

University of Central Florida

CGS 2545

Database Concepts

DEPARTMENT OF ELECTRICAL ENGINEERING & COMPUTER SCIENCE
COMPUTER SCIENCE DIVISION

Codd's 12 Rules

- 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.

Codd's 12 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.

Codd's 12 Rules

- 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.

Codd's 12 Rules

- 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.

Codd's 12 Rules

- 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.

Codd's 12 Rules

- 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.

Codd's 12 Rules

- Rule 6: View Updating Rule
 - All the views of a database, which can theoretically be updated, must also be updatable by the system.

Codd's 12 Rules

- 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.

Codd's 12 Rules

- 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.

Codd's 12 Rules

- 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.

Codd's 12 Rules

- 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.

Codd's 12 Rules

- 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.

Codd's 12 Rules

- 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.