Date: Sep 3, 2025

B+ tree

- B+ tree is a variant of B-tree in which all the records are stored at the leaf level. Only the keys are stored in the interior nodes called index nodes or indices.
- The leaf nodes are connected to one another in a linked list.

B tree	B+ tree
Search keys are not repeated.	Search keys may be repeated.
Data is stored in internal or leaf nodes.	Data is stored only in the leaf node.
Searching takes more time as data may be found in a leaf or non-leaf node.	Searching data is very easy as data can be found in leaf nodes only.
Deletion of non-leaf nodes is very complicated.	Deletion is simple as data will be in the leaf node.
Leaf nodes cannot be stored using linked list.	Leaf node data are ordered using sequential linked list.
The structure and operations are complicated.	The structure and operations are simple.

Insertion

- Insert the new node as a leaf node.
- If the leaf node overflows, split the leaf node and copy the middle element to the next index node.
- If the index node overflows, split that node and move the middle element to the next index page.

Deletion

- Delete the key and data from the leaves.
- If the leaf node underflows, merge that node with the sibling and delete the key in between them.
- If the index node underflows, merge that node with the sibling and move down the key in between them.

Advantages

- Records can be fetched in equal number of disk accesses.
- It can be used to perform a wide range of queries easily as leaves are linked to nodes at the higher level.
- Height of the tree is less and balanced.
- Supports both random and sequential access to records.
- Keys are used for indexing.