



- ❑ Dr Edgar F. Codd, after his extensive research on the Relational Model of database systems, came up with twelve rules of his own, which according to him, a database must obey in order to be regarded as a true relational database.
- ❑ These rules can be applied on any database system that manages stored data using only its relational capabilities. This is a foundation rule, which acts as a base for all the other rules.

## **Rule 1: 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.**

## **Rule 2: Guaranteed Access Rule**

- ☐ **Every single data element (**value**) is **guaranteed** to be accessible logically with a combination of **table-name**, **primary-key** (row value), and **attribute-name** (column value).**
- ☐ **No other means, such as pointers, can be used to access data.**

### **Rule 3: Systematic Treatment of NULL Values**

- The NULL values in a database must be given a systematic and uniform treatment.**
- This is a very important rule because a NULL can be interpreted as one the following – data is missing, data is not known, or data is not applicable.**

### **Rule 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.**
- Users can use the same query language to access the catalog which they use to access the database itself.**

## **Rule 5: Comprehensive Data Sub-Language Rule**

- ☐ **A database can only be accessed using a language having linear syntax that supports data definition, data manipulation, and transaction management operations.**
- ☐ **This language can be used directly or by means of some application.**
- ☐ **If the database allows access to data without any help of this language, then it is considered as a violation.**

## **Rule 6: View Updating Rule**

- ☐ **All the views of a database, which can theoretically be updated, must also be updatable by the system.**

## **Rule 7: High-Level Insert, Update, and Delete Rule**

- ☐ **A database must support high-level insertion, updation, 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.**

## **Rule 8: Physical Data Independence**

- ☐ **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.**

## **Rule 9: Logical Data Independence**

- ☐ **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.**

## **Rule 10: Integrity Independence**

- ☐ **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.**

## **Rule 11: Distribution Independence**

- ☐ **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.**

## **Rule 12: Non-Subversion Rule**

- ☐ **If a system has an interface that provides access to low-level records, then the interface must not be able to subvert the system and bypass security and integrity constraints.**

**Any Questions?**

**Floor is Open  
for  
Discussion ....**

**References & Acknowledgements**

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