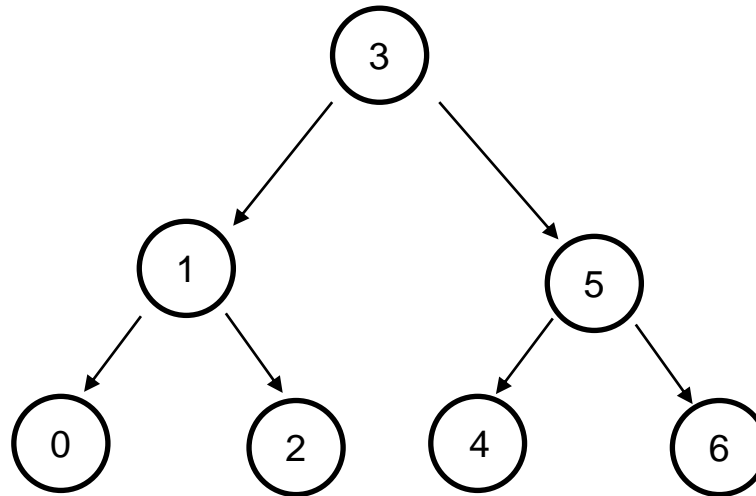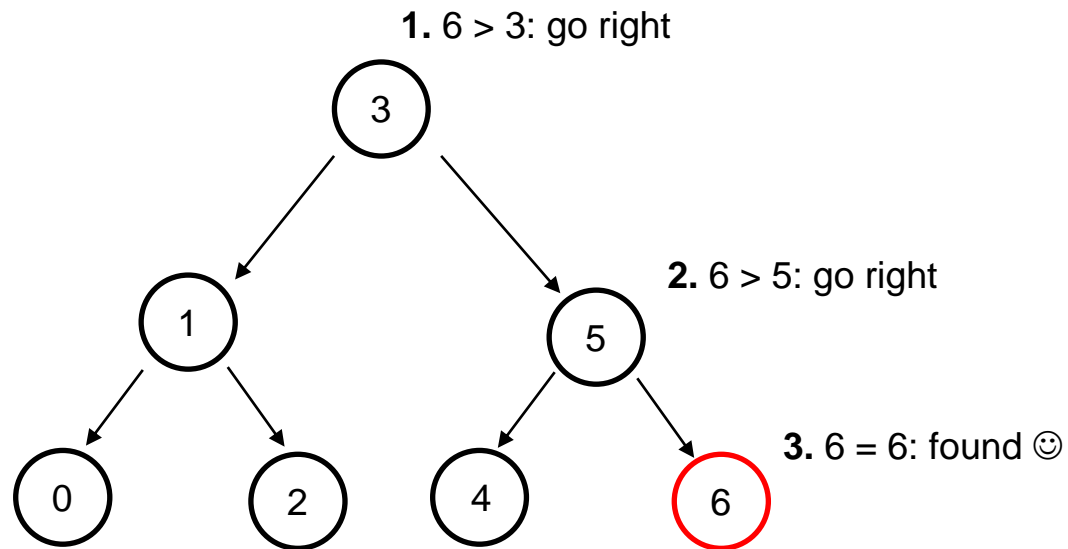# Week2 Exercise

Binary Search Tree
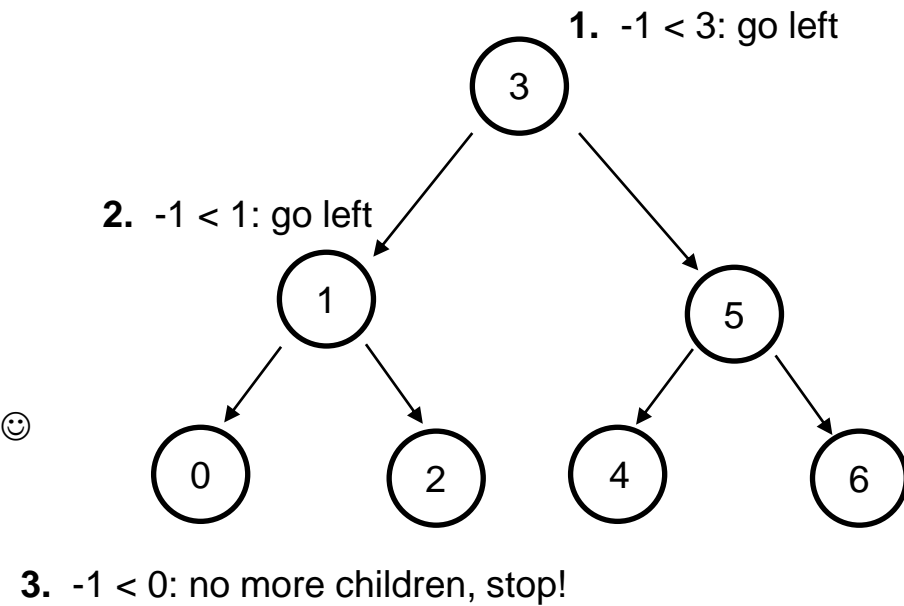
Search by value

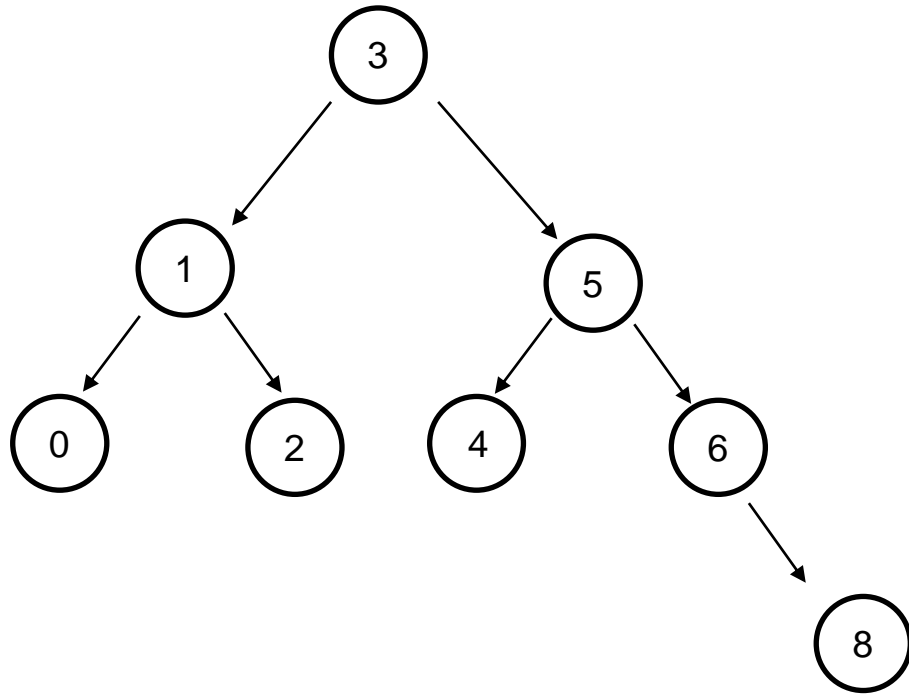- Search for value 6   Search for value -1

1. 6 > 3: go right   **1.** -1 < 3: go left

(3)   (3)

2. 6 > 5: go right   **2.** -1 < 1: go left

(1)   (5)   (1)   (5)

3. 6 = 6: found ☺

(0)   (2)   (4)   (6)   (0)   (2)   (4)   (6)

                                        3. -1 < 0: no more children, stop!
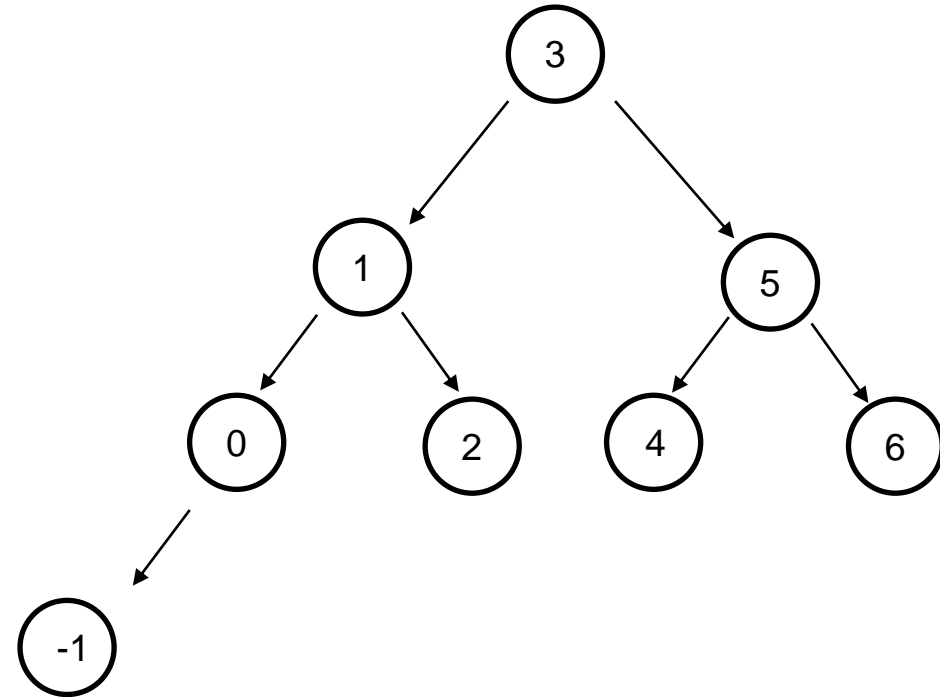
Insert new node

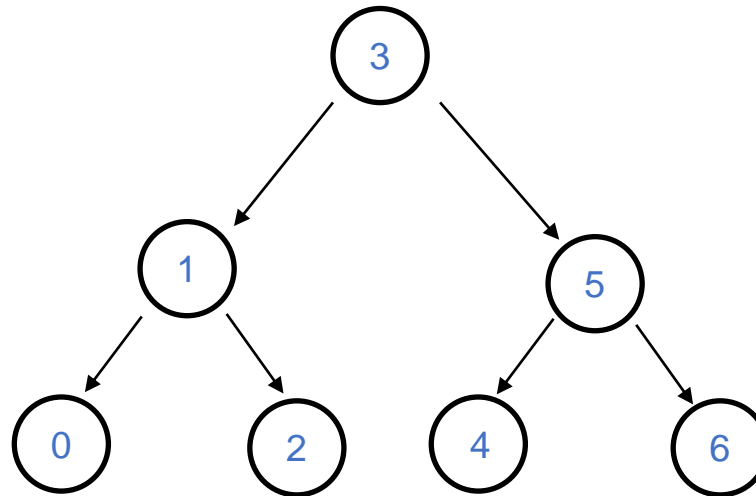- Insert one node with value 8   Insert one node with value -1

Tree traversal

In-order
Left -> Root -> Right
Result : 0 1 2 3 4 5 6

Pre-order
Root -> Left -> Right
Result : 3 1 0 2 5 4 6
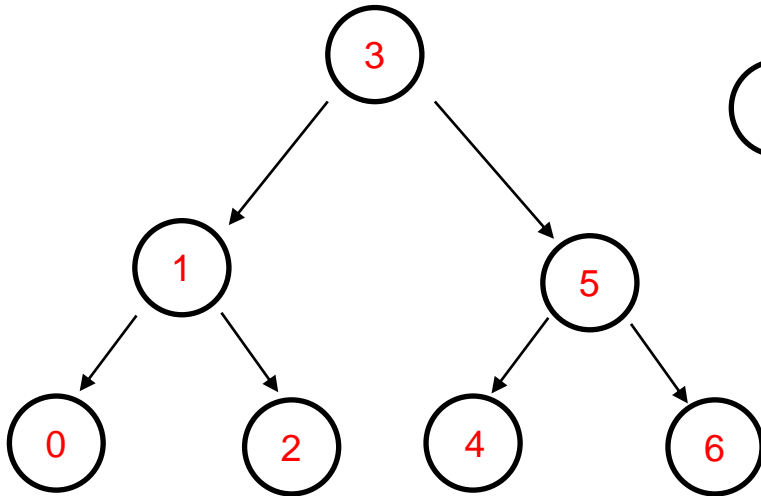
Post-order
Left -> Right -> root
Result : 0 2 1 4 6 5 3
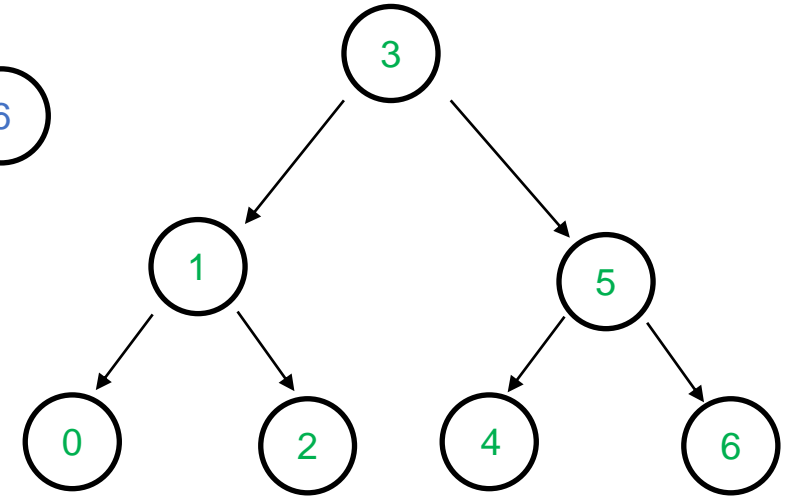
Input Format

Command	Description	Notes
i val	Insert value "val" into BST	
s val	Search value "val" in BST	
p	Inorder traverse the BST and print out the result	
m	Print out Min and Max values	
r low high	Print out all the values within [low,high]	
t	Show the tree structure of the BST	Debug purpose, there is no 't' in testcase

```
i 3
i 1
i 5
i 0
i 2
i 4
i 6
p
s 2
s 8
m
r 1 6
```

Output Format and Verify

- Output

```
0 1 2 3 4 5 6
Search 2: Found
Search 8: Not Found
Max: 6, Min: 0
Nodes in range [1, 6]: 1 2 3 4 5 6
```

- Execute

  ./BST case<num>.txt   make

  ./gen_golden_ans case<num>.txt   make check_ans

  - If Error message appears <Permission Denied>
    - chmod +x gen_golden_ans