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Ts: What are database indexes and why is it important to apply them?

Indexes are the way in which we refer to a specific piece of data, or in the context of relational database to an entity, and it is what helps us to identify it within a database that can contain a variable number of entities.

As an example, we can think of a library, the way in which a book can be specifically identified within this library is through its ISBN, DOI or ISSN, which is an index that identifies an single book, allowing it to be easily found.

An index can be used to efficiently find all rows matching some column in your query and then walk through only that subset of the table to find exact matches. If you don't have indexes on any column in the WHERE clause, the SQL server has to walk through the whole table an check every row to see if it matches, which may be a slow operation on big tables.

The index can also be a UNIQUE index, which means that you cannot have duplicate values in that column, or a PRIMARY KEY which in some storage engines defines where in the database file the value is stored. In MySQL you can use EXPLAIN in front of your SELECT statement to see if your query will make use of any index. This is a good start for troubleshooting performance problems.