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Sec : C
Sub : Advanced Data Structures

Assignment - II

1. Insert the following keys into an empty B-Tree of order 3 show the result step by step detail 7, 8, 9, 10, 11, 16, 2, 18

Sol Given $m = 3$

min no. of children $\lceil \frac{m}{2} \rceil = \lceil \frac{3}{2} \rceil = 2$

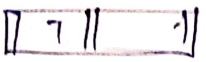
max no. of child = 3.

max no. of keys = $m - 1 = 2$

min no. of key = $\lceil \frac{M}{2} \rceil - 1 = 1$

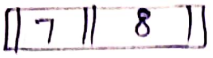
Insert 7

Initially . B-Tree is empty



Insert 8

Insert the key 8 into the node maintaining sorted order 8.

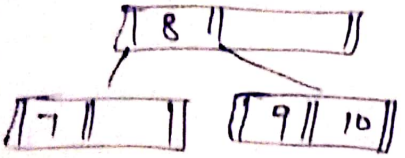


Insert 9

After insert the key 9 then overflow occurd (m-1), now split the node into two nodes. promote middle key to parent node Remaining blw 2 Nodes

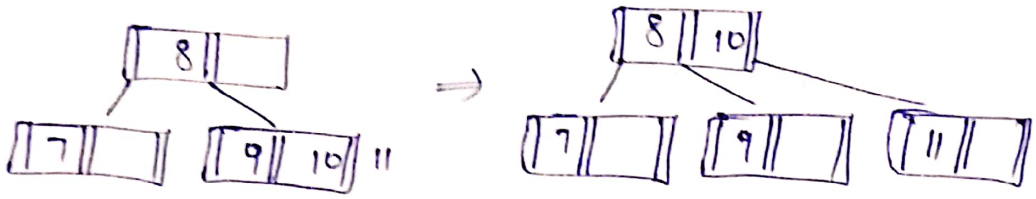
Insert 10

→ Here 10 is greater than 8 and 9 place on right side



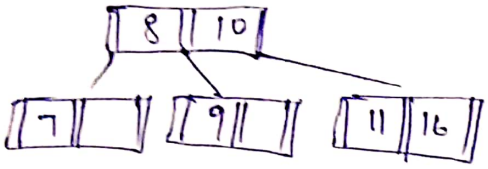
Insert 11

- After insert key 11, the overflow occurd Now split Node into two nodes. promote middle key into parent node and Remain blw two nodes



Insert 16

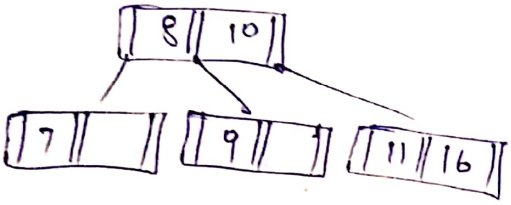
Insert the key 16 into node there 16 is greater than 11, Then place to it's right side.

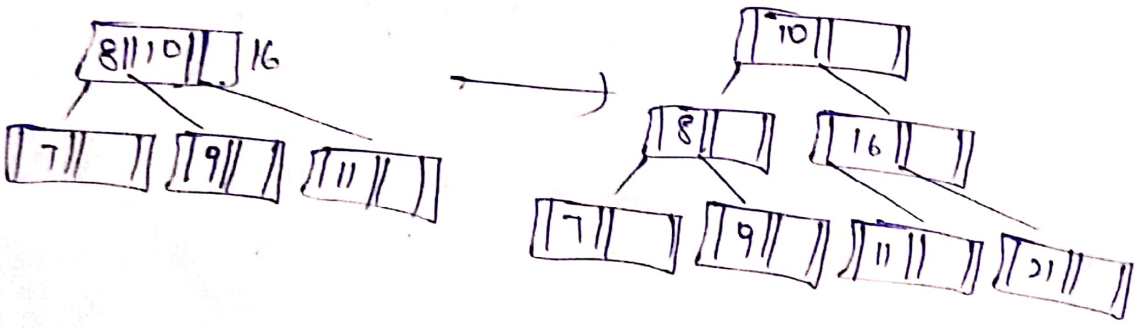


Insert 21

After inserting the key 21 there overflow condition is violating

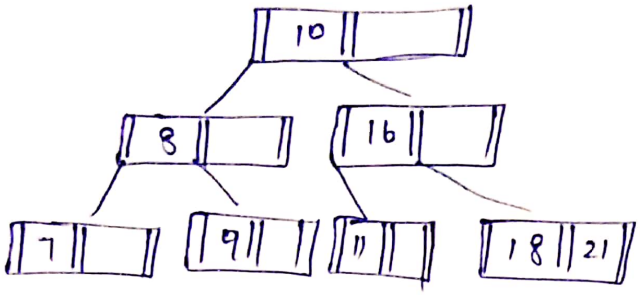
- Now, split the node into two Nodes
- So, Now again, overflow condition is violating then perform same as Above





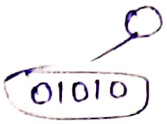
Insert 18

Insert the key 18 into node. Here 18 is greater than 16 and less than 21. So place 18 on left side of 21

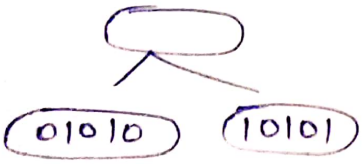


2) Construct the binary trie for the keys 01010, 10101, 10110 01001, 00000, 11011, 00110, Then delete the keys 00000, 10101 and 11011. How does the deletion process works in binary trie.

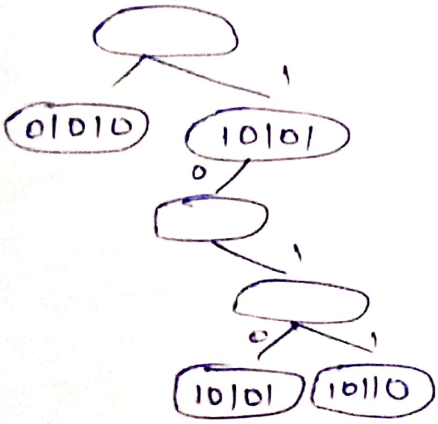
Insert 01010



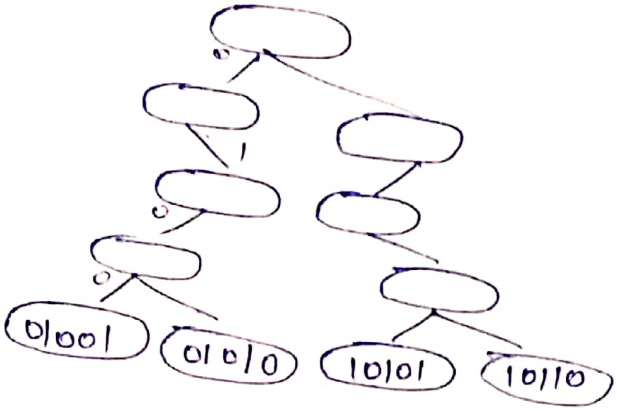
Insert 10101



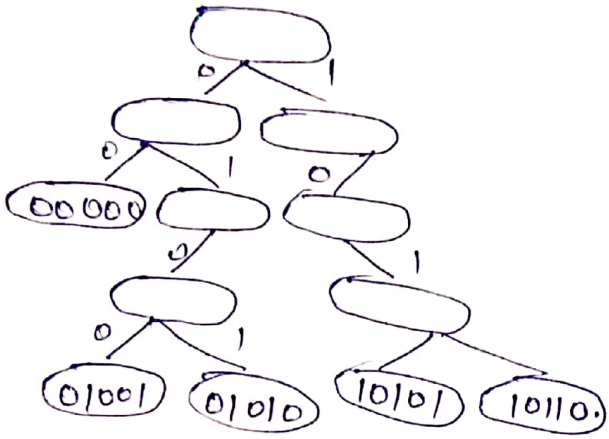
Insert 10110



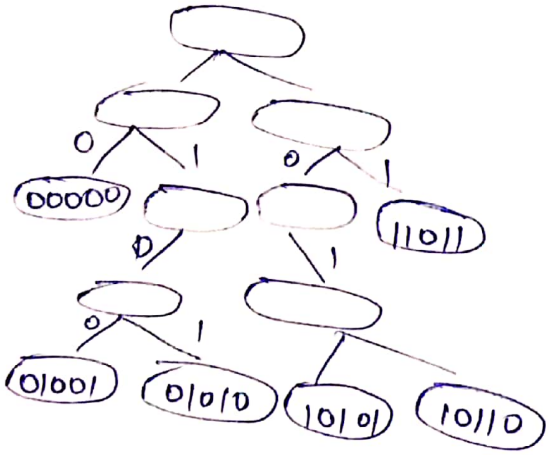
Insert 01001



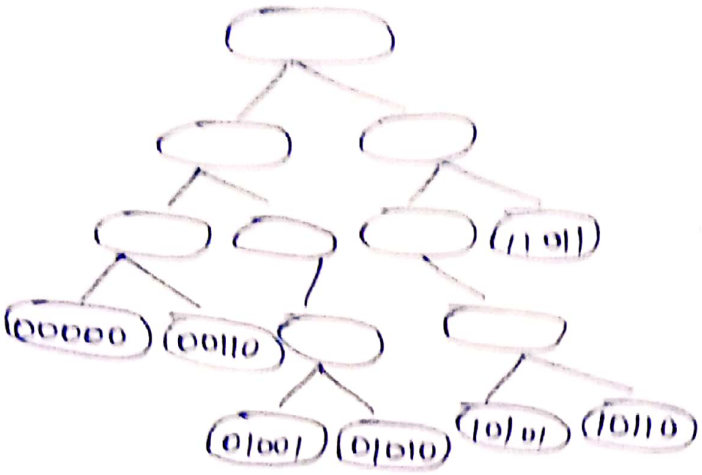
Insert 00000



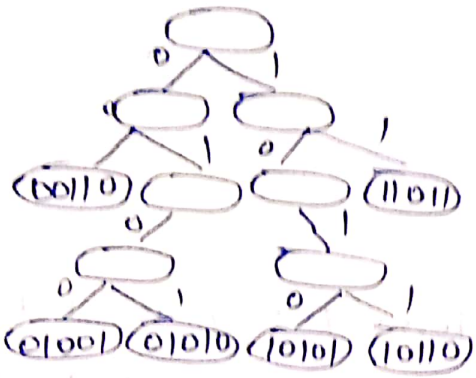
Insert 11011



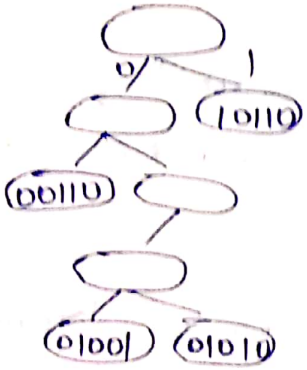
Insert 00110



Delete 00000

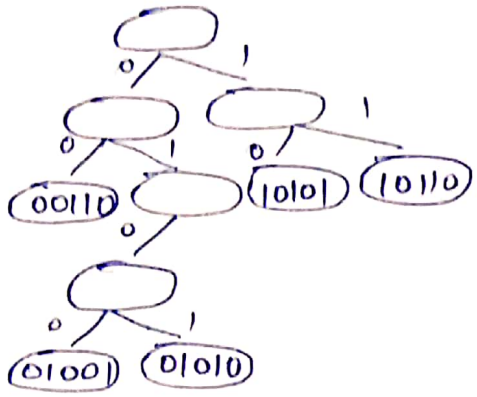


delete 11011

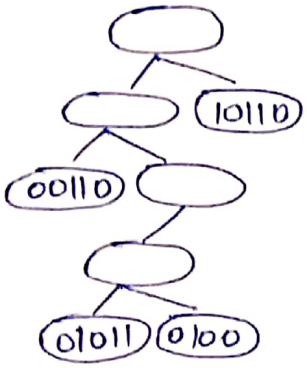


delete 11011

delete 10101



delete 11011



Whatever the element to be deleted that must be always leaf node because in binary the element node are present in leaf node only.

In this we have two situation.

1. Whatever the node to be delete has sibling as element node that delete the branch node also in the path from the element to root node.

2. whatever the node to delete has sibling as branch node then simply delete it.