



**College of Science and Technology**  
Rinchending: Bhutan

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# **DBS101**

## **Database Systems Fundamentals**

### **SS(2024)**

## ***Practical{6} Report***

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Topic : Reddit Comment

Task 1 : The function in the reddit comment follows the first normal form. Where each column in the table contains atomic values that hold only one per row and there are no columns that contain sets of values or repeating groups, so the table is normalized to 1NF

Task 2 : Since the table in task 1 is in first normal form, the function follows the second normal form. To check if the table follows the second normal form or not we need to check the composite primary key to be fully functionally dependent on the primary key. Moreover the table should not have the attribute that is dependent on the subset of the primary key.

Task 3 : Since the table in task 2 is in second normal form, the function follows the third normal form. All the non-primary key columns are not dependent on the primary key and not on any other non-primary key column. So there are no attributes that are dependent on the primary key and no transitive dependencies , the function is normalized to the third normal form.

Task 4 : As the dataset follows the third normal form, it also follows the Boyce-Codd Normal form. It has the non-trivial functional dependencies,  $X \rightarrow Y$ , where x is the superkey.

Task 5 : Now since the database follows the BCNF, it is normalized to the fourth normal form. It doesn't have any multi-valued dependencies that are not also functional dependencies. So the multi-valued dependencies are addressed by splitting the table into two or more tables to ensure that each table represents only one type of relationship.

Task 6 : Since every join dependency in the table is a consequence of the superkeys from the BCNF, it is normalized to the fifth normal form. So decomposition of the table into smaller tables into smaller tables does not result in a loss of information when the tables are joined together.

#### Conclusion :

In conclusion, the reddit table's design demonstrates a thoughtful approach to database normalization. By adhering to the principles of the first normal form (1NF), it ensures that data is stored in atomic values, eliminating repeating groups and arrays. Progressing to the second normal form (2NF), the table maintains full functional dependency on a composite primary key, avoiding partial dependencies that could lead to anomalies.

As the table evolves into the third normal form (3NF), it eliminates transitive dependencies, ensuring that non-primary key columns are dependent solely on the primary key. This progression continues with the Boyce-Codd Normal Form (BCNF), where the table satisfies all the requirements of 3NF while also ensuring that every determinant is a candidate key, thus preventing any non-trivial functional dependencies on non-superkeys

Advancing to the fourth normal form (4NF), the table addresses multi-valued dependencies by splitting the data into separate tables, each representing a unique type of relationship. This step is crucial for maintaining data integrity and avoiding redundancy.

Finally, achieving the fifth normal form (5NF) signifies that the table's structure allows for lossless joins and does not contain any join dependencies that are not implied by the superkeys. This level of normalization ensures that the data is stored in the most efficient and reliable manner possible, with each table representing a distinct and necessary aspect of the overall data model.