JOINING AND SPLITTING 2-3-4 trees

Strategy

On the way from the root down to leap split up all 4 node on the way

Insertion procedure

Similar to insertion in 2-3 trees

Items are inserted in the leaf

Since a 4 node cannot take another item 4 node are split up during insertion process

Each update takes o(t) since a call to B tree insert makes at most h h splits where h h is the height of the tree the total time it takes to update height is o(th) preserving the symptotic running time of insert for deletion the situation is very simple

For insertion it will suffice to explain how to update height when we split a node suppose node xx is split into node x and y and median of x is merged into node ww the height of ww remain unchanged unless xx was the root in which case height=x.height+1

Without loss of generality assume h>h we essentially wish to merge T into T at a node of height h using node x to do this find the node at depth h’ h” on the right spine of T add x as a key to this node and T as a additional child.if it should happen that a node was already full perform a split operation