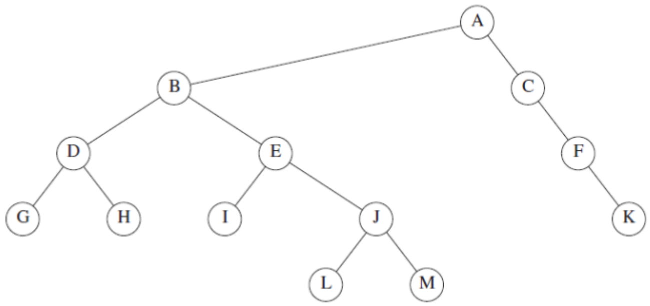
Noah Krill
Assignment 3



Part A

1. Which is the root node? A is the root node.
2. Which nodes are leaves? G, H, I, L, M, and K are leaves.
3. children of B? D and E are the children of B.
4. Who are the siblings of B? C is the only sibling of B.
5. What is the height of J? The height of J is 1
6. What is the depth of J? The depth of J is 3.
7. What is the height of the tree? -The height of the tree is 4
8. What is the depth of the tree? The depth of the tree is 4

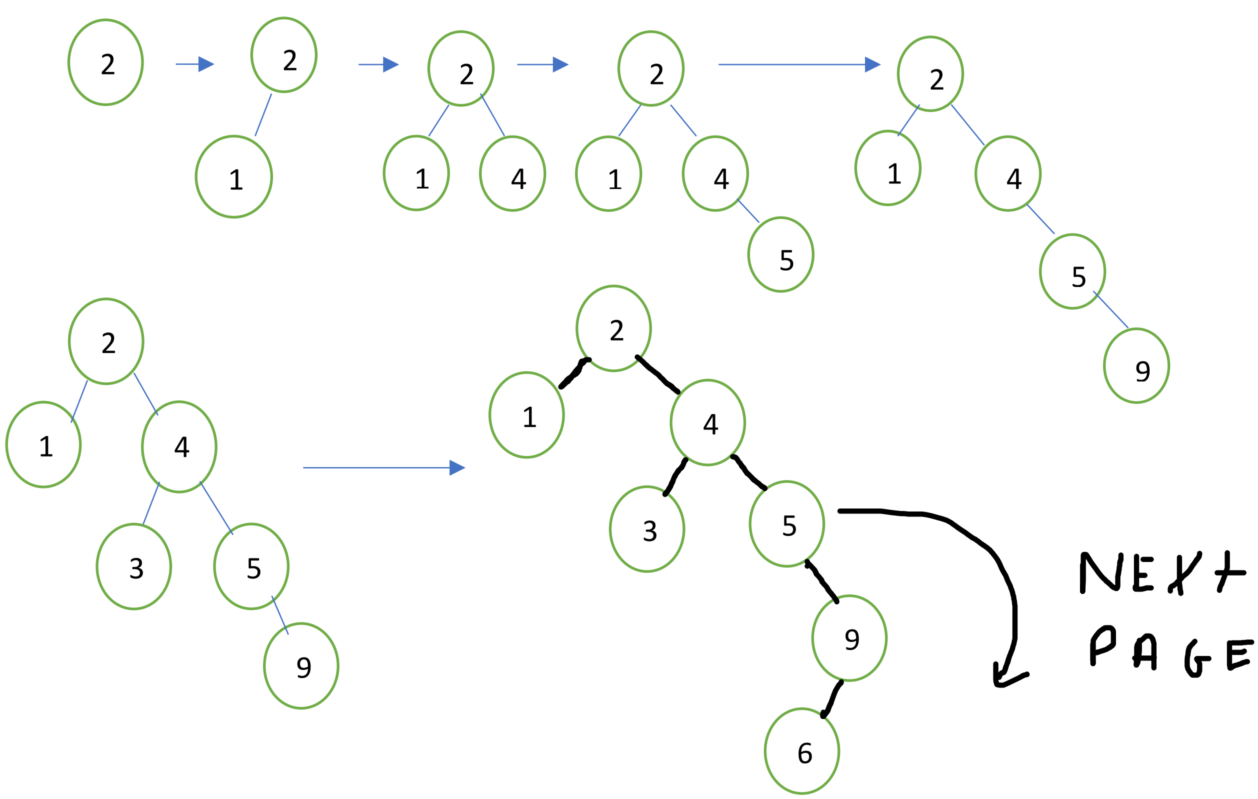
Part B

PreOrder traversal - a, b, d , g, h, e, i, j, l, m, c, f, k
inOrder traversal – g, d, h, l, j, m, I, e, b, a, c, f, k
PostOrder traversal – g, h, d, l, m, j, I, e, b, k, f, c, a

Part C

Show that in a binary search tree with n nodes, there are n+1 null links pointing representing children. The theorem is trivially true when h=0. Assume that this theorem is true for h= 1,2, 3,…, k. A tree of height k + 1 can have two subtrees of height at most k. These can have at most 2 ^(k+1)– 1 nodes each by the induction hypothesis. These 2 ^(k+2)- 2 nodes plus the root prove the theorem for height k + 1 and hence for all heights.

Part D



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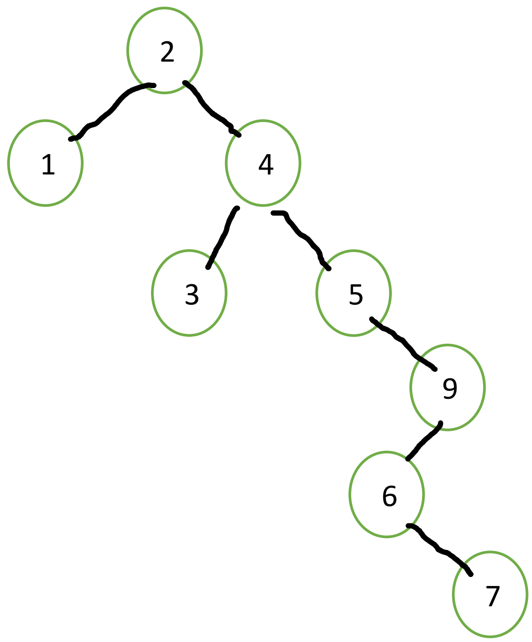
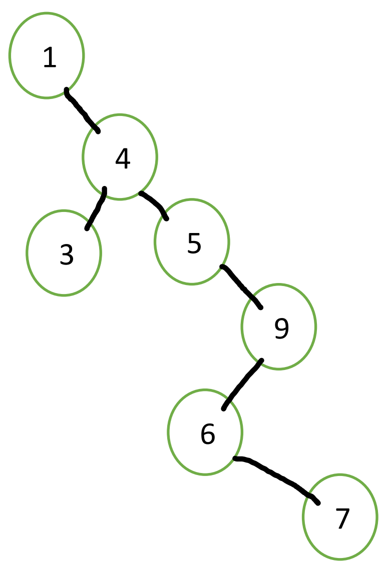


Remove the root node of 2



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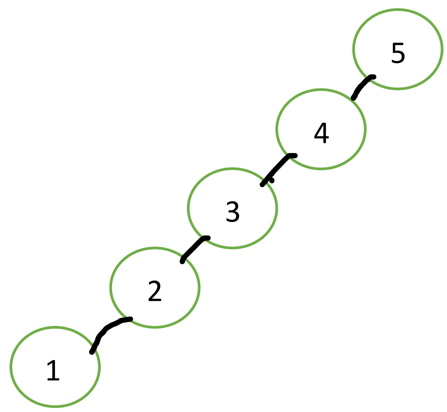
What's the worst case for the binary search tree to find the minimum value? Well the average case would be O(log(n)) but the worst-case would be O(N) because it may be set in a way from longest to shortest.

Ex. It would have to iterate through all five to get to 1.



Part E.
Insert 2, 1, 4, 5, 9, 3, 6, 7 on AVL Tree.
In short when there is more then a one depth difference on either side of the tree, you have to change the root node and move the tree around to make it even or at least one depth difference on either side.