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ADS Lab

2-3 Trees Writeup

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Insert function: Pseudo Code

```
void insert(int k) {
    if(!root){
        root= new TreeNode(true);
        root->keys[0] = k;
        root->n = 1;
    } else{
        if(root->n==3 ) {
            Treenode *s = new TreeNode(false);
            s->child[0] = root;
            s-> split(child(0, root);
            int i=0;
            if (s->keys[0]<k) ++i;
            s-> child[i]->insertNonFull(k);
            root=s;
        } else
            root->insertNonFull(k);
    }
```

Deletion:

```
void delet(int k){
        int idx = find(k);
        if(idx<n && keys[idx]==k){
            if (leaf) removeFromLeaf(idx);
        else removeFromNonleaf(idx);
        }
```

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```
else {
    if(leaf) {
        cout<<" doesn't exist "<<k;
        return;
    }
    bool flag = ((idx==n)? true : false);
    if(child[idx]->n < 2) fill(idx);
    if(flag && idx >n)
        child[idx-1]->remove(k);
    else child[idx]->remove(k);
}
return;
}
```

Auxiliary Functions:

removeFromLeaf ⇒ shifts elements to left side after deletion.
removeFromNonLeaf → merges nodes after deletion
splitChild ⇒ splits a Node int children Nodes
insertNonFull ⇒ inserts key into Node