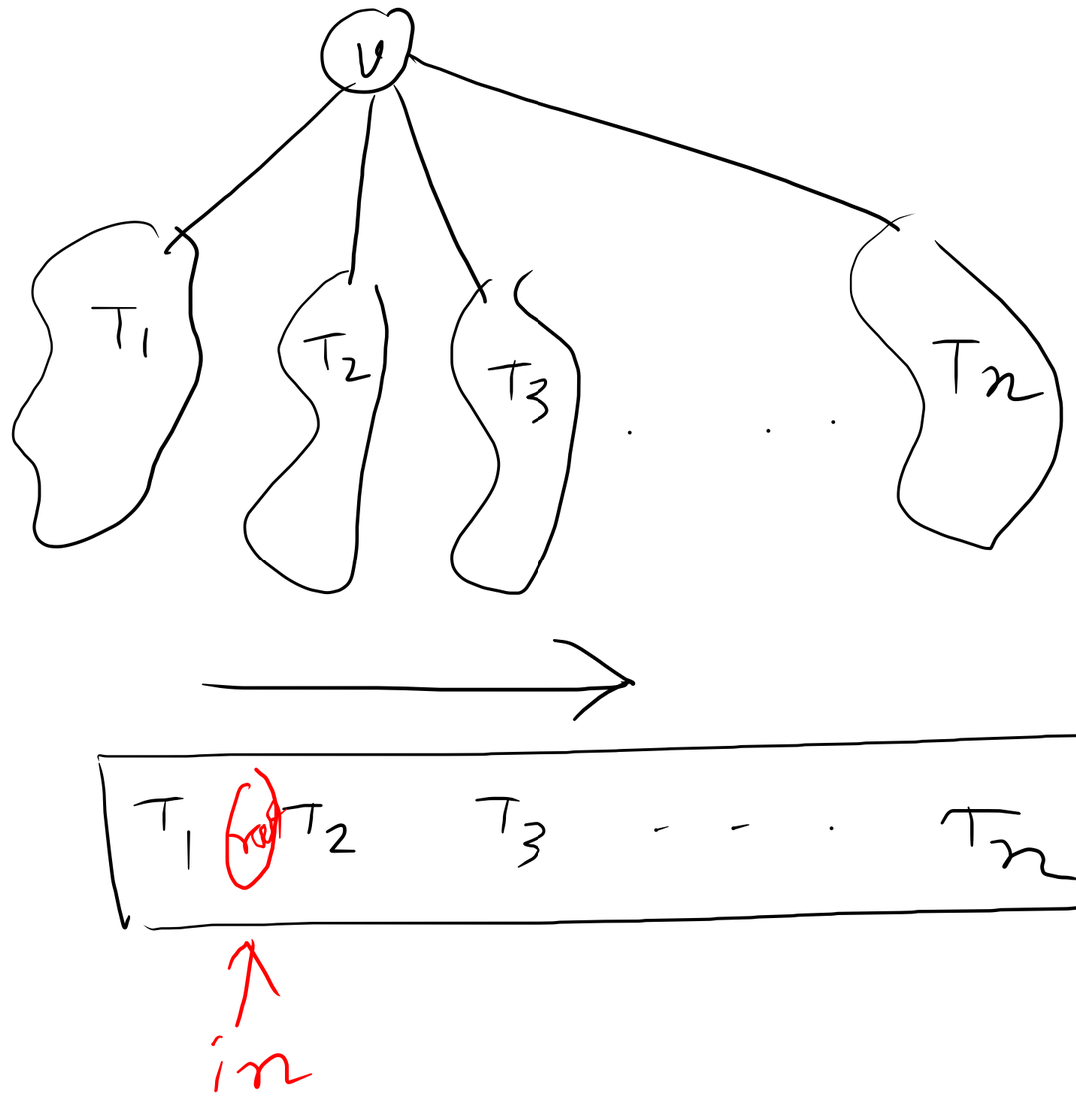
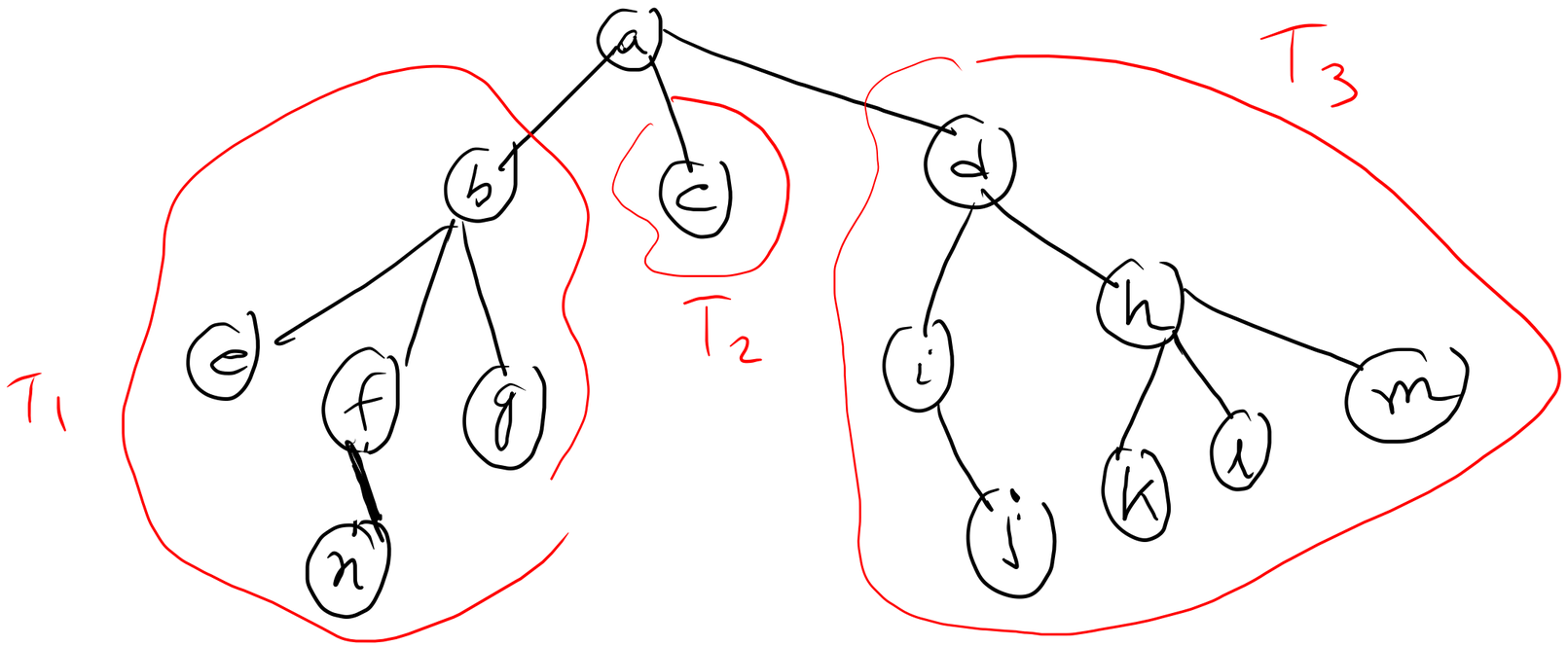
Tree traversals

- Preorder ✓✓
- Inorder
- Post order





Postorder:

T_1 T_2 T_3 a

Preorder: a b e f n g c d i j h k l m

Inorder: T_1 a T_2 T_3

T_{11} b T_{12} T_{13} a T_2 T_3

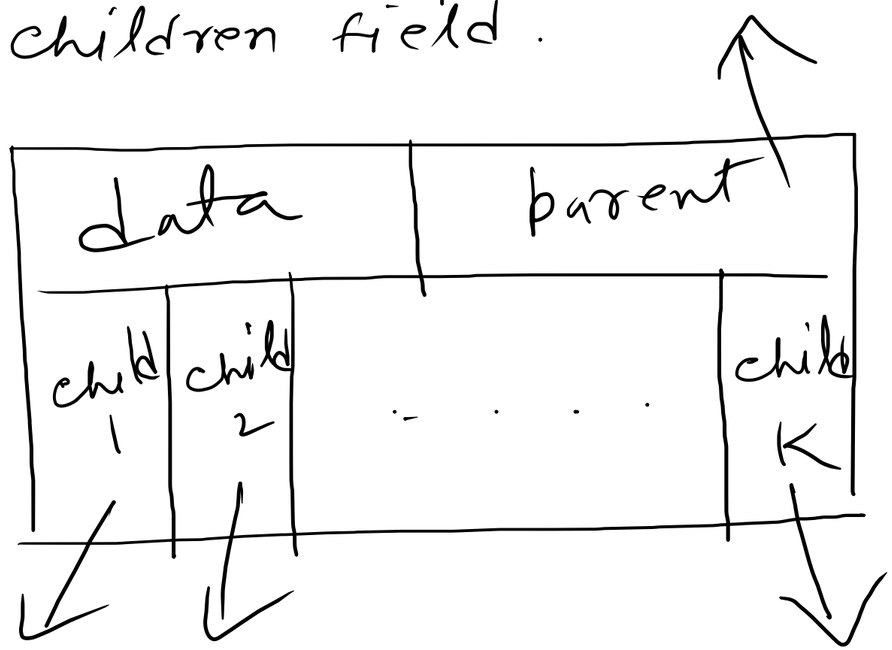
e b f n g a c

Structure of a node;

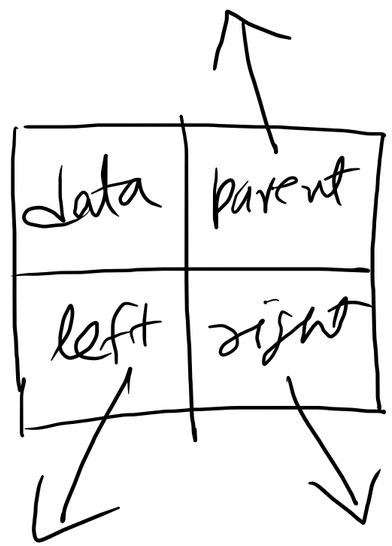
Linked List.

General node

A tree node with a single data field and a parent and at most K children field.



Binary tree



Binary Search Tree

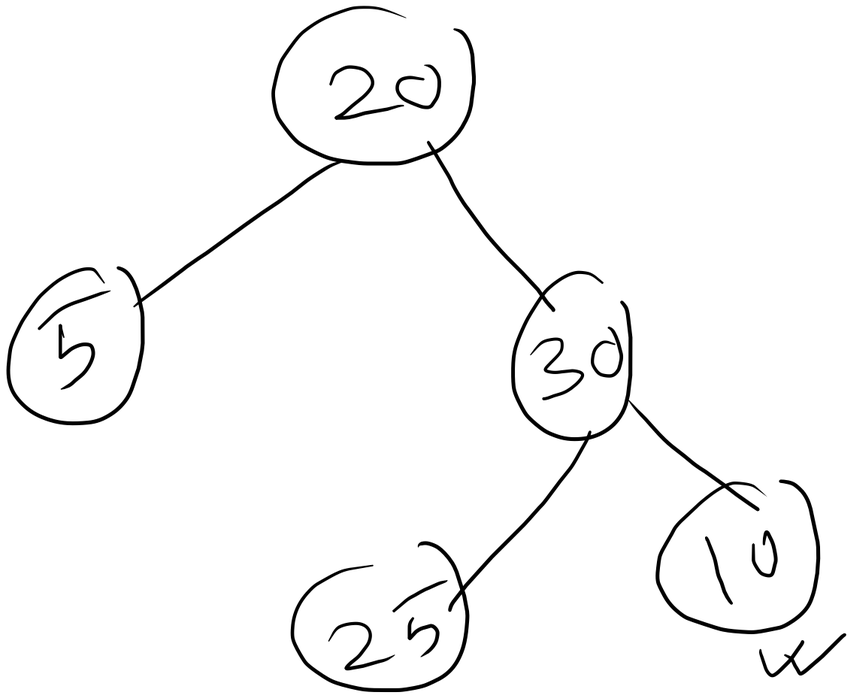
A binary tree is called a binary search tree (BST) if it satisfies the following.

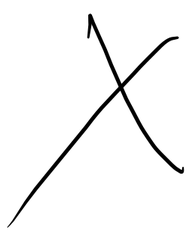
for every node x let y be its left child and z be its right child

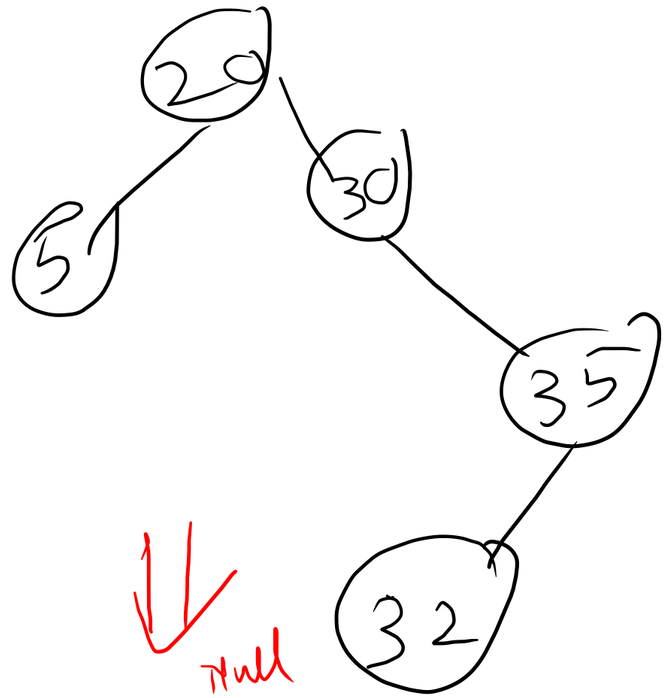
the key value of $x \geq$ the key value of y

and the key value of $x <$ the key value of z

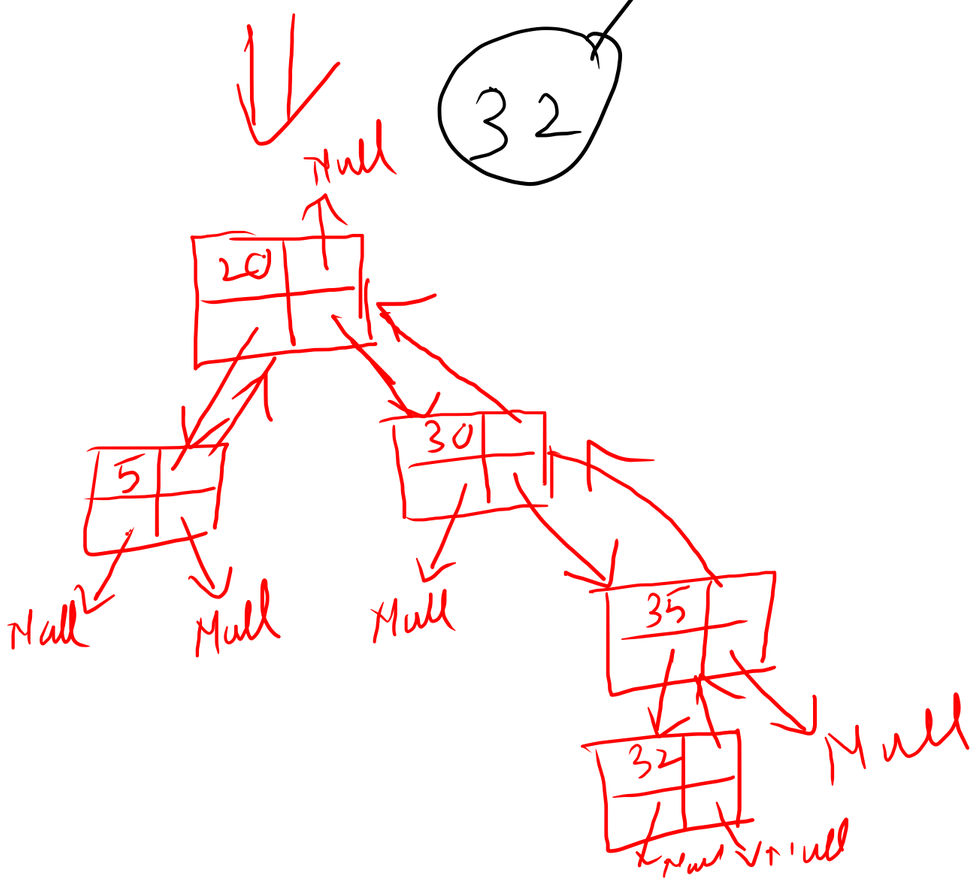
Ex^m







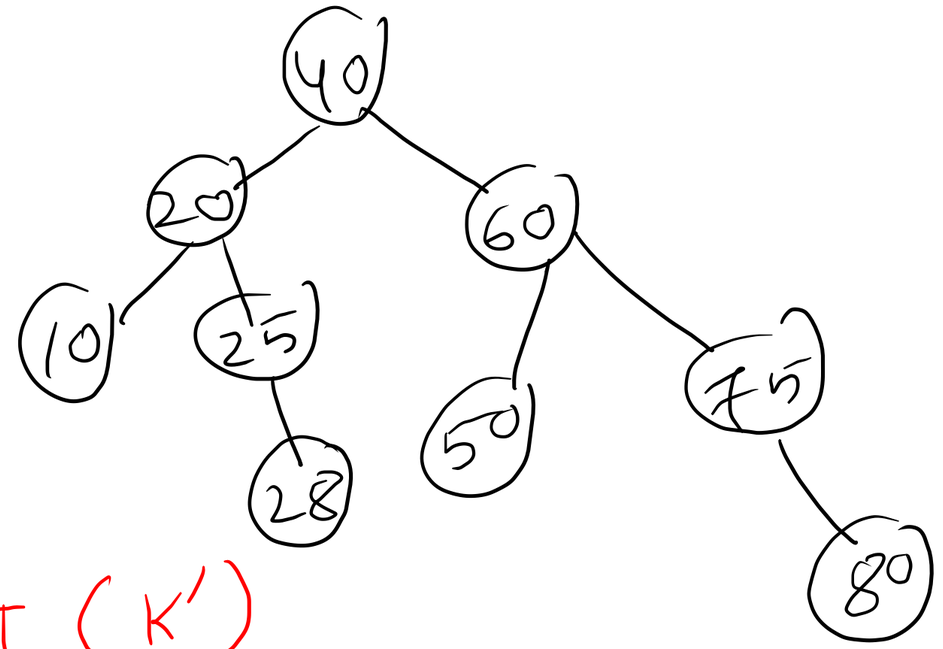
p, left
right



BST traversal

In-order traversal:

```
Inorder (T, x)                          —— T(n)
 if  x ≠ Null                           —— θ(1)
     |   Inorder (T, x.left)            —— T(K')
     |   Process (x)                    —— θ(1)
     |   Inorder (T, x.right)           —— T(K'')
```

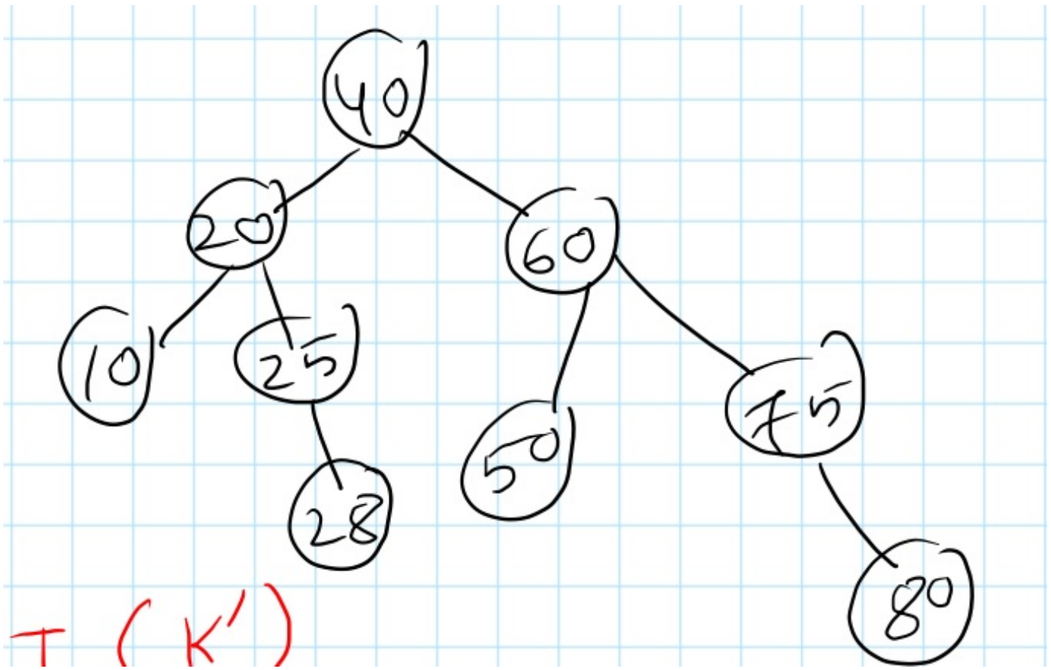


$K' + K'' = n - 1$

$T(n) = T(K) + T(n-K-1) + \theta(1)$

Apply substitution: $T(n) = O(n)$

} H.W.



T (K')

10, 20, 25, 28, 40, 50, 60, 75, 80

Inorder gives sorted order.