

CSE 101
Spring 2021
Quiz 4

Solutions

1. (20 Points) Let T be an empty Binary Search Tree. Insert the following keys: 5, 9, 7, 2, 6, 4, 8, 3, 1, 10 (in order) into T . The BST algorithms can be found [here](#).

- a. (5 Points) Give the keys in the order printed by a **pre-order tree walk**.

Solution: 5, 2, 1, 4, 3, 9, 7, 6, 8, 10

- b. (5 Points) Give the keys in the order printed by a **post-order tree walk**.

Solution: 1, 3, 4, 2, 6, 8, 7, 10, 9, 5

Delete the following keys: 5, 9, 4 (in order) from T .

- c. (5 Points) Give the keys in the order printed by a **pre-order tree walk**.

Solution: 6, 2, 1, 3, 10, 7, 8 (corrected!)

- d. (5 Points) Give the keys in the order printed by a **post-order tree walk**.

Solution: 1, 3, 2, 8, 7, 10, 6 (corrected!)

(See next page for problem 2)

2. (30 Points) Let T be a Binary Search Tree containing the keys $\{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13\}$. Suppose that a **pre-order tree walk** prints the keys in order: 2, 1, 12, 10, 8, 7, 5, 4, 3, 6, 9, 11, 13, and that a post-order tree walk prints the keys in order: 1, 3, 4, 6, 5, 7, 9, 8, 11, 10, 13, 12, 2. Determine the structure of T . (Hint: each of the two tree walks uniquely determines the structure of T . Both walks are given here just so you can verify your result.) Display your answer either by drawing a picture of the tree, or by constructing a table giving, for each node, its parent node.

Picture:

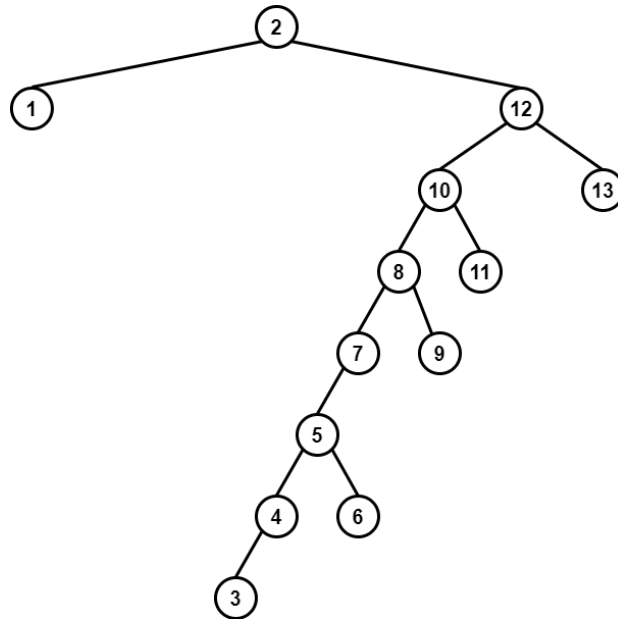


Table:

Node	Parent
1	2
2	Nil
3	4
4	5
5	7
6	5
7	8
8	10
9	8
10	12
11	10
12	2
13	12