B-Trees

Lawrence Cabbabe, Aaron Levesque, Ben Uthoff,
Sam Zhong

What are B-Trees?

Definition:

A balanced tree data structure used for organizing and storing data.

Key Features:

- Balanced Structure
- Node Structure
- Degree or Order
- Sorted Data

A Brief History

- The term "B-tree" was coined by Donald Knuth in "The Art of Computer Programming"
- B-tree first introduced in Rudolf Bayer and Edward M. McCreight's paper in 1972 named "Organization and Maintenance of Large Ordered Indexes"
- B-Tree was made to address the limitations of binary search trees for large datasets, and to optimize storage and retrieval in secondary storage systems
- Between 1970s - 1980s, IBM adopted B-trees in their database systems
- In modern day, B-tree is a fundamental data structure for indexing and storage
- It is widely used in databases, filesystems, and applications requiring efficient indexing

How B-Tree works
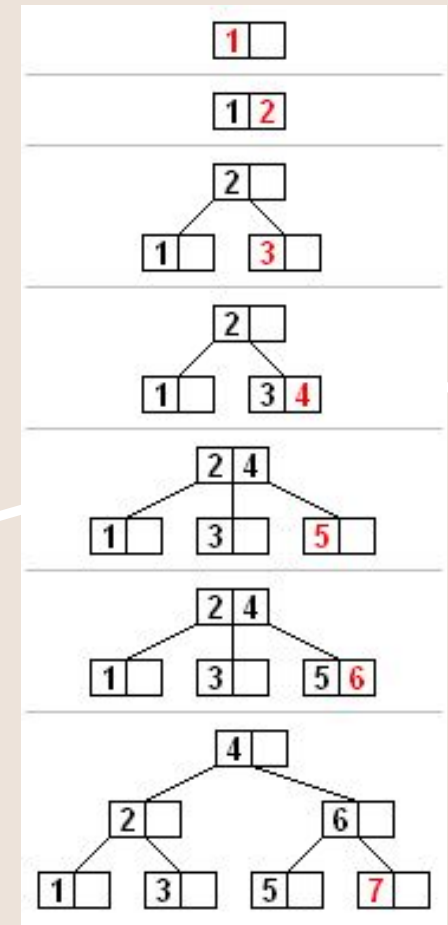
Time Complexity

	Worst Case	Average Case	Best Case
Search Operation	O(logn)	Θ(logn)	Ω(logn)
Insertion Operation	O(logn)	Θ(logn)	Ω(logn)
Deletion Operation	O(logn)	Θ(logn)	Ω(logn)

Applications to the Real World

Code

Questions?

Sources