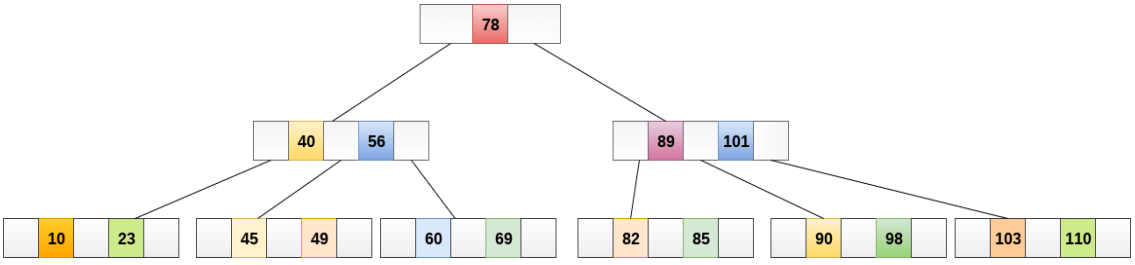
Operations on B Tree

1. Searching:

Searching in B Trees is similar to that in Binary search tree. For example, if we search for an item 49 in the following B Tree. The process will something like following :

1. Compare item 49 with root node 78. since 49 < 78 hence, move to its left sub-tree.
2. Since, 40<49<56, traverse right sub-tree of 40.
3. 49>45, move to right. Compare 49.
4. match found, return.

Searching in a B tree depends upon the height of the tree. The search algorithm takes O(log n) time to search any element in a B tree.



2. Insertion

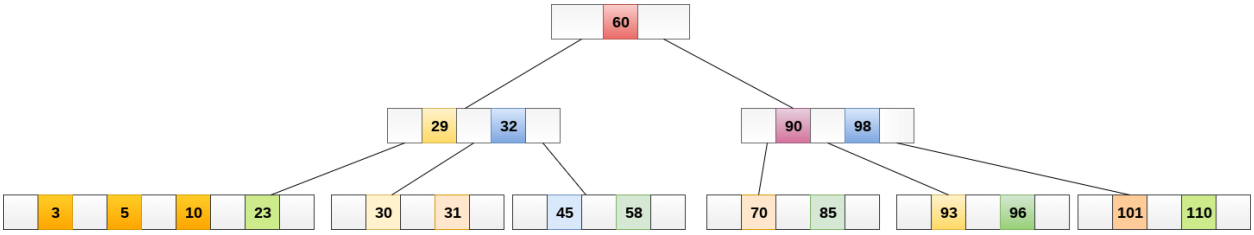
Insertions are done at the leaf node level. The following algorithm needs to be followed in order to insert an item into B Tree.

1. Traverse the B Tree to find the appropriate leaf node at which the node can be inserted.
2. If the leaf node contains less than m-1 keys, then insert the element in the increasing order.
3. Else, if the leaf node contains m-1 keys, then follow the following steps.

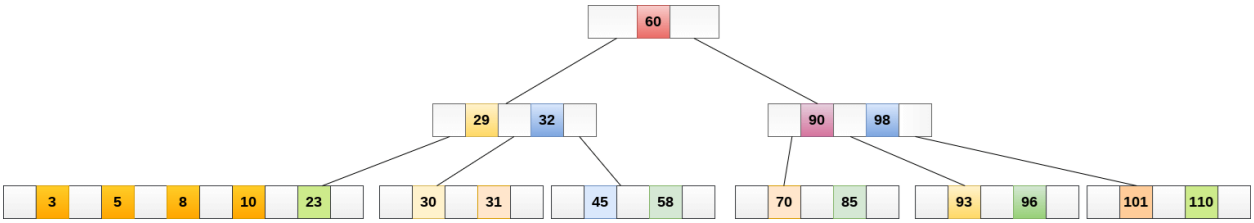
- Insert the new element in the increasing order of elements.
- Split the node into the two nodes at the median.
- Push the median element upto its parent node.
- If the parent node also contains m-1 number of keys, then split it too by following the same steps.

Example

Insert the node 8 into the B Tree of order 5 shown in the following image.



8 will be inserted to the right of 5, therefore insert 8.



The node, now contain 5 keys which is greater than (5 -1 = 4) keys. Therefore split the node from the median i.e. 8 and push it up to its parent node shown as follows.