Answer: C) The candidate 1-itemsets are {milk, bread, juice, cookies, eggs, coffee} with respective supports of 0.5, 0.25, 0.3, 0.4, 0.75, and 0.6. (Page Source: '/content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf', 'page': 1088, 'page\_label': '1089')  
  
Level: Analyze (Difficulty level 4)  
Question: Compare and contrast Factoid Questions with other types of questions in Question Answering Systems.  
A) Both are mutually exclusive categories that can't be combined, and they require different answering strategies.  
B) They are not always mutually exclusive, and they may require hybrid answering strategies.  
C) They can only be answered using statistical analysis.  
D) They can only be answered using big data tools and technologies.  
Answer: B) They are not always mutually exclusive, and they may require hybrid answering strategies. (Page Source: '/content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf', 'page': 1074, 'page\_label': '1075')  
  
Level: Create (Difficulty level 6)  
Question: Develop an example of a Factoid Question related to the data given in the document.  
A) In which city is the headquarters of the company whose database design theory and normalization part we are studying?  
B) How many transactions are there in the transaction data used in Algorithm 28.1?  
C) Who were the authors of the book "Fundamentals of Database Systems Seventh Edition"?  
D) What is the total number of pages in this document?  
Answer: A) In which city is the headquarters of the company whose database design theory and normalization part we are studying? (Page Source: '/content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf', 'page': 1074, 'page\_label': '1075')

* Question: Create six multiple choice question and answer of the question with the Trojan Horse attacks concept

Response: Level: Remember  
Question: Define the Trojan Horse attacks?  
A) A type of software that pretends to be harmless but is actually malicious  
B) A physical attack on a computer system using a hidden device  
C) An attack on a computer network using false information or deception  
D) A virus that spreads through email attachments  
Answer: A) A type of software that pretends to be harmless but is actually malicious (Level: 1, PAGE SOURCE: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf)  
  
Level: Understand  
Question: Explain how Trojan Horse attacks work?  
A) By tricking users into downloading and installing malicious software  
B) By exploiting vulnerabilities in operating systems or applications  
C) By using brute force to crack passwords  
D) By stealing sensitive information from the computer  
Answer: A) By tricking users into downloading and installing malicious software (Level: 2, PAGE SOURCE: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf)  
  
Level: Apply  
Question: Solve the following scenario: User receives an email attachment named "Invoice.zip" claiming to be from a known sender. What should the user do?  
A) Open the attachment immediately without any verification  
B) Delete the email without opening the attachment  
C) Verify the sender's identity before opening the attachment  
D) Forward the email to a friend for advice  
Answer: C) Verify the sender's identity before opening the attachment (Level: 3, PAGE SOURCE: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf)  
  
Level: Analyze  
Question: Compare and contrast Trojan Horse attacks with viruses?  
A) Both are types of malware that infect computers but have different purposes  
B) Viruses are more dangerous than Trojans  
C) Trojans cannot self-replicate like viruses  
D) There is no difference between Trojan Horse attacks and viruses  
Answer: A) Both are types of malware that infect computers but have different purposes (Level: 4, PAGE SOURCE: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf)  
  
Level: Evaluate  
Question: Determine the best method to protect against Trojan Horse attacks?  
A) Regularly updating antivirus software  
B) Installing a firewall  
C) Using strong and unique passwords for all accounts  
D) All of the above  
Answer: D) All of the above (Level: 5, PAGE SOURCE: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf)  
  
Level: Create  
Question: Generate a sentence that describes the Trojan Horse attack using the information provided in the document?  
A) A Trojan Horse attack is a type of malware that disguises itself as harmless software to trick users into downloading and installing it, potentially leading to serious security issues.  
B) Trojans are viruses that spread through email attachments.  
C) A Trojan horse is a physical device used to attack computer systems.  
D) The best way to protect against Trojan Horse attacks is by using strong passwords.  
Answer: A) A Trojan Horse attack is a type of malware that disguises itself as harmless software to trick users into downloading and installing it, potentially leading to serious security issues. (Level: 6, PAGE SOURCE: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf)

* Question: Create six multiple choice question and answer of the question with the Tuple concept

Response: LEVEL: Remember  
Question: Define a tuple in the context of SQL queries. (Fundamentals of Database Systems Seventh Edition)  
A) A set of attributes in a table  
B) A single row in a table  
C) The total number of rows in a table  
D) A collection of tables  
Answer: B) A single row in a table  
  
LEVEL: Understand  
Question: Describe the use of EXISTS and NOT EXISTS with nested queries. (Fundamentals of Database Systems Seventh Edition)  
A) EXISTS returns TRUE if there are no tuples in the result of the nested query, while NOT EXISTS returns FALSE  
B) EXISTS returns TRUE if there is at least one tuple in the result of the nested query, while NOT EXISTS returns TRUE if no tuples exist  
C) Both EXISTS and NOT EXISTS are used to count the number of tuples in a table  
D) EXISTS and NOT EXISTS are not related to nested queries  
Answer: B) EXISTS returns TRUE if there is at least one tuple in the result of the nested query, while NOT EXISTS returns TRUE if no tuples exist  
  
LEVEL: Apply  
Question: Solve Query 16 using EXISTS or NOT EXISTS. (Fundamentals of Database Systems Seventh Edition)  
A) SELECT E.Fname, E.Lname FROM EMPLOYEE AS E WHERE NOT EXISTS (SELECT \* FROM DEPENDENT AS D WHERE E.Ssn != D.Essn AND E.Sex = D.Sex AND E.Fname = D.Dependent\_name)  
B) SELECT E.Fname, E.Lname FROM EMPLOYEE AS E WHERE EXISTS (SELECT \* FROM DEPENDENT AS D WHERE E.Ssn != D.Essn AND E.Sex = D.Sex AND E.Fname != D.Dependent\_name)  
C) SELECT E.Fname, E.Lname FROM EMPLOYEE AS E WHERE EXISTS (SELECT \* FROM DEPENDENT AS D WHERE E.Ssn = D.Essn AND E.Sex = D.Sex AND E.Fname = D.Dependent\_name)  
D) SELECT E.Fname, E.Lname FROM EMPLOYEE AS E WHERE NOT EXISTS (SELECT \* FROM DEPENDENT AS D WHERE E.Ssn = D.Essn AND E.Sex = D.Sex AND E.Fname = D.Dependent\_name)  
Answer: D) SELECT E.Fname, E.Lname FROM EMPLOYEE AS E WHERE NOT EXISTS (SELECT \* FROM DEPENDENT AS D WHERE E.Ssn = D.Essn AND E.Sex = D.Sex AND E.Fname = D.Dependent\_name)  
  
LEVEL: Analyze  
Question: Compare the operation of EXISTS and NOT EXISTS in SQL queries. (Fundamentals of Database Systems Seventh Edition)  
A) Both EXISTS and NOT EXISTS return TRUE when there are no tuples in the result of the nested query, but they behave differently when there are tuples  
B) Both EXISTS and NOT EXISTS return TRUE or FALSE depending on whether there are any tuples in the result of the nested query, with no difference between them  
C) EXISTS returns TRUE if there are no tuples in the result of the nested query, while NOT EXISTS returns TRUE if there are tuples  
D) Both EXISTS and NOT EXISTS return FALSE when there are tuples in the result of the nested query, but they behave differently when there are no tuples  
Answer: A) Both EXISTS and NOT EXISTS return TRUE when there are no tuples in the result of the nested query, but they behave differently when there are tuples  
  
LEVEL: Evaluate  
Question: Justify the use of aggregate functions SOME and ALL in SQL queries. (Fundamentals of Database Systems Seventh Edition)  
A) SOME returns TRUE if at least one element in the collection is FALSE, whereas ALL returns TRUE if all elements in the collection are FALSE  
B) SOME returns TRUE if at least one element in the collection is TRUE, whereas ALL returns TRUE if all elements in the collection are TRUE  
C) Both SOME and ALL are used to count the number of tuples in a table  
D) SOME and ALL are not related to Boolean values  
Answer: B) SOME returns TRUE if at least one element in the collection is TRUE, whereas ALL returns TRUE if all elements in the collection are TRUE  
  
LEVEL: Create  
Question: Generate a SQL query using UNIQUE(Q) that retrieves the names of employees who work on project numbers 1, 2, or 3 (from Query 17). (Fundamentals of Database Systems Seventh Edition)  
A) SELECT Lname, Fname FROM EMPLOYEE WHERE UNIQUE((SELECT Project\_num FROM PROJECT WHERE Essn = Ssn AND Project\_num IN (1,2,3)))  
B) SELECT Lname, Fname FROM EMPLOYEE WHERE UNIQUE(Project\_num IN (SELECT \* FROM PROJECT WHERE Essn = Ssn AND Project\_num IN (1,2,3)))  
C) SELECT Lname, Fname FROM EMPLOYEE WHERE UNIQUE((SELECT Project\_num FROM PROJECT WHERE Essn = Ssn AND Project\_num = 1 OR Project\_num = 2 OR Project\_num = 3))  
D) SELECT Lname, Fname FROM EMPLOYEE WHERE UNIQUE(SELECT Project\_num FROM PROJECT WHERE Essn = Ssn AND Project\_num IN (1,2,3))  
Answer: D) SELECT Lname, Fname FROM EMPLOYEE WHERE UNIQUE(SELECT Project\_num FROM PROJECT WHERE Essn = Ssn AND Project\_num IN (1,2,3))

* Question: Create six multiple choice question and answer of the question with the Two-Phase Locking (2PL) Protocol concept

Response: Question Level: Remember - Define  
Q1: What does 2PL stand for in the context of database systems?  
A1) Answer: Two-Phase Locking Protocol  
 LEVEL: Remember  
 PAGE SOURCE: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf (page 801, 802)  
  
Question Level: Understand - Explain  
Q2: How does the Two-Phase Locking Protocol ensure serializability?  
A2: Answer: By enforcing two-phase locking rules, it guarantees that every schedule is serializable, obviating the need to test for serializability of schedules.  
 LEVEL: Understand  
 PAGE SOURCE: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf (page 801)  
  
Question Level: Apply - Solve  
Q3: What is the difference between strict and rigorous 2PL in terms of lock management?  
A3: Answer: Strict 2PL holds write-locks until it commits, whereas the latter holds all locks (read and write).  
 LEVEL: Apply  
 PAGE SOURCE: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf (page 802)  
  
Question Level: Analyze - Compare  
Q4: What is the difference between conservative and rigorous 2PL in terms of lock acquisition?  
A4: Answer: The former must lock all its items before it starts, so once the transaction starts it is in its shrinking phase; the latter does not require this.  
 LEVEL: Analyze  
 PAGE SOURCE: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf (page 802)  
  
Question Level: Evaluate - Justify  
Q5: Why does the Two-Phase Locking Protocol sometimes limit concurrency in a schedule?  
A5: Answer: Because a transaction T may not be able to release an item X after it is through using it if T must lock an additional item Y later; or, conversely, T must lock the additional item Y before it needs it so that it can release X.  
 LEVEL: Evaluate  
 PAGE SOURCE: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf (page 801)  
  
Question Level: Create - Develop  
Q6: Generate a short paragraph that summarizes the variations of two-phase locking (2PL).  
A6: Answer: There are several variations of two-phase locking (2PL), including basic 2PL, strict 2PL, conservative 2PL, and rigorous 2PL. The technique described earlier is known as basic 2PL, where a transaction locks items before it commits or aborts. Conservative 2PL requires a transaction to lock all the items it accesses before the transaction begins. Strict 2PL and Rigorous 2PL are more common because they guarantee strict schedules by having transactions hold their locks until after they commit or abort, making them less prone to deadlocks.  
 LEVEL: Create  
 PAGE SOURCE: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf (page 820)

* Question: Create six multiple choice question and answer of the question with the Union concept

Response: LEVEL: 1 (Remember)  
Question: Define what is the UNION operation in the context of databases?  
A) An operation that combines tuples from two relations to produce the final result.  
B) An operation used for string pattern matching.  
C) An operation that compares only parts of a character string using the LIKE comparison operator.  
D) An operation that takes the UNION of tuples in two relations R and S that are partially compatible, meaning that only some of their attributes are union compatible.  
Answer: A) An operation that combines tuples from two relations to produce the final result. (SOURCE: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, page 699)  
  
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LEVEL: 2 (Understand)  
Question: Explain how UNION operation works with partially compatible relations in databases?  
A) By taking the union of tuples in two relations R and S that are fully compatible.  
B) By eliminating duplicate tuples from the result.  
C) By taking the UNION of tuples in two relations R(X, Y) and S(X, Z) that are partially compatible, meaning that only some of their attributes are union compatible.  
D) By comparing only parts of a character string using the LIKE comparison operator.  
Answer: C) By taking the UNION of tuples in two relations R(X, Y) and S(X, Z) that are partially compatible, meaning that only some of their attributes are union compatible. (SOURCE: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, page 277)  
  
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LEVEL: 3 (Apply)  
Question: Solve the following problem using UNION operation: You have two tables A and B containing employee data. Table A has columns 'name' and 'salary', while table B has columns 'name' and 'department'. Both tables have duplicate entries for some names. Write a SQL query to get a list of all employees along with their salaries and departments without any duplicates.  
A) SELECT name, salary FROM A UNION SELECT name, department FROM B  
B) SELECT name, department FROM A UNION ALL SELECT name, salary FROM B  
C) SELECT name, salary, department FROM A UNION ALL SELECT name, NULL as department FROM B  
D) SELECT name, department FROM A UNION ALL SELECT name, NULL as salary FROM B  
Answer: C) SELECT name, salary, department FROM A UNION ALL SELECT name, NULL as department FROM B (SOURCE: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, page 277)  
  
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LEVEL: 4 (Analyze)  
Question: Compare the UNION and UNION ALL operations in SQL with respect to duplicate handling.  
A) Both operations eliminate duplicates from the result.  
B) The UNION operation eliminates duplicates while the UNION ALL operation does not.  
C) The UNION ALL operation eliminates duplicates while the UNION operation does not.  
D) Both operations do not eliminate duplicates from the result.  
Answer: B) The UNION operation eliminates duplicate tuples, while the UNION ALL operation does not. (SOURCE: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, page 277)  
  
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LEVEL: 5 (Evaluate)  
Question: Justify the use of the OUTER UNION operation in database systems.  
A) To combine tuples from two relations that have no common attributes.  
B) To combine tuples from two relations that have some common attributes, but are not union (type) compatible.  
C) To eliminate duplicate tuples from the result.  
D) To compare only parts of a character string using the LIKE comparison operator.  
Answer: B) To combine tuples from two relations that have some common attributes, but are not union (type) compatible. (SOURCE: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, page 277)  
  
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LEVEL: 6 (Create)  
Question: Develop a SQL query using the OUTER UNION operation to combine tuples from two relations R and S that have some common attributes but are not union (type) compatible. Assume that both relations have a common attribute X, and R has an additional attribute Y while S has an additional attribute Z.  
A) SELECT X FROM R UNION SELECT X FROM S  
B) SELECT X, Y FROM R OUTER UNION SELECT X, Z FROM S  
C) SELECT X, NULL as Y FROM R OUTER UNION SELECT X, NULL as Z FROM S  
D) SELECT X, NULL as Y, NULL as Z FROM R OUTER UNION SELECT X FROM S  
Answer: B) SELECT X, Y FROM R OUTER UNION SELECT X, Z FROM S (SOURCE: /content/drive/MyDrive/Colab Notebooks/Llama3/RDB.pdf, page 277)

* Question: Create six multiple choice question and answer of the question with the Weak entity concept

Response: LEVEL: Remember  
Question: What is a weak entity type?  
A) A regular entity type with key attributes  
B) An entity type that does not have its own key attributes  
C) An entity type with composite, multivalued attributes  
D) An entity type that always has a total participation constraint  
Answer: B) An entity type that does not have its own key attributes  
  
LEVEL: Understand  
Question: How are weak entities identified?  
A) By their own unique attributes  
B) By being related to specific entities from another entity type in combination with one of their attribute values  
C) By having a total participation constraint  
D) By having an identifying relationship  
Answer: B) By being related to specific entities from another entity type in combination with one of their attribute values  
  
LEVEL: Apply  
Question: Which of the following is NOT a weak entity type representation?  
A) Specifying a multivalued composite attribute for EMPLOYEE  
B) Representing DEPENDENTS as a weak entity type  
C) Giving multiple identifying entity types to a weak entity type  
D) Using double lines to distinguish weak entities on an ER diagram  
Answer: D) Using double lines to distinguish weak entities on an ER diagram  
  
LEVEL: Analyze  
Question: Compare and contrast the terms parent entity type, dominant entity type, child entity type, subordinate entity type, partial key, and discriminator.  
A) They are all synonyms for identifying entity type  
B) They are all synonyms for weak entity type  
C) They describe different aspects of the relationship between strong and weak entity types  
D) They have no relation to each other in database systems theory  
Answer: C) They describe different aspects of the relationship between strong and weak entity types  
  
LEVEL: Evaluate  
Question: Justify why a weak entity type may have more than one identifying entity type.  
A) To improve data redundancy  
B) To provide more flexibility in representing relationships  
C) To reduce the complexity of the database schema design  
D) To improve the performance of the database system  
Answer: B) To provide more flexibility in representing relationships  
  
LEVEL: Create  
Question: Develop an example of a weak entity type and its identifying relationship in an ER diagram.  
A) CAR -> OWNER, where car is the weak entity and owner is the strong entity, with the identification being the VIN number of the car  
B) EMPLOYEE -> DEPENDENT, where employee is the weak entity and dependent is the strong entity, with the identification being the social security number of the employee  
C) ACCOUNT -> BANK\_ACCOUNTS, where account is the weak entity and bank\_accounts is the strong entity, with the identification being the account number and bank name  
D) None of the above  
Answer: A) CAR -> OWNER, where car is the weak entity and owner is the strong entity, with the identification being the VIN number of the car