In relational database theory, a **functional dependency** is a constraint between two sets of attributes in a relation from a database. In other words, a functional dependency is a constraint between two attributes in a relation.

A functional dependency is denoted by an arrow "→". The functional dependency of X on Y is represented by X → Y. This means that the value of attribute Y is completely determined by the value of attribute X.

For example, in the following table, the functional dependency of `EmployeeNumber` on `EmployeeName` is denoted by `EmployeeNumber → EmployeeName`. This means that the value of `EmployeeName` is completely determined by the value of `EmployeeNumber`.

```
| EmployeeNumber | EmployeeName | City |
| ---------- | ---------- | ------- |
| 1001 | John Doe | London |
| 1002 | Jane Doe | Paris |
| 1003 | Peter Smith | New York |
```

There are four types of functional dependencies:

* **Trivial functional dependency:** A trivial functional dependency is a functional dependency where the dependent attribute is a subset of the determinant attribute. For example, in the above table, the functional dependency of `EmployeeNumber` on `EmployeeNumber` is a trivial functional dependency.

* **Non-trivial functional dependency:** A non-trivial functional dependency is a functional dependency where the dependent attribute is not a subset of the determinant attribute. For example, in the above table, the functional dependency of `EmployeeName` on `EmployeeNumber` is a non-trivial functional dependency.

* **Multivalued functional dependency:** A multivalued functional dependency is a functional dependency where the dependent attribute can take on multiple values for a single value of the determinant attribute. For example, in the following table, the functional dependency of `Department` on `EmployeeNumber` is a multivalued functional dependency.

```
| EmployeeNumber | Department |
| ---------- | ---------- |
| 1001 | Sales |
| 1001 | Marketing |
| 1002 | Finance |
```

* **Transitive functional dependency:** A transitive functional dependency is a functional dependency where the dependent attribute is determined by a combination of two or more determinant attributes. For example, in the following table, the functional dependency of `City` on `EmployeeNumber` and `Department` is a transitive functional dependency.

```
| EmployeeNumber | Department | City |
| ---------- | ---------- | ------- |
| 1001 | Sales | London |
| 1001 | Marketing | London |
| 1002 | Finance | Paris |
```

Functional dependencies are used in database design to ensure the **integrity** of the data. They can also be used to **denormalize** tables, which can improve the performance of queries.