

Properties of a Table

In this lesson, we will outline some of the characteristics of relations (tables).

WE'LL COVER THE FOLLOWING



- Properties of relational tables
 - 1. Each row is unique
 - 2. Values are atomic
 - 3. Column values are of the same kind
 - 4. The sequence of columns is insignificant
 - 5. The sequence of rows is insignificant
 - 6. Each column has a unique name

Properties of relational tables

Although we defined relations as a table of values, certain characteristics make a relation different from a table. We highlight these properties with the help of the following table:

Student Relation

Stud_Id	First_Name	Last_Name	Class	Major
1	Adam	Smith	Junior	CS
2	Jonathan	Joestar	Sophomore	Economics
3	Lucas	Klein	Senior	Physics
4	Brandon	Jones	Freshman	Biology

5	Ian	Damiani	Junior	Sociology
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1. Each row is unique

This property ensures that no two rows in a relational table are identical; there is at least one column, or set of columns, whose values uniquely identify each row in the table. Such columns are called primary keys and are discussed in more detail in the next lesson.

In the STUDENT relation above, we can see that the `Stud_Id` attribute is unique for every student, so it can be used to identify each student tuple in the STUDENT relation.

2. Values are atomic

An **atomic value** is one that can not be broken down into smaller pieces. In other words, the table does not contain repeating groups or multivalued attributes.

The key benefit of the atomic value property is that it simplifies data manipulation logic.

As we can see, each column in our STUDENT relation contains simple data that cannot be broken down any further.

3. Column values are of the same kind

In relational terms, this means that all values in a column come from the same domain based on their data type including:

- number (numeric, integer, float, smallint,...)
- character (string)
- date
- logical (true or false)

This property simplifies data access because developers and users can be certain of the type of data contained in a given column. It also simplifies data validation.

This property is evident in our STUDENT relation as all records in the `Stud_Id` attribute are of the same type i.e. *integer*. While the rest of the attributes are of type *string*.

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4. The sequence of columns is insignificant

This property states that there is no specific sequence of columns, i.e., columns can be retrieved in any order and various sequences. The benefit of this property is that it enables many users to share the same relational table without concern of how the table is organized. It also permits the physical structure of the database to change without affecting the relations.

So, according to this property, even if we change the order of the columns, it will not have any impact on the workings of the relational model.

5. The sequence of rows is insignificant

This property is analogous to the one above but applies to rows instead of columns. The main benefit is that the rows of a relational table can be retrieved in any order or sequence. Adding information to a relational table is simplified and does not affect existing queries.

Similar to the above property, even if the rows are ordered differently, it will not affect the way the relational model works.

6. Each column has a unique name

Because the sequence of columns is insignificant, columns must be referenced by name and not by position. In general, a column name need not be unique within an entire database but only within the relation to which it belongs.

Since we have unique names for each of the columns in our STUDENT relation, this property is being satisfied.

In the next lesson, we will learn about the different types of keys that are present in relational databases.