What are the various forms of Normalization?

First Normal Form-

- Every relation cell must have atomic value.
- Relation must not have multi-valued attributes
- If there is a composite or multi-valued attribute, it violates the 1NF.
- To solve this, we can create a new row for each of the values of the multi-valued attribute to convert the table into the 1NF.

Second Normal Form (2NF)

The normalization of 1NF relations to 2NF involves the elimination of partial dependencies.

- For a relational table to be in second normal form, it must satisfy the following rules:
- The table must be in first normal form.
- It must not contain any partial dependency, i.e., all non-prime attributes are fully functionally dependent on the primary key.

Third Normal Form (3NF)

The normalization of 2NF relations to 3NF involves the elimination of transitive dependencies in DBMS.

For a relational table to be in third normal form, it must satisfy the following rules:

- The table must be in the second normal form.

- there should be no transitive dependency for non-prime attributes, which indicates that non-prime attributes (which are not a part of the candidate key) should not depend on other non-prime attributes in a table.
- The third Normal Form ensures the reduction of data duplication. It is also used to achieve data integrity.

Boyce-Codd Normal Form-

For a relational table to be in Boyce-Codd normal form, it must satisfy the following rules:

- The table must be in the third normal form.
- For every non-trivial functional dependency X -> Y, X is the super key of the table. That means X cannot be a non-prime attribute if Y is a prime attribute.