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CTEC 424

Data Normalization Levels

1st Normal Form: Every row must be unique; columns and rows must have a single value and have a unique identifier/primary key. This will help eliminate any duplicate data.

A blue and white table with black text

Description automatically generated

2nd Normal Form: Must first be in 1st Normal Form. Columns must be connected to the primary key and should not have partial dependency to any other columns. Meaning each row must belong to a primary key and no relation to other columns/keys.

\***Partial dependency:** Attribute depends on only part of the primary key than the whole primary key.

A close-up of a list

Description automatically generated

3rd Normal Form: Must first be 2nd Normal Form. Non primary key attributes are independent of other non-primary key attributes. It must not have transitive dependency.

\***Transitive dependency:** When changing a non-key column, might cause any of the other non-key columns to change. ( A depends on B, and B depends on C, so A depends on C indirectly.)

“Every non-key attribute in a table must depend on the key, the whole key and nothing but the key.”

A table with text and numbers

Description automatically generated with medium confidence

Boyce-Codd Normal Form: Must be in 3rd Normal Form. This form is a slightly stronger form of 3rd Normal Form. This enforces that every attribute that affects another attribute must be a candidate key.

“Every attribute in a table must depend on the key, the whole key and nothing but the key.”

A screenshot of a computer

Description automatically generated

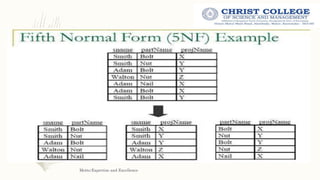
4th Normal Form: Must be in Boyce-Codd Normal Form. It declares multivalued dependencies in a table must be multivalued dependencies on the key. For a single value of A, there are multiple instances of B, table should have at least 3 columns, For A,B,C 🡪 B and C should be independent.

\***Multivalued dependencies:** Having multiple rows in each table. Thus, it implies that there is a presence of multiple other rows in another table.

A screen shot of a computer

Description automatically generated

5th Normal Form: Must be in 4th Normal Form. The table cannot be describable as the logical result of joining some other tables together.



**SOURCES**

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