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## Grokking the System Design Interview

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## Indexes

We'll cover the following

- Example: A library catalog
- How do Indexes decrease write performance?

Indexes are well known when it comes to databases. Sooner or later there comes a time when database performance is no longer satisfactory. One of the very first things you should turn to when that happens is database indexing.

The goal of creating an index on a particular table in a database is to make it faster to search through the table and find the row or rows that we want. Indexes can be created using one or more columns of a database table, providing the basis for both rapid random lookups and efficient access of ordered records.

### Example: A library catalog

#

A library catalog is a register that contains the list of books found in a library. The catalog is organized like a database table generally with four columns: book title, writer, subject, and date of publication. There are usually two such catalogs: one sorted by the book title and one sorted by the writer name. That way, you can either think of a writer you want to read and then look through their books or look up a specific book title you know you want to read in case you don't know the writer's name. These catalogs are like indexes for the database of books. They provide a sorted list of data that is easily searchable by relevant information.

Simply saying, an index is a data structure that can be perceived as a table of contents that points us to the location where actual data lives. So when we create an index on a column of a table, we store that column and a pointer to the whole row in the index. Let's assume a table containing a list of books, the following diagram shows how an index on the 'Title' column looks like:

Index		Table		
Search Key	Pointer	Title	Writer	Date
Database indexes		Intro to databases	Michele Clark	Dec 2, 2017
Intro to computers		Database indexes	Adam Cambel	Nov, 14, 2016
Intro to databases		Intro to computers	Nickolas Homes	Feb 5, 2018
Intro to software		Intro to software	Nicholas Robin	Feb 7, 2018

Just like a traditional relational data store, we can also apply this

