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# Codd's 12 Rules

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Dr Edgar F. Codd did some extensive research in Relational Model of database systems with twelve rules of his own which according to him, a database must obey in order to be a relational database.

These rules can be applied on a database system that is capable of managing its storage and its relational capabilities. This is a foundation rule, which provides a base to imply other rules.

## Rule 1: Information rule

This rule states that all information (data), which is stored in the database, must be a single cell. Everything in a database must be stored in table formats. This information can be accessed by data.

## Rule 2: Guaranteed Access rule

This rule states that every single data element (value) is guaranteed to be accessible by a combination of table-name, primary-key (row value) and attribute-name (column value). Such as pointers, can be used to access data.

## Rule 3: Systematic Treatment of NULL values

This rule states the NULL values in the database must be given a systematic treatment. NULL can have several meanings, i.e. NULL can be interpreted as one of the following: data is not known, data is not applicable etc.

## Rule 4: Active online catalog

This rule states that the structure description of whole database must be stored in an active data dictionary, which can be accessed by the authorized users. Users can use the same catalog to access the database which they use to access the database itself.

## Rule 5: Comprehensive data sub-language rule

This rule states that a database must have a support for a language which has facilities for data definition, data manipulation and transaction management operations. If a language is accessed by means of this language only, either directly or by means of some application program, it can be accessed or manipulated in some way without any help of this language, it is the comprehensive data sub-language rule.

## Rule 6: View updating rule

This rule states that all views of database, which can theoretically be updated, must be updatable by the system.

## Rule 7: High-level insert, update and delete rule

This rule states the database must employ support high-level insertion, updation and deletion.

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DBMS File Structure

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not be limited to a single row that is, it must also support union, intersection and minus sets of data records.

## Rule 8: Physical data independence

This rule states that the application should not have any concern about how the data is stored. Also, any change in its physical structure must not have any impact on application.

## Rule 9: Logical data independence

This rule states that the logical data must be independent of its user's view (application). Logical data must not imply any change in the application using it. For example, if two or one is split into two different tables, there should be no impact the change on user. This is one of the most difficult rule to apply.

## Rule 10: Integrity independence

This rule states that the database must be independent of the application using it. Database constraints can be independently modified without the need of any change in the application. This makes database independent of the front-end application and its interface.

## Rule 11: Distribution independence

This rule states that the end user must not be able to see that the data is distributed across multiple locations. User must also see that data is located at one site only. This rule is the foundation of distributed database systems.

## Rule 12: Non-subversion rule

This rule states that if a system has an interface that provides access to low level records, then it must not be able to subvert the system and bypass security and integrity constraints.

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