Any database management system that merely uses its relational capabilities to manage stored data is subject to these criteria. This is a foundational rule that serves as the cornerstone for all other 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.

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.

Rule 3: Systematic Treatment of NIOL Values

The pull 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.

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. Cartesian Product (X)

Combines information of two different relations into one.

Notation – r X s

Where r and s are relations and their output will be defined as -

 $r X s = \{ q t | q \in r and t \in s \}$

```
\sigma_{author = 'tutorialspoint'} (Books X Articles)
```

Output – Yields a relation, which shows all the books and articles written by tutorialspoint.

Rename Operation (p)

The results of relational algebra are also relations but without any name. The rename operation allows ato rename the output relation. 'rename' operation is denoted with small Greek letter rho ρ . Notapore ρ_{x} (E)

Where the result of expression E is saved with name of x.

Additional operations are -

- Set intersection
- Assignment
- Natural join

Relational Calculus

In contrast to Relational Algebra, Relational Calculus is a nonprocedural query language, that is, it tells what to do but never explains how to do it.

Relational calculus exists in two forms –

{< article, page, subject > | ∈ TutorialsPoint ∧ subject = 'database'}

Output – Yields Article, Page, and Subject from the relation TutorialsPoint, where subject is database.

Just like TRC, DRC can also be written using existential and universal quantifiers. DRC also involves relational operators.

The expression power of Tuple Relation Calculus and Domain Relation Calculus is equivalent to Relational Algebra.

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