

Submission II : B-tree

2)

4	6	22
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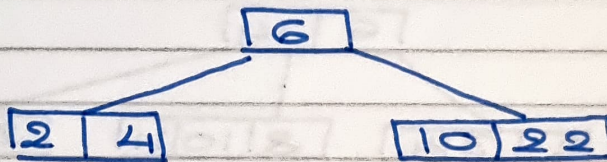
→ Insert 10

4	6	10	22
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10 is inserted normally as it does not violate the property as degree is 5 and $5-1=4$ elements can be accommodated

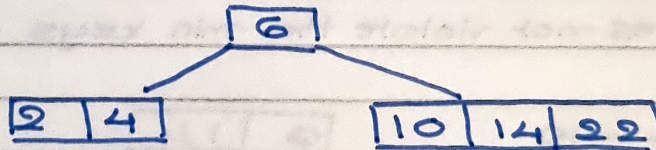
→ Insert 2

There will be an overflow. The middle element 6 is taken as root and split with 2 child pointers



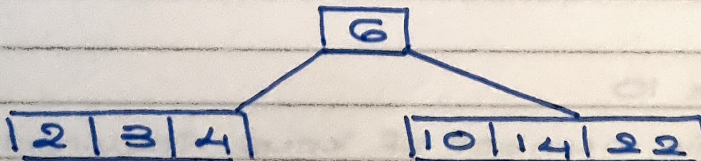
→ Insert 14

Insert 14 to right leaf node



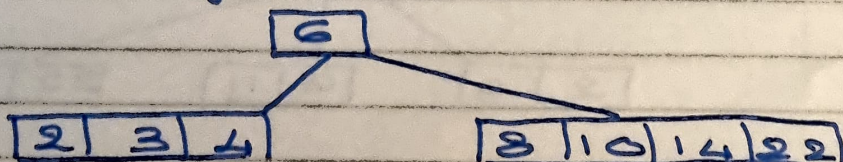
→ Insert 3

3 to be inserted to left leaf node



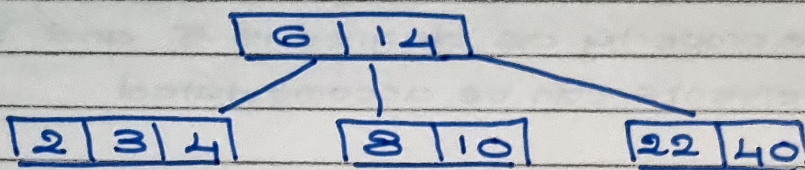
→ Insert 8

Since adding 8 does not cause overflow, insert to right leaf node.



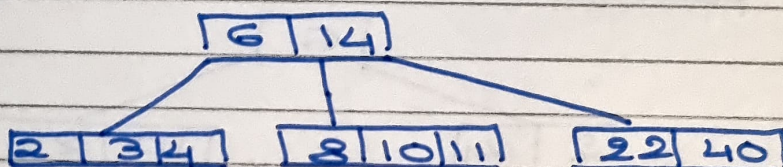
→ Insert 40

Adding 40 to right ~~subtree~~ leaf node causes, overflow, so 14 is taken to root and the leaf node is split



→ Insert 11

Insert it to the node with 8, 10

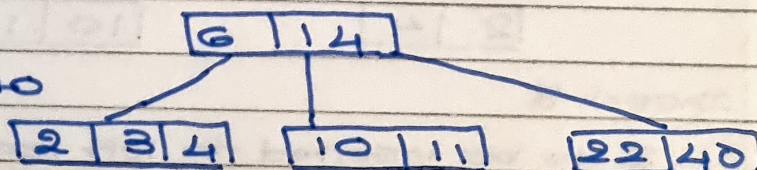


2) Delete 8

8 can be deleted without an issue as it does not violate the min keys required. $\lceil \frac{5-1}{2} \rceil = 2$

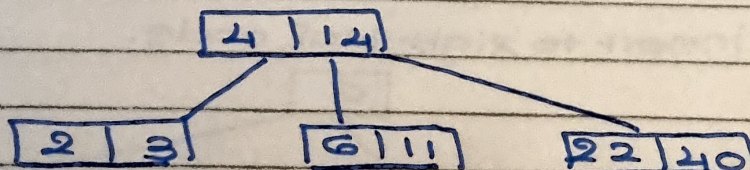
Delete 10

Deleting 10

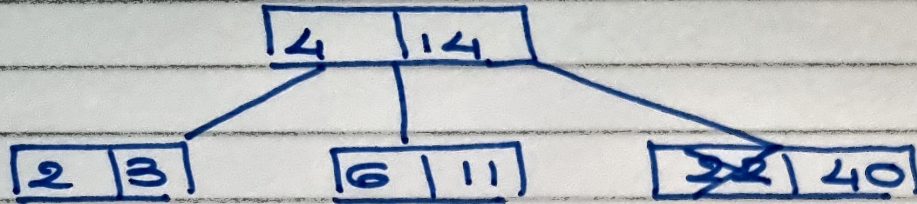


Delete 10

The min. number of keys required is 2. So this will cause under-flow. Its predecessor 6 is brought to its position. 4 is promoted to root



Delete 22



tooless keys

Merge with its siblings — 6, 11, 14 and 40

