Assignment 11: 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
   ```