11/11/2020 B - tree insertion KARTHIK VENUGOPAL

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Pseudocode for insertion of an element in B-tree

```
BtreeInsertion (T, k)
r = root[T]
if n[r] = 2t - 1
    s = new Node()
    root[T] = s
    leaf[s] = false
    n[s] = 0
    c1[s] = r
    BtreeSplitChild (s, 1, r)
    BtreeInsertNonFull (s, k)
else BtreeInsertNonFull (r, k)

BtreeInsertNonFull (x, k)
i = n[x]
if leaf[x]
    while i ≥ 1 and k < key[i][x]
        key[i+1][x] = key[i][x]
        i = i - 1
    key[i+1][x] = k
    n[x] = n[x] + 1
```

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```
else while i >= 1 and k < x.c[i].key[0]
        i = i - 1
    i = i + 1
    if n[x.c[i]] == 2t - 1
        BTreeSplitChild(x, i, x.c[i])
        if k > x.key[i]
            i = i + 1
    BTreeInsertNonFull(x.c[i], k)
BTreeSplitChild(x, i)
BTreeSplitChild(x, i, y)
z = new Node()
leaf[z] = leaf[y]
n[z] = t - 1
for j = 1 to t - 1
    key[j][z] = key[j+t][y]
if not leaf[y]
    for j = 1 to t
        c[j][z] = c[j+t][y]
n[y] = t - 1
for j = n[x] + 1 to i + 1
    c[j+1][x] = c[j][x]
c[i+1][x] = z
```

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for $j = n[a]$ to i:

$key[j+1][a] = key[j][a]$

$key[i][a] = key[t][y]$

$n[a] = n[a] + 1$