

Written assignment - 2

Std Id :- 700741281

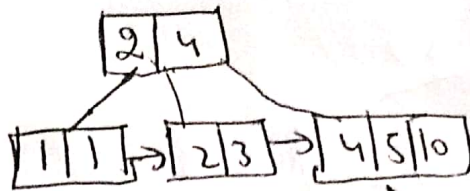
1, 3, 10, 4, 5, 1, 2, 3, 5, 6, 7, 8, 9, 11, 10, 2, 3, 7, 8, 12, 1, 4, 5

Insert 12

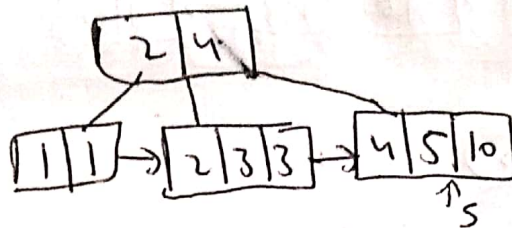
```

graph TD
    Node[11 | 3 | 4] --> Leaf1[4 | 5 | 10]
    Node --> Leaf2[12]
  
```

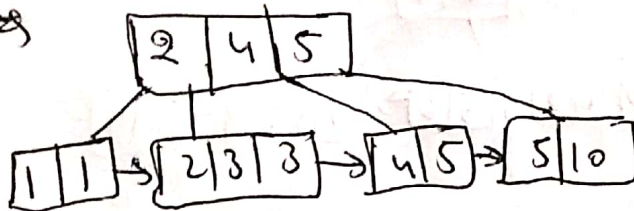
Insert 2 ⇒



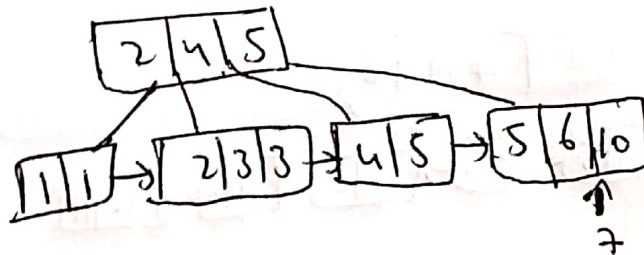
Insert 3 ⇒



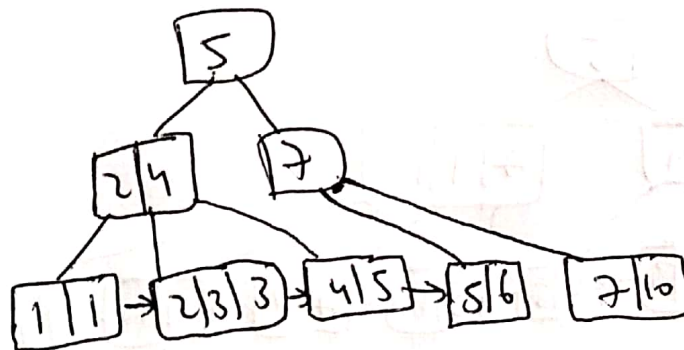
Insert 5 ⇒



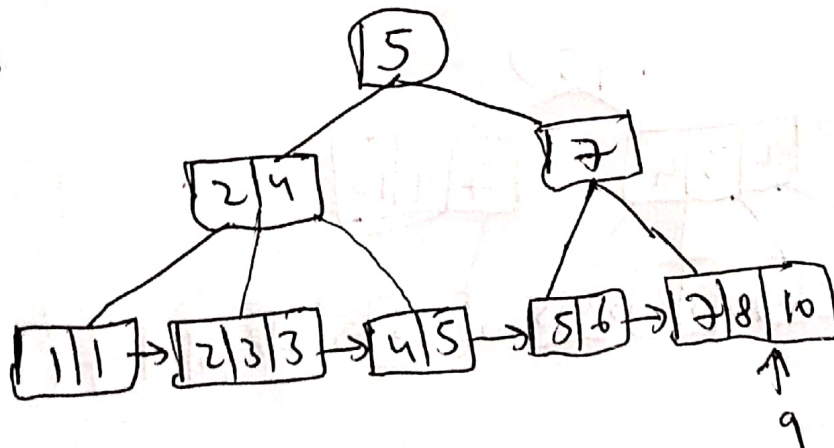
Insert 6 ⇒



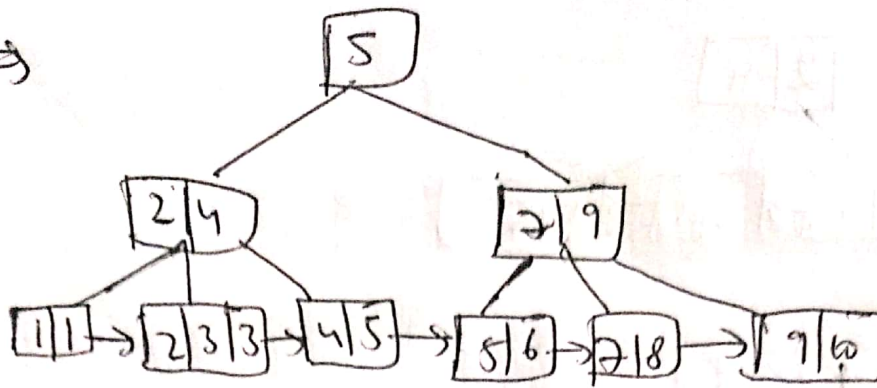
Insert 7 ⇒



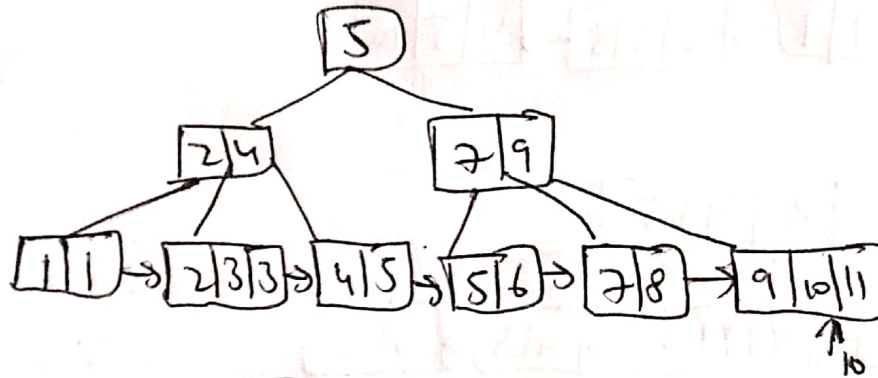
Insert 8 ⇒



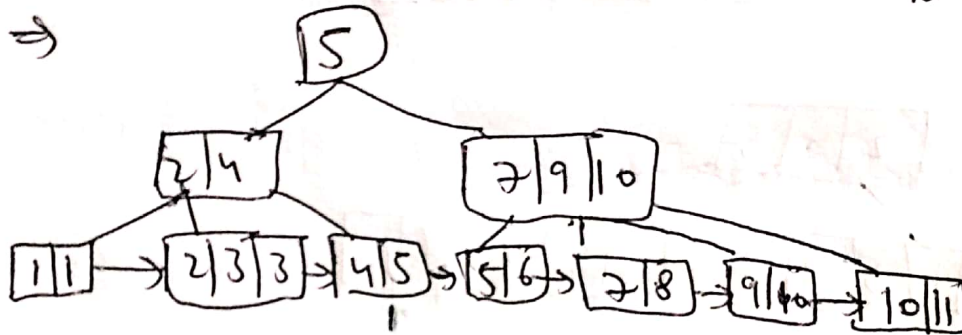
Insert 9 ⇒



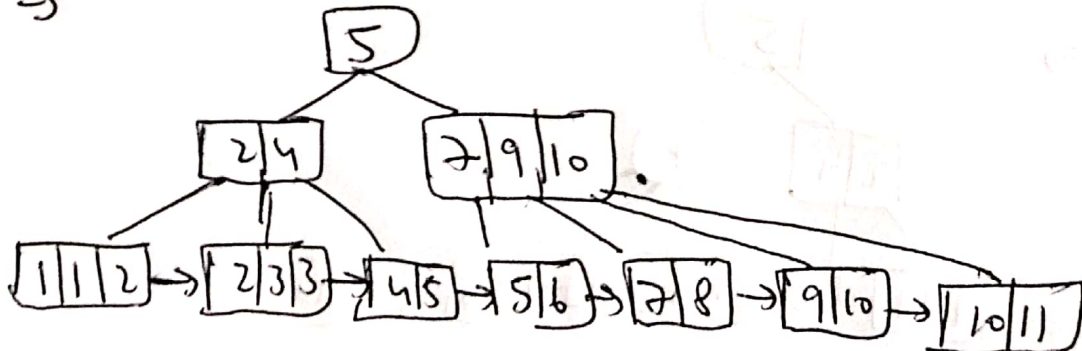
Insert 11 ⇒



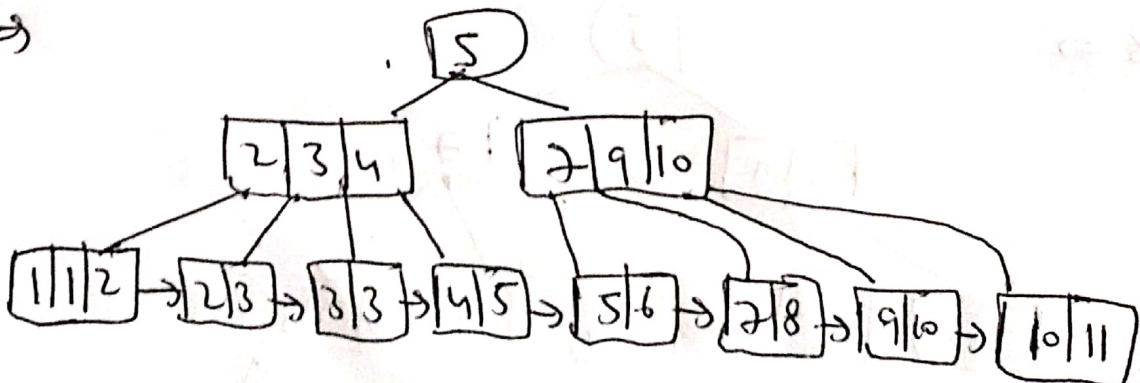
Insert 10 ⇒



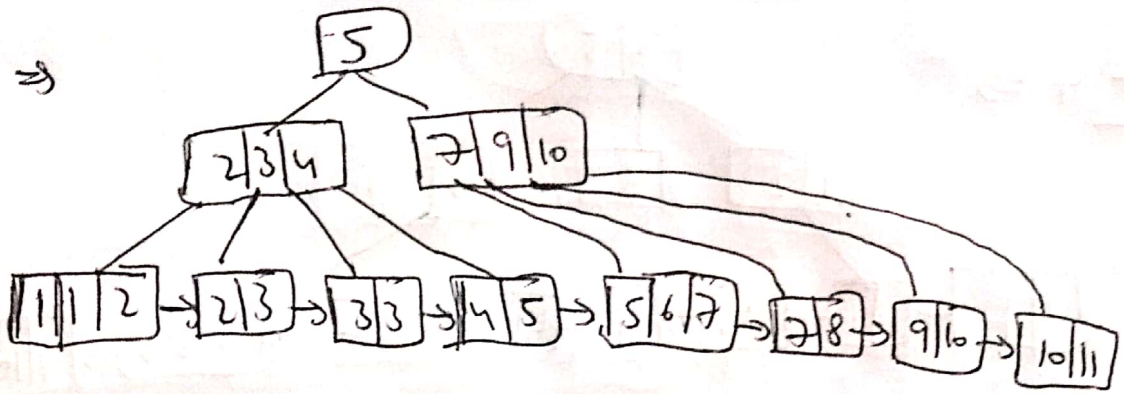
Insert 2 ⇒



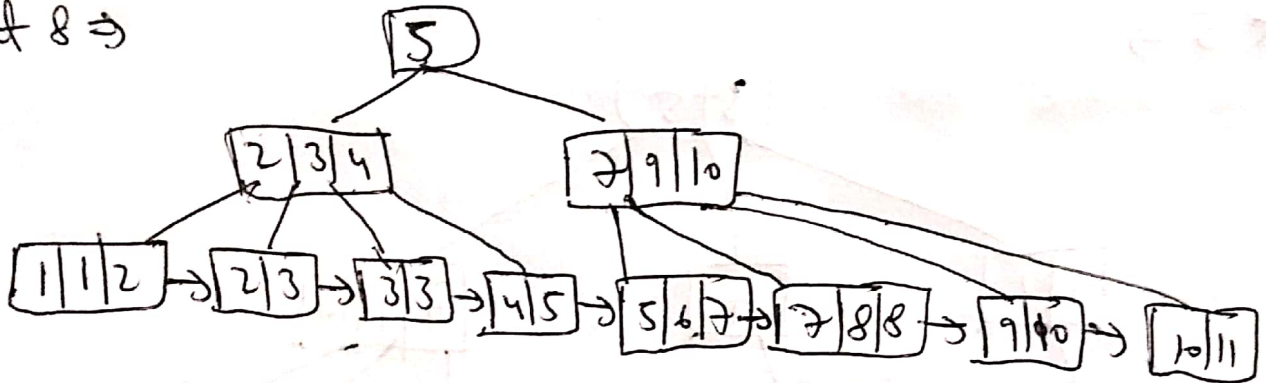
Insert 3 ⇒



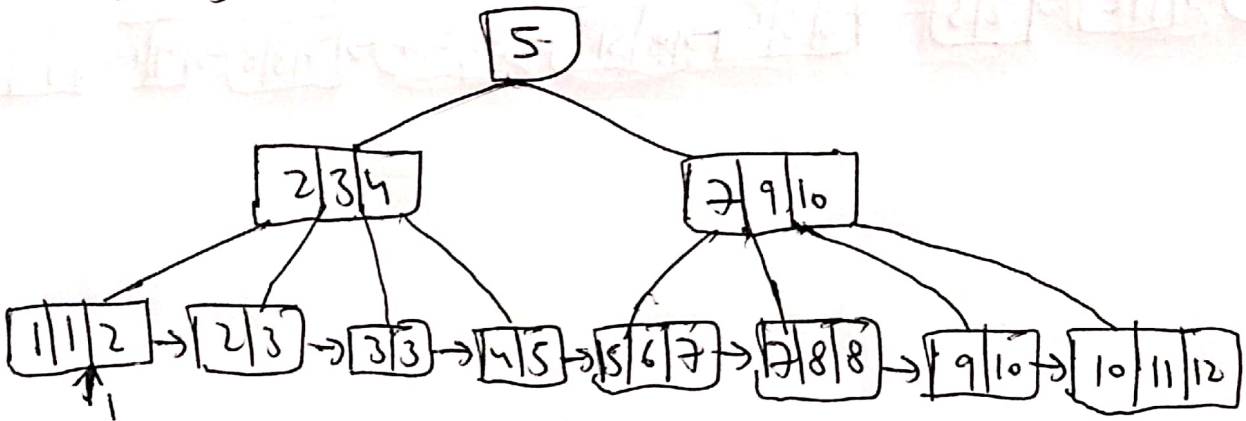
Insert 7 ⇒



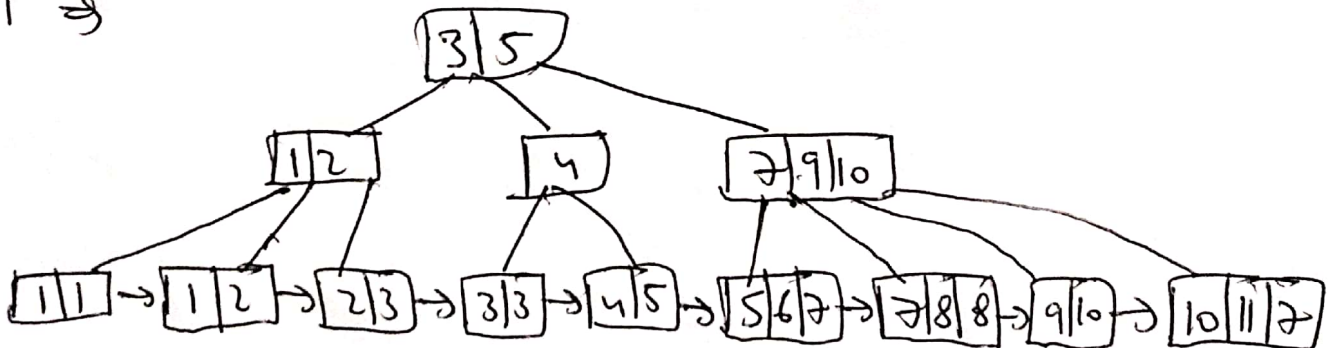
Insert 8 ⇒



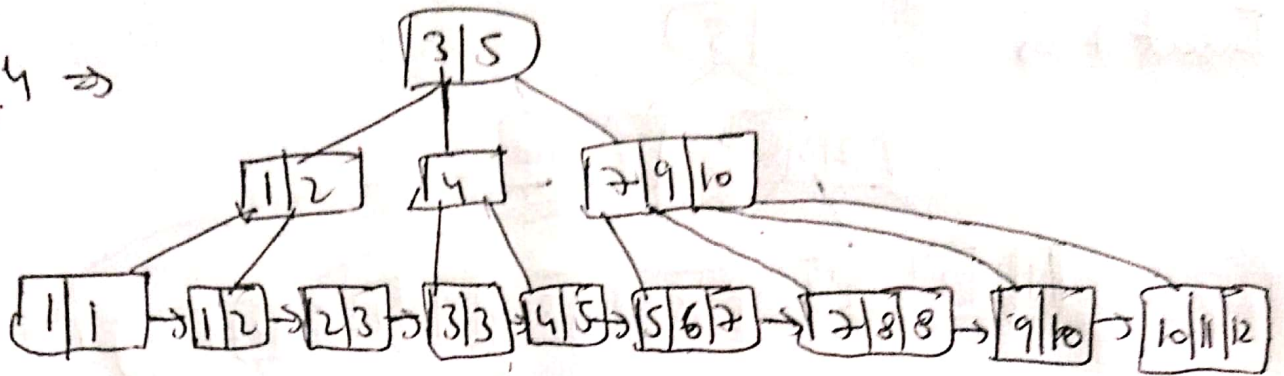
Insert 12 ⇒



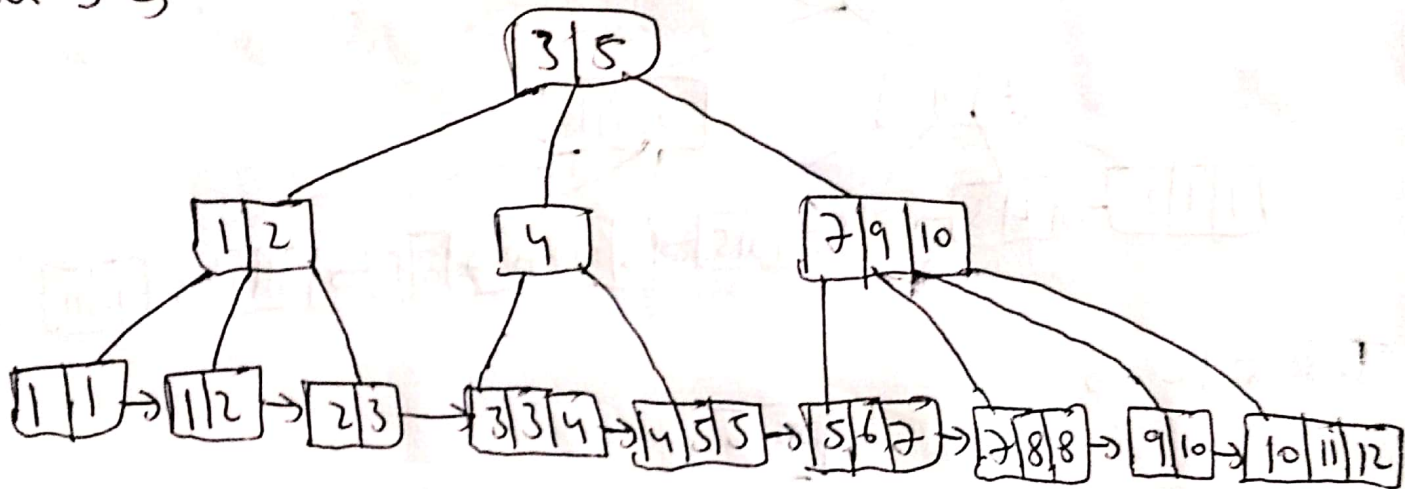
Insert 1 ⇒



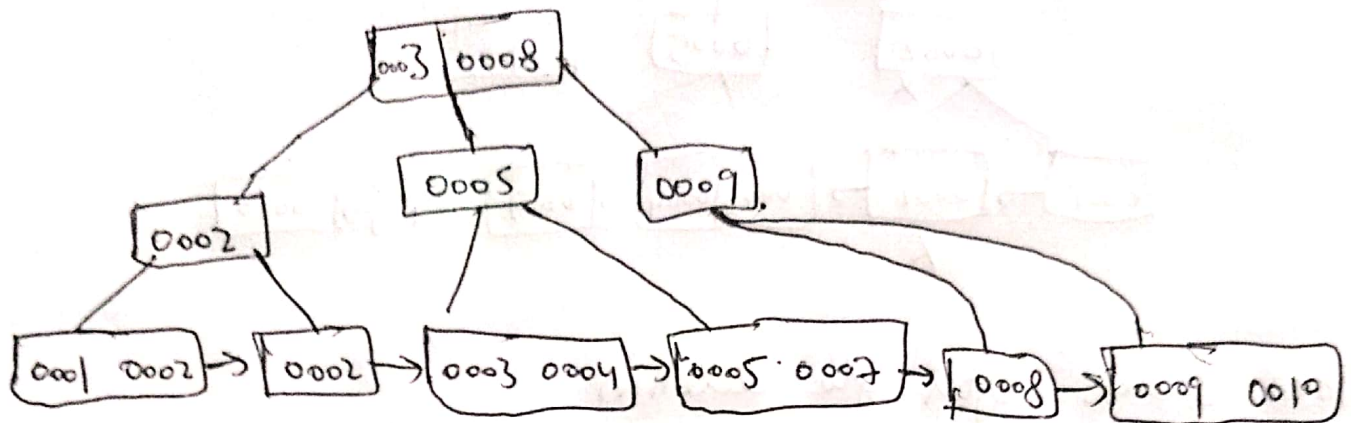
Insert 4 ⇒



Insert 5 ⇒

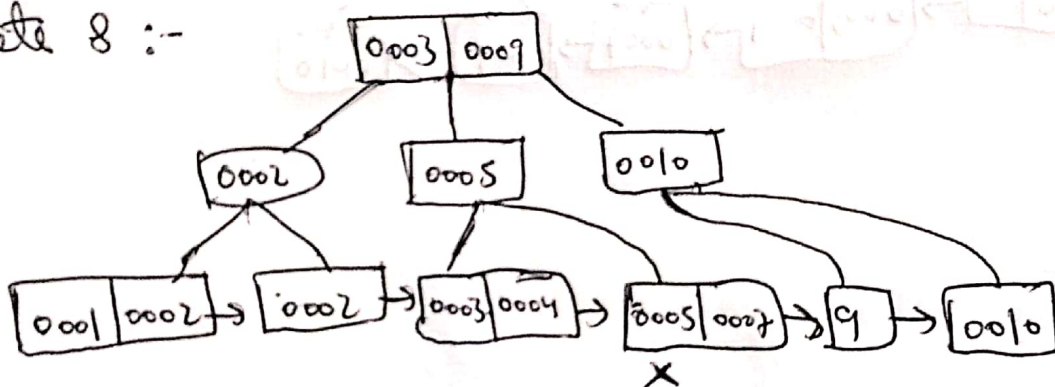


② Regarding to the following B+ Tree Index ($m=3$)

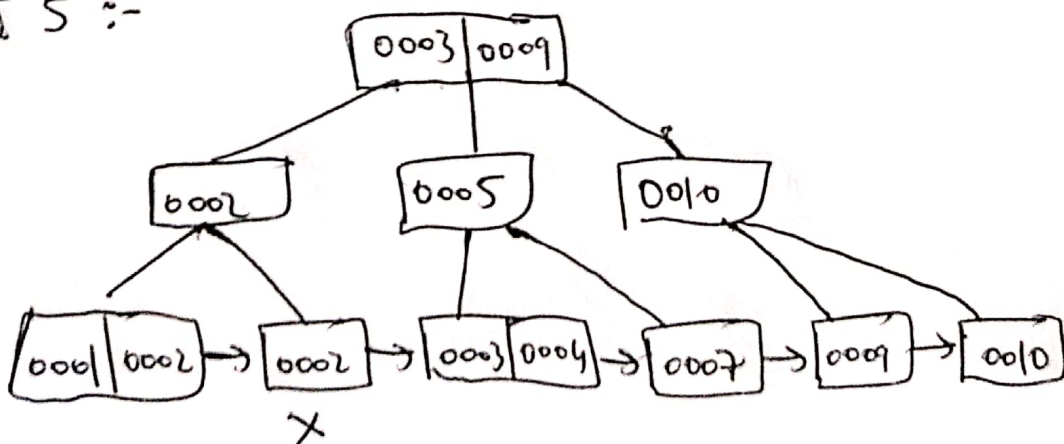


If we delete index key 8, 5 and all 2s what is the B+ Tree Index after the deletion?

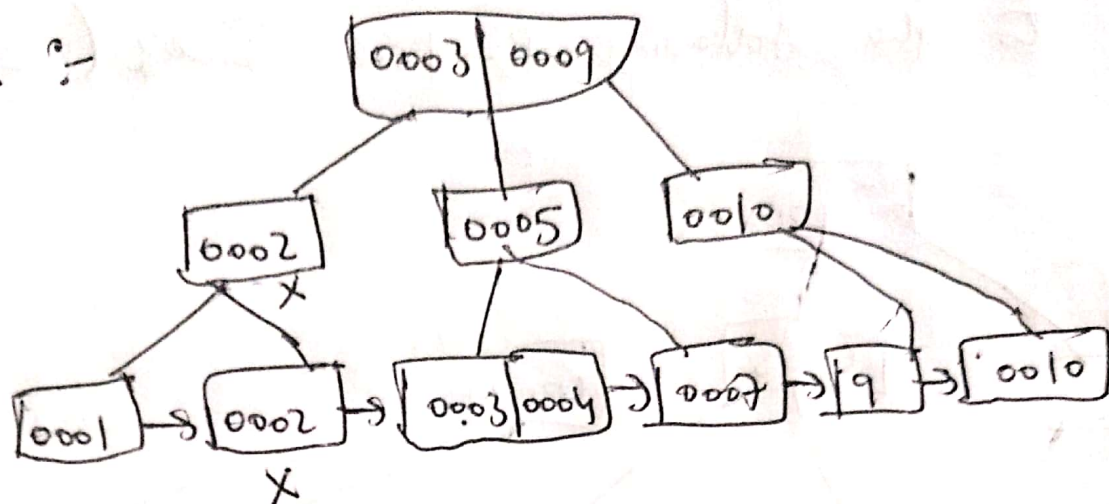
Sol Delete 8 :-



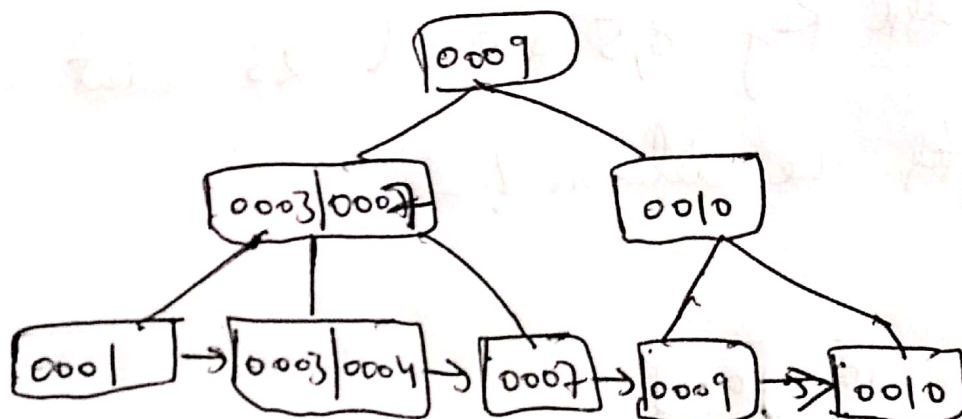
Delete 5 :-



Delete 2 :-



B-Tree Index after the deletion



③ Linear Hash: Create the hash table from the following index key values, with the bucket size = 3, and initial hash function: $\text{hash } h_1 = \text{index value mod } 2$.

Given input index keys: 8, 17, 12, 3, 5, 7, 10, 11, 1, 9, 4, 6, 14

3.1) what is the hash table after round 0?

Round 0:

Sp \Rightarrow

0	8, 12
1	17, 3, 5

\rightarrow [7]

overflow on bucket #1

Rehash on bucket #0

Sp \Rightarrow

0	8, 12
1	17, 3, 5
2	10

\rightarrow [7, 11]

overflow on bucket #1

Rehash on bucket #1

hash 1: Index value mod 2

$$8 \bmod 2 = 0$$

$$17 \bmod 2 = 1$$

$$12 \bmod 2 = 0$$

$$3 \bmod 2 = 1$$

$$5 \bmod 2 = 1$$

$$7 \bmod 2 = 1$$

hash 2: Index value mod 4

$$8 \bmod 4 = 0$$

$$12 \bmod 4 = 0$$

hash 1: index value mod 2

$$10 \bmod 2 = 0$$

hash 2:

$$10 \bmod 4 = 2$$

$$11 \bmod 2 = 1$$

0	8, 12
1	17, 5
2	10
3	3, 7, 11

$$17 \bmod 4 = 1$$

$$3 \bmod 4 = 3$$

$$5 \bmod 4 = 1$$

$$7 \bmod 4 = 3$$

$$11 \bmod 4 = 3$$

Here split pointer can not point to next pointer so
ending Round 0

3.2 what is the final hash table?

Round 1 :-

SP \Rightarrow

0	8, 12
1	17, 5, 1
2	10
3	3, 7, 11

\rightarrow [9]

Use hash 2: index value mod 4

$$1 \bmod 4 = 1$$

$$9 \bmod 4 = 1$$

overflow on bucket #1

Rehash on bucket #0

hash 3: index value mod 8

$$8 \bmod 8 = 0$$

$$12 \bmod 8 = 4$$

sp \Rightarrow

0	8
1	17, 5, 1 \rightarrow [9]
2	10, 6, 14
3	3, 7, 11
4	12, 4

$$4 \bmod 4 = 0 \text{ (sp at 1 so Refresh)}$$

$$4 \bmod 8 = 4$$

$$6 \bmod 4 = 2$$

$$14 \bmod 4 = 2$$