EC330 HW 6

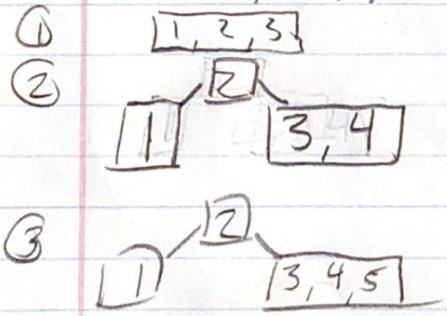
Chase Howie
U1871987
BZ

1a) In an AVL tree, the max # of child nodes w/ no siblings is $n/2$ at the most, where n is the # of total nodes. This is due to the fact that the difference between heights of left & right subtrees ≤ 1 for all n. Therefore, only-children of AVL trees have to be leaves, which have a unique parent node that isn't an only child. Thus, the max # of only-children is the same as the max # of leaves, $n/2$.

b) The order where elements are inserted into a B-tree does matter, due to the properties that insertion order affects which key(s) are pushed into a parent node(s) when a node split is necessary. This can be seen to be true in the following counterexample:

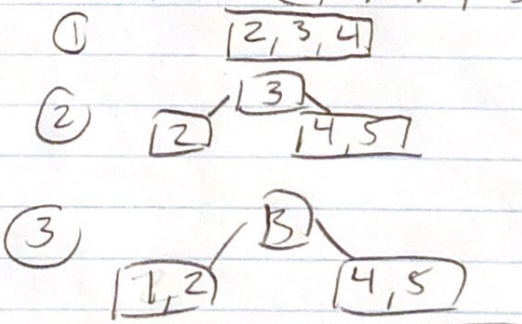
$m = 4$

Insert(1, 2, 3, 4, 5)



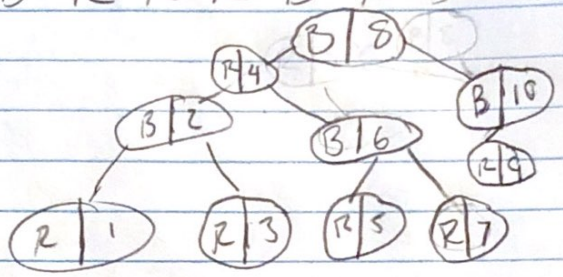
$m = 4$

Insert(2, 3, 4, 5, 1)



Order of insertion does matter

2a) In-order traversal of red-black tree on the set of nums 1→10 gives the colors
R B R R R B R B R B



b) post-order traversal of nums 1→10
where the colors are B B B R B B R B B B