Binary Search & Trees

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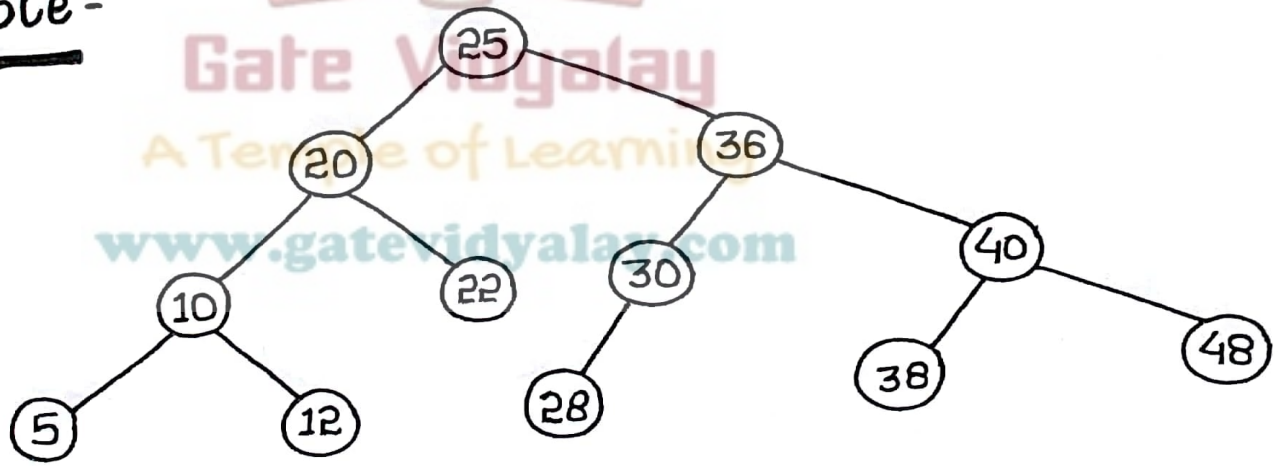
Definition-

Binary Search Tree (BST) is a special kind of binary tree in which every node contains smaller values only in its left subtree and only larger values in its right subtree.

Example-



Number of distinct BSTs with 'n' distinct keys -

$$\frac{{}^{2n}C_n}{n+1}$$

Example-

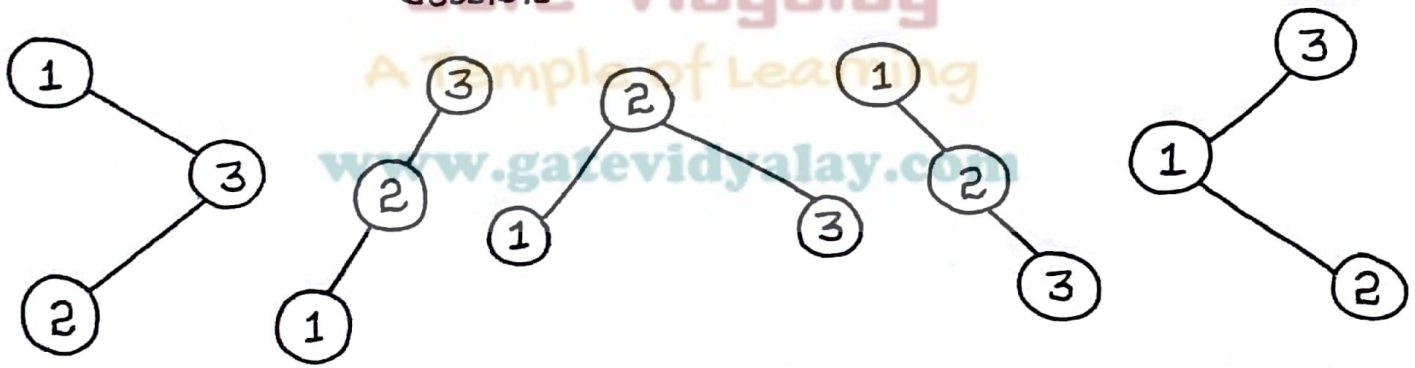
Number of distinct Binary search Trees with 3 distinct keys

$$= {}^{2\times3}C_3 \,/\, 3+1$$

$$= 5$$

Consider three distinct keys are - 1 , 2 , 3

Possible BSTs are -



Construction of BST -

Question -

Construct a Binary Search Tree (BST) for the following sequence of numbers -

50 , 70 , 60 , 20 , 90 , 10 , 40 , 100

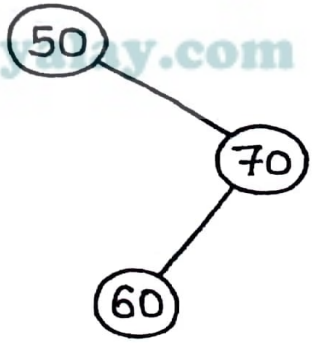
Solution -

When elements are given in a sequence, we consider the first element as the root node.

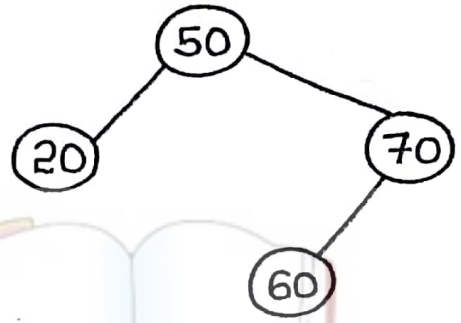
- **Insert 50 -**

- **Insert 70 -**

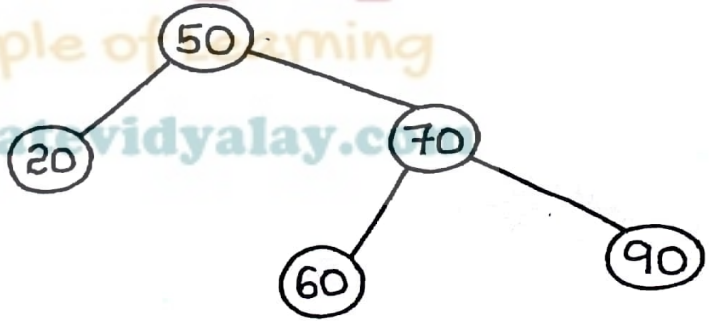
- **Insert 60 -**



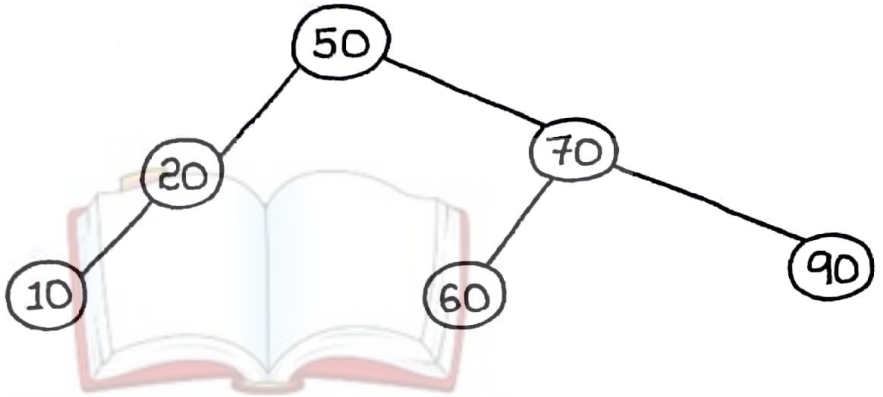
- Insert 20 -



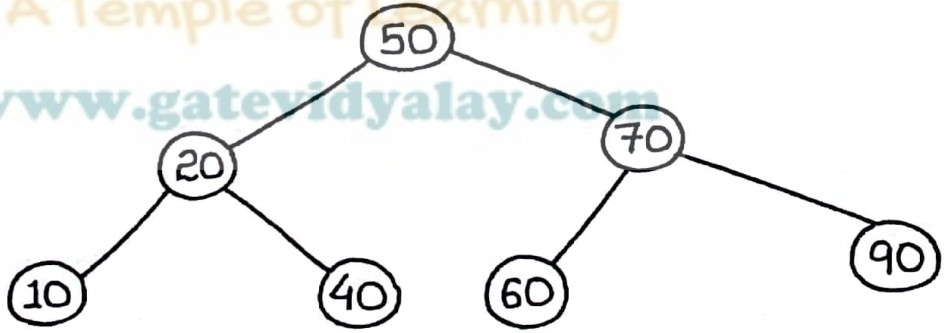
- Insert 90 -



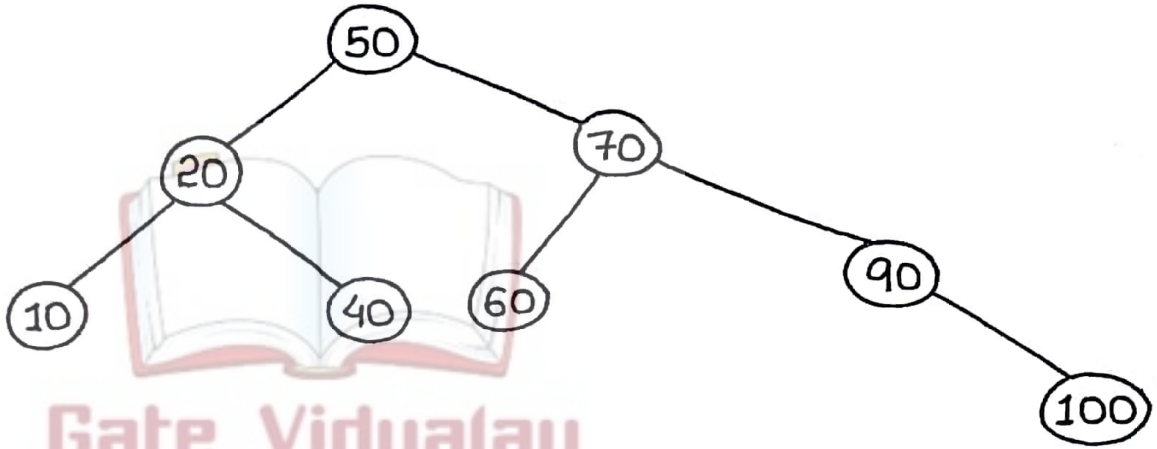
- Insert 10 -



- Insert 40 -



- **Insert 100 -**



This is the required Binary Search Tree.