Codd´s twelve rules

The twelve rules of Codd are a set of thirteen rules designed for the relational model proposed by Frank Codd in the year of 1970. These rules defined what is necessary to define a database management system to be relational.

Rules:

Rule 0: The foundation rule

A database management system is relational if it can manage the database entirely through its relation capabilities.

Rule 1: The information rule:

The information in a relational database is represented at the logical level only with values in tables.

Rule 2: The guaranteed access rule:

Every data can be logically accessible from a table name, a column name, and a primary key.

Rule 3: Systematic treatment of null values:

The missing information or inapplicable information can be represented by a null value (independent of the data type). This means that the relational database management system accepts null values.

Rule 4: Dynamic online catalog based on the relational model:

The structure of the database must have an online catalog (database dictionary), which can be access by authorized users. The logical description ensures that the relational language interrogations are the same for the database dictionary and the database itself.

Rule 5: The comprehensive data sublanguage rule:

A system can have several languages and terminal uses. But it needs at least one language with characters expressions to support the following:

1. Data definition.
2. View definition.
3. Data manipulation.
4. Integrity constrains.
5. Authorization.
6. Transaction boundaries.

Rule 6: The view updating rule:

Al the views of a database that can be (theoretically) updated, must also be updated by the database management system.

Rule 7: Relational operations rule:

The system must have a high-level data manipulation. So, the system can make insertions, actualizations, and deletions to sets of data records (tuples).

Rule 8: Physical data independence:

The data in a database and the access to the database from external applications are independent. Any change in the physical structure of the database must not affect the way external applications accesses the stored data.

Rule 9: Logical data independence:

Any logical change in the data (for example, merging two tables), must not affect the user views.

Rule 10: Integrity independence:

The database must be independent of the applications that uses it. There is no dependence between the database and the application (front-end app)

Rule 11: Distribution independence:

The user most not able to see the movement (distribution) of the data. The data needs to give the impression of been stored in one place.

Rule 12: The nonsubversion rule:

If the system has a low-level language, that language can´t be used to bypass the integrity of the constraints expressed in the high-level language.

References

[1] “Codd´s 12 rules”. Wikipedia. https://en.wikipedia.org/wiki/Codd%27s_12_rules (accessed Sep. 16, 2023).

[2] “Codd´s 12 rules”. tutorialspoint. https://www.tutorialspoint.com/dbms/dbms_codds_rules.htm (accessed Sep. 16, 2023).