

# Database Management Systems (BCSC–1003)

Topic: **E. F. Codd's 12 Rules**



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# Codd's 12 Rules in DBMS

Codd's twelve rules are a set of thirteen rules (numbered zero to twelve) proposed by Edgar F. Codd, a pioneer of the relational model for databases, designed to define what is required from a database management system in order for it to be considered relational, i.e., a relational database management system (RDBMS).

# Codd's 12 Rules in DBMS

## **Rule 0: Foundation Rule**

Any relational database management system that is propounded to be RDBMS or advocated to be a RDBMS should be able to manage the stored data in its entirety through its relational capabilities.

## **Rule 1: Rule of Information**

The information can be represented in one and only one way i.e., tables (also known as Relations). This rule emphasizes the fact that the information can be stored in rows and columns, whenever the data has to be stored or represented, it has to be in tabular form only.

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

Every data entity which is atomic in nature should be accessed logically by using a right combination of the name of table, primary key represented by a specific row value and column name represented by attribute value.

## **Rule 3: Rule of Systematic Null Value Support**

Null values are completely supported in relational databases. They should be uniformly considered as 'missing information'. Null values are independent of any data type. They should not be mistaken for blanks or zeroes or empty strings. Null values can also be interpreted as 'inapplicable data' or 'unknown information.'.

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## **Rule 4: Rule of Active and online relational Catalog**

RDBMS should maintain data dictionary tables to keep track of current state of the database. These are special tables which keep track of the current state of the database. These tables contain information about table definitions, views, column definitions and other types of database object updated automatically when changes are made to database.

## **Rule 5: Rule of Comprehensive Data Sub-language**

RDBMS should have comprehensive transactional data definition language, data manipulation language & data control language. All the operations on database should be supported by the data language which is a part of the package.

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## **Rule 6: Rule of Updating Views**

One can feel that any view can be updated, but in real practice, one cannot update all the views as some views are based on aggregating and virtual columns.

## **Rule 7: Rule of Set level insertion, update and deletion**

A single operation should be sufficient to retrieve, insert, update and delete the data.

# Codd's 12 Rules in DBMS

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

A change in the storage strategy should not affect the performance of data.

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

The data should be independent of logic involved in programming, in case the database design is changed then the programs should be independent of these changes.

## **Rule 10: Rule of Integrity Independence**

Integrity constraints should be available and stored as metadata in data dictionary.

# Codd's 12 Rules in DBMS

## **Rule 11: Rule of Distribution Independence**

A database should work properly regardless of its distribution across a network. Even if a database is geographically distributed, with data stored in pieces, the end user should get an impression that it is stored at the same place. This lays the foundation of distributed database.

## **Rule 12: Rule of Non Subversion**

Any row should obey the security and integrity constraints imposed. No special privileges are applicable.



# References



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