

Assignment 9: Self-balancing BSTs

1. Construct a binary search tree from given elements and perform the right rotation around root and print pre-order traversal.

Input: (n, {x_i})

7

20 40 10 5 15 1 7

Output:

1 5 7 10 15 20 40

10 5 1 7 20 15 40

2. Construct a binary search tree from given elements and perform the left rotation around root and print pre-order traversal.

Input: (n, x_i)

6

50 69 90 99 57 31

Output:

31 50 57 69 90 99

69 50 31 57 90 99

3. Construct an AVL search tree by inserting the following elements in the order of their occurrence. Print pre-order traversal.

Input: (T, n_i, {x_i})

2

8

64 1 14 26 13 110 98 85

6

10 20 30 40 50 25

Output:

14 1 13 64 26 98 85 110

30 20 10 25 40 50

4. Delete k elements from AVL tree. Print pre-order traversal.

Input: (n, {x_i}, k, {x'_i})

9

9 5 10 0 6 11 -1 1 2

5

10 5 -1 6 11

Output:

9 1 0 -1 5 2 6 10 11

1 0 -1 9 5 2 6 11

1 0 -1 9 6 2 11

6 1 0 2 9 11

9 1 0 2 11

1 0 9 2

5. Insert k elements into splay tree. Print pre-order traversal.

Input: (T, n, {x_i})

6
100 50 200 40 30 20
3
25 55 35

Output:

25 20 50 30 40 100 200
55 50 25 20 30 40 100 200
35 30 25 20 40 50 55 100 200

6. Search k elements in splay tree. Print pre-order traversal.

Input: (T, n_i, {x_i})

6
100 50 200 40 30 20
3
20 40 50

Output:

20 50 30 40 100 200
40 30 20 50 100 200
50 40 30 20 100 200

7. Delete an element x' from splay tree.

Input: (n, {x_i}, x')

6
4 2 6 57 1
6

Output:

5 4 2 1 7