1. 4.6

Base case (A nonempty tree which height is 2):

#full node is 1

#leaves is 2

$1 + 1 = 2$

Induction case;

Assume there are two nonempty tree t_1, t_2, for some $\#leaves$ and $\#full\ nodes$ of t_1 are i, j and $\#leaves$ and $\#full\ nodes$ of t_2 are k, l, which $i = j + 1$ and $k = l + 1$.

Add t_1, t_2 and two children of a new root.

Then $\#full\ node$ of new tree is $j + l + 1$, $\#leaves$ of new tree is $i + k$

Because $i + k = j + 1 + l + 1 = j + l + 2$, $i + k = (j + l + 1) + 1$ (by IH)

So $\#leaves\ =\ \#full\ nodes\ +\ 1$

2. 4.8

I. Prefix

a. - * * a b + c d e

b. -

- Predecessor - null
- Successor - *

c. c

- Predecessor - +
- Successor – d

II. infix

a. a * b * c + d - e

b. -

- Predecessor - d
- Successor - e

c. c

- Predecessor - *
- Successor - +

III. Postfix

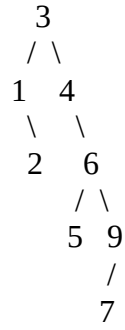
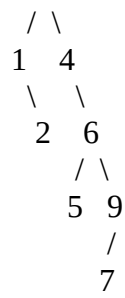
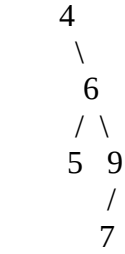
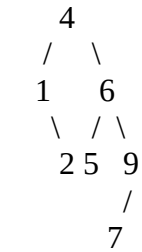
a. a b * c d + * e -

b. -

- Predecessor - e
- Successor - null

c. c

- Predecessor - *
- Successor – d

3. 4.9
    a.

    b. Remove 3

Put 4 with his right child as new root and right child

Put original left child as new left child


2. 1. 4. 5. 9. 3. 6. 7

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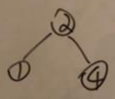
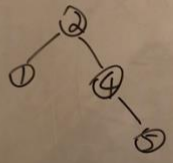


2. 1. 4. 5. 9. 3. 6. 7



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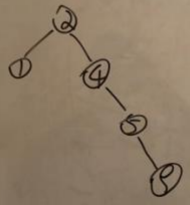
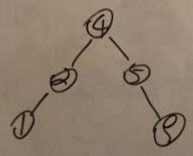


RR

2. 1. 4. 5. 9. 3. 6. 7



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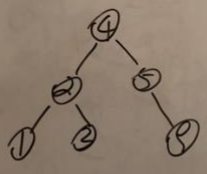
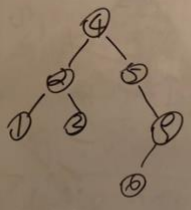
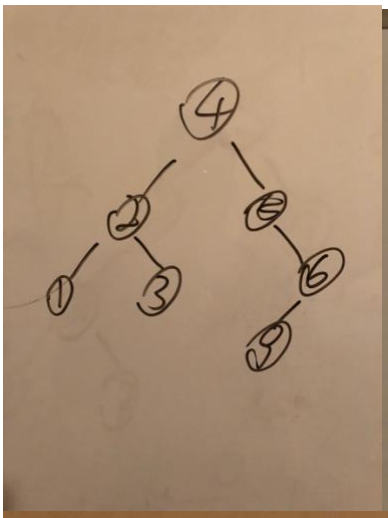
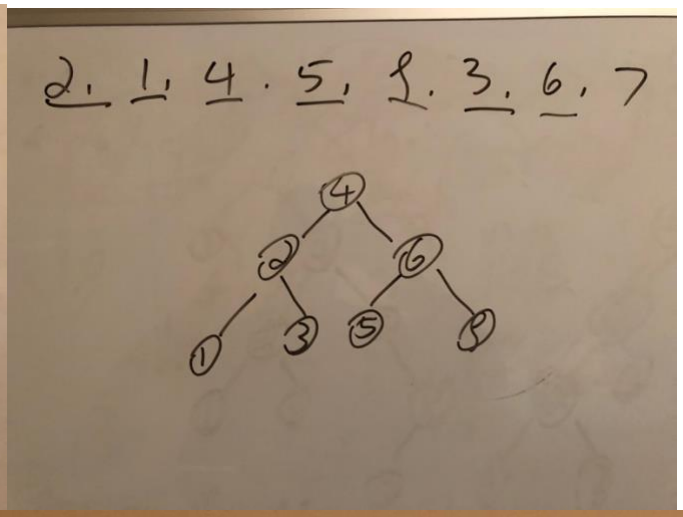


2. 1. 4. 5. 9. 3. 6. 7



RL


4
2
6
1
3
9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4
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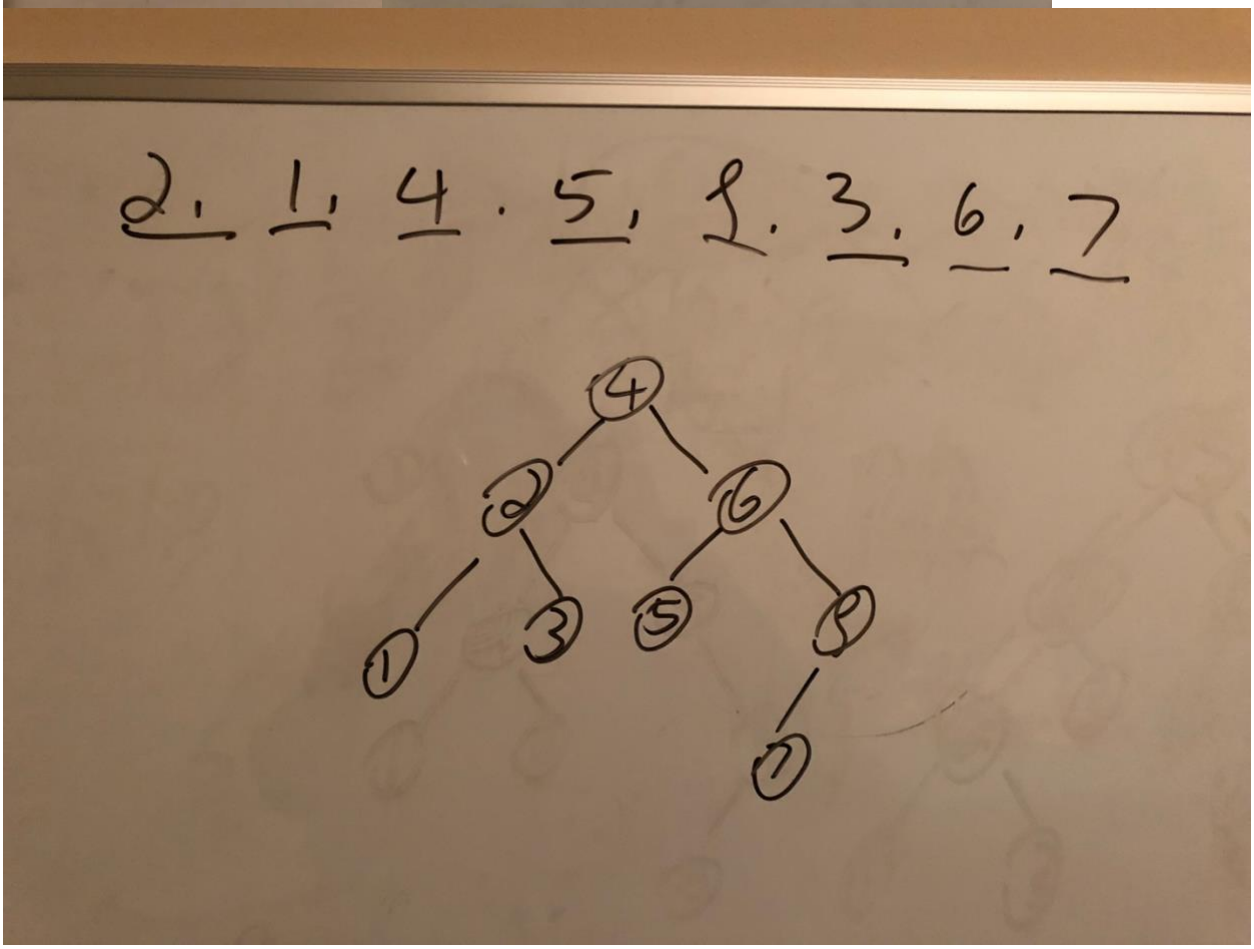
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