Codds Rules

- The information rule
- The rule of guaranteed access
- The systematic treatment of null values
- Active online catalog
- Comprehensive data sub language
- The view updating rule
- The High level insert and update rule
- The physical independence rule
- The logical data independence rule
- The integrity independence rule
- The distribution independence rule

E.F. Codd's Rules

1. **The information rule**: The data stored in a database, may it be user data or metadata, must be a value of some table cell. Everything in a database must be stored in a table format.
2. **The rule of guaranteed access**: Every item of data must be logically addressable with the help of a table name, primary key value and column name.

E.F. Codd's Rules

3. **The systematic treatment of null values**: The RDBMS must be able to support null values (these values are different from zeroes and spaces) to represent missing or accessible to users with appropriate authority and are stored in the data dictionary.

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4. **Active online catalog**: - The structure description of the entire database must be stored in an online catalog, known as data dictionary, which can be accessed by authorized users..

- These are accessible to users with appropriate authority and are stored in the data dictionary.

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5.Comprehensive data sub language:

- A relational database may support multiple languages.
- But it should also support an additional well – defined declarative language that provides support for data definition, integrity constraints, data manipulation, transaction management and view definition.

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6. **The view updating rule**: All views that are theoretically updatable must also be updatable by the RDBMS. Views help in data abstraction
7. **The High level insert and update rule**: A database must support high-level insertion, updating, and deletion. This must not be limited to a single row, that is, it must also support union, intersection and minus operations to yield sets of data records.

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8. **The physical independence rule**: The data stored in a database must be independent of the applications that access the database. Any change in the physical structure of a database must not have any impact on how the data is being accessed by external applications.

E.F. Codd's Rules

9. The logical data independence rule: The logical data in a database must be independent of its user's view (application). Any change in logical data must not affect the applications using it. For example, if two tables are merged or one is split into two different tables, there should be no impact or change on the user application. This is one of the most difficult rule to apply.

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10. The integrity independence rule:

- A database must be independent of the application that uses it. All its integrity constraints can be independently modified without the need of any change in the application. This rule makes a database independent of the front-end application and its interface.

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11. The distribution independence rule:

- The end-user must not be able to see that the data is distributed over various locations. Users should always get the impression that the data is located at one site only. This rule has been regarded as the foundation of distributed database systems.

E.F. Codd's Rules

12. **The non-subversion rule**: If the system supports low – level access to the data, there must not be a way to bypass the integrity rules of the database. This is necessary for data integrity.