

The Codd's Rules:

Dr. E. F. Codd, the father of Relational Database Systems[‡], has categorized the features of the Relational Model in three broad categories:-

- **Structural features** that support the view of data. These include relations and their underlying components, views and queries (mechanism for virtual queries)
- **Integrity Features** like referential integrity and application specific constraints
- **Data Manipulation Features** for data insertion/deletion/updation/retrieval. These must be able to emulate any relational algebraic operation.

Dr. Codd has laid down 12 rules for RDBMS systems. If the product follows all the rules then it can be said that the RDBMS is **Fully Relational**.

1. Information Rule : All information in a relational database is represented explicitly at the logical level and in exactly one way i.e. As values in tables.
2. Guaranteed Access : Each and every datum in a relational DBMS is guaranteed to be logically accessible using a combination of table name, primary key value and column name.
3. Systematic treatment of nulls : Null values are supported for representing missing information and inapplicable information. They must be handled in a systematic manner independent of datatype.
4. Dynamic on-line catalog based on relational model : The database description is represented at the logical level in the same way as ordinary data so that authorized user can apply the same relational language to interrogate it as commonly done to ordinary data.
5. Comprehensive data Sub-language: The relational system may support several languages and the various modes of terminal use, however there must be at least one language whose statements are able to express all of the following: Data Definition, View Definition, Data Manipulation, Integrity Constraints, Authorization & Transactions.
6. View Updation : Any view that is theoretically updatable can be updatable by the RDBMS. Data consistency is ensured since any change made in the view are transmitted back to the base table.
7. High level Insert/Update/Delete : The RDBMS has to support Insert / Update / Delete at the table level. The command should be able to act on a set of records at a time.
8. Physical data Independence: The execution of application programs and terminal sessions should remain normal even if any change is made to storage representation or access methods.

[‡] Dr. Codd published a paper “The relational model of data for large shared databases” in June 1970. This was followed up with a series of extensive investigations for suitability for data modeling. Codd's ideas became an instant hit and he became a star.

9. Logical Data Independence : The execution of application programs and terminal sessions should remain normal even if any logical change is made to the tables like addition of columns and change in size of columns which theoretically permit unimpaired service
10. Integrity independence : Integrity constraints specific to a particular relational database must be definable in the relational data sub-language and storable in the on-line catalogs just like table and view definitions and not in application programs.
11. Distribution Independence : The application programs and queries are not affected by the placement of data(whether the data is physically centralized or distributed).
12. Non-subversion rule: If the relational database system has a low level language interface, that should not subvert the integrity rules and bypass the integrity constraints.

~ E. F. Codd – June 1970 ~