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Assignment-2

Quest What is functional dependencies and Explain about the 3rd normal form and BCNF?

Ans Functional dependencies are a core concept in the field of database management. They describe the relationships between attributes within a relation (table) in a relational database. A functional dependencies exists when knowing the value of one attribute (or set of attributes) uniquely determines the value of another attribute in the same relation.

Third normal form (3NF)

- A relation is in 3NF if it in 2NF and every non-prime attribute is non-transitively dependent on every superkey of the relation.
- To put it simply, every non-key attribute must be functionally dependent only on the primary key, and not on other non-key attributes.

Boyce-codd normal form (BCNF)-

- A stronger form of 3NF where every non-trivial functional dependency is a dependency on a superkey.
- IN BCNF, for every non trivial functional

dependency 'X -> Y', 'X' must be a superkey.

- This eliminates certain types of anamolies more effectively than 3NF.

Ques 2 Explain about relational algebra?

Ans Relational algebra is a formal system for manipulating relations (tables) in a relational database. It provides a set of operations that can be used to perform various queries and transformations on relations. These operations are based on set theory and logic, and they form the foundation for query languages like SQL.

Some key concepts and operations in relational algebra -

1. Relations - In relational algebra, relations are represented as tables with rows and columns. Each row represents a tuple (record) and each column represents an attribute (field).
2. Basic operations.
   - Selection
   - Projection
   - Union
   - Intersection
   - Difference
3. Advanced operations
   - Join
   - Cartesian product
   - Rename
4. Closure properties.

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Ques3 What are the properties of decompo-sition, give brief about them?

Ans Decomposition in database management refers to the process of breaking down a single relation (table) into multiple smaller relations to eliminate redundancy and improve data integrity when decomposing a relation, its essential to ensure that certain properties are maintained to preserve the semantics and correctness of the data. Here are the key properties of decomposition in DBMS:-

1. Lossless join decomposition -
Achiving lossless join decomposition typi-cally involves identifying a common set of attributes (keys) b/w the decomposed relations.

2. Dependency preservation -
Dependency preservation ensure that functional dependencies present in the original relation are preserved in the decomposed relations.

3 Dependency preservation and Lossless Join (BCNF Decomposition).
BCNF (Boyce Codd Normal Form) decomposit-ion is a specific type of decomposition that guarantees both lossless join and dependency preservation properties.