Normalization

Normalization is a process that “improves” a database design by generating relations that are of higher normal form.

The *objective* of normalization: “*to create relations where every dependency is on the key, the whole key, and nothing but the key*”.

Normalization Sequence

There are several level in the normalization process. Each level will make the database better and more efficient.

There are SIX Normal forms but we are going to discuss the first three.

1NF: Considered the weakest.

2NF: Is stronger than the 1NF.

3NF: Is stronger than the 2NF

BCNF: is considered the strongest.

(BCNF = Boyce-Codd Normal Form which is this: A relation is in BCNF if it is in 1NF and if every determinant is a candidate key.

Normalization Sequence

This is the sequencing and further explaniation of the normalization process. Each level will make the database better and more efficient.

1NF: Considered the weakest.

2NF: Is stronger than the 1NF.

3NF: Is stronger than the 2NF

BCNF: is considered the strongest.

Any relationship that is in BCNF is in 3NF.

Any relationship in 3NF is in 2NF

Any relationship in 2NF is in 1NF.

Normalization

We consider the BCNF to be fully normalized.

The benefit of higher normal form is that update semantics for the affected data are simplified. Meaning that application required to maintain the database are simpler.

If we base our database on a lesser degree of normalcy than BCNF we will have more redundancy in our database which can lead to data integrity problems.

Functional Dependency

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Defining 1NF & 2NF

First Normal Form (1NF): We say a relation is in 1NF if all values stored in the relation are single-value and atomic.

Second Normal Form (2NF): A relation is in 2NF if it is in 1NF, and every non-key attribute is fully dependent on each candidate key.

More 3NF

Third Normal Form (3NF): if the relations is in 1NF and all determinates of non-key attributers are candidate keys.

The definition of 3NF differs from BCNF only in the specification of non-key attributes. A 3NF is weaker than BCNF as BCNF requires all determinants to be candidate keys.