

DATABASE NORMALIZATION

NORMALIZATION

- Normalization is a database design technique that reduces data redundancy and eliminates issues caused by anomalies while performing Insertions, Updates and Deletions.
- Normalization rules divides larger tables into smaller tables and links them using relationships.
- The purpose of Normalization in SQL is to eliminate redundant (repetitive) data and ensure data is stored logically.

NORMAL FORMS

Here is a list of Normal Forms in SQL:

- 1NF (First Normal Form)
- 2NF (Second Normal Form)
- 3NF (Third Normal Form)
- BCNF (Boyce-Codd Normal Form)
- 4NF (Fourth Normal Form)
- 5NF (Fifth Normal Form)
- 6NF (Sixth Normal Form)

NORMALIZATION RULES

- 1NF (First Normal Form) Rules
 - Each table cell should contain a single value.
 - Each record needs to be unique.
- 2NF (Second Normal Form) Rules
 - Rule 1- Be in 1NF
 - Rule 2- Single Column Primary Key that does not functionally dependent on any subset of candidate key relation
- 3NF (Third Normal Form) Rules
 - Rule 1- Be in 2NF
 - Rule 2- Has no transitive functional dependencies

NORMALIZATION RULES

- **BCNF (Boyce-Codd Normal Form)**
 - Even when a database is in 3rd Normal Form, still there would be anomalies resulted if it has more than one Candidate Key.
 - Sometimes is BCNF is also referred as 3.5 Normal Form.
- **4NF (Fourth Normal Form) Rules**
 - If no database table instance contains two or more, independent and multivalued data describing the relevant entity, then it is in 4th Normal Form.
- **5NF (Fifth Normal Form) Rules**
 - A table is in 5th Normal Form only if it is in 4NF and it cannot be decomposed into any number of smaller tables without loss of data.
- **6NF (Sixth Normal Form) Proposed**
 - 6th Normal Form is not standardized, yet however, it is being discussed by database experts for some time.

NORMALIZATION - SUMMARY

- Database designing is critical to the successful implementation of a database management system that meets the data requirements of an enterprise system.
- Normalization in DBMS is a process which helps produce database systems that are cost-effective and have better security models.
- Functional dependencies are a very important component of the normalize data process
- Most database systems are normalized database up to the third normal forms in DBMS.