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CODD'S 12 RULES IN DBMS

In 1985, Dr Edgar Frank "Ted" Codd- A computer scientist working for IBM proposed the relational model for database management which forms the theoretical basis for relational databases. He defined thirteen rules, numbered from 0 to 12. Accordingly, if a database has to be called as true relational database management system.

0 Base Rule

"The system has to qualify as a relational, a database and a management system".

A system to qualify as a relational DBMS, must utilize the facilities to manage database.

1. Information Rule

" All the information including metadata (data about data) has to be represented as stored data in cells of tables".

- ✓ Also says that the rows and columns have to be strictly unordered.
- ✓ All the data must be in a table format.

2. Guaranteed Access Rule

"Each unique piece of data should be accessible by the combination of table name, primary key and attribute".

- ✓ It simply means that All the data has to be accessible.
- ✓ Accessed by: table name + primary key (Row) + attribute (column) and not by other means like pointers.

3. Systematic Treatment Of Null Values

“RDBMS should be capable of allowing each attribute to remain as null, should also support the representation of missing information and inapplicable information”.

- ✓ Has to be handled consistently, cannot be zero or blank.
- ✓ Primary key cannot be Null.
- ✓ Null can be missing data, data that is not applicable or also no data.
- ✓ Can Used when data does not exist or when data should not be used for the particular case.

4. Active Online Catalog Based On The Relational Model

“Catalog called as database dictionary should have the description of the database”.

- ✓ Data dictionary should be stored as relational tables and accessible through the regular data access language.
- ✓ The same query language is to be used on the catalog as on the application database.

5. Comprehensive Data Sub-Language Rule

“One well defined language having linear syntax has to be provided to provide all ways of access to the data”.

- ✓ Example is SQL
- ✓ It supports data definition, data manipulation, transaction management and integrity constraints.

- ✓ It becomes a violation to the rules if database allows the access to data with no help, the language has to be used by means of some or the other application.

6. View Updating Rule

“All views that can be theoretically updated must be updated by the system”.

- ✓ View is nothing but the virtual table which is temporarily derived from the base tables.

7. Relational level Operation Rule (High-Level Insert, Update And Delete Rule)

“The system must support Insert, Update and Delete operations at each level of relations”.

- ✓ They should also support union, intersection and minus operations.

8. Physical Data Independence Rule

“The physical storage of the data should never matter to the system”.

- ✓ Say for example, if any file supporting table was renamed or moved from one disk to other then it should not effect the application.
- ✓ Change in physical structure should never have any effect on how actually the data is being accessed.

9. Logical Data Independence Rule

“If there is change in the logical structure or table structure of the database then the user view of the data must not be changed implemented through views”.

- ✓ In simple words, the logical data should not be dependent upon its application view(user view).

Say, if a table has been split into two tables a new view should give the result as the join of the two tables.

10. Integrity Independence Rule

“The database must be able to enforce its own integrity rather using other programs”.

- ✓ The integrity rules filters to allow correct data,stored in data dictionary.
- ✓ Key and check constraints, triggers should be stored in data dictionary.
- ✓ Makes RDBMS independent of front-end.

11. Distribution Independence Rule

“A database should work properly irrespective of its distribution across a network” .

- ✓ It forms the base for distributed database.
- ✓ The distribution of portion of the database to various locations should be invisible to the end-user of the database.

12. Non-Subversion Rule

“If low level access to the records is provided to a system by using the interface, then neither it should be able to subvert (undermine the authority) nor bypass integrity rules to change the data”.

- ✓ It can be achieved by locking or encryption.