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Introduction to Indexes

Indexes: Speeding Up Database Searches Efficiently

DEFINITION

> Indexes are special data structures that improve the speed of data retrieval in databases. They work like a book's index, allowing quick access to specific data without scanning the entire dataset.

KEY CONCEPTS

B-Tree Index

A balanced tree structure that maintains sorted data and allows for efficient searching, inserting, and deleting.

Unique Index

An index that ensures all values in a column are different, preventing duplicate entries.

Composite Index

An index that uses multiple columns to improve query performance for searches involving those columns.

Full-Text Index

An index designed for searching text data, enabling efficient searches for words or phrases in large text fields.

Clustered vs Non-Clustered

Clustered indexes determine the physical order of data, while non-clustered indexes create a separate structure to reference data.

EXAMPLES

→ Using a B-Tree index to find customer records quickly.

→ Implementing a unique index on email addresses to prevent duplicates.

→ Creating a composite index on first name and last name for faster searches.

MEMORY TIPS

★ Think of indexes like a book's index for quick reference.

★ Remember 'unique' means no duplicates, like a fingerprint.

★ Associate 'composite' with 'combined' for multi-column indexing.

COMMON MISTAKES

✗ Assuming all queries benefit from indexes equally.

✗ Neglecting to update indexes after data changes.

✗ Over-indexing, which can slow down data modification operations.

QUICK RECAP

Indexes significantly enhance database performance by allowing faster data retrieval. Understanding different types of indexes, such as unique and composite, is crucial for optimizing queries.