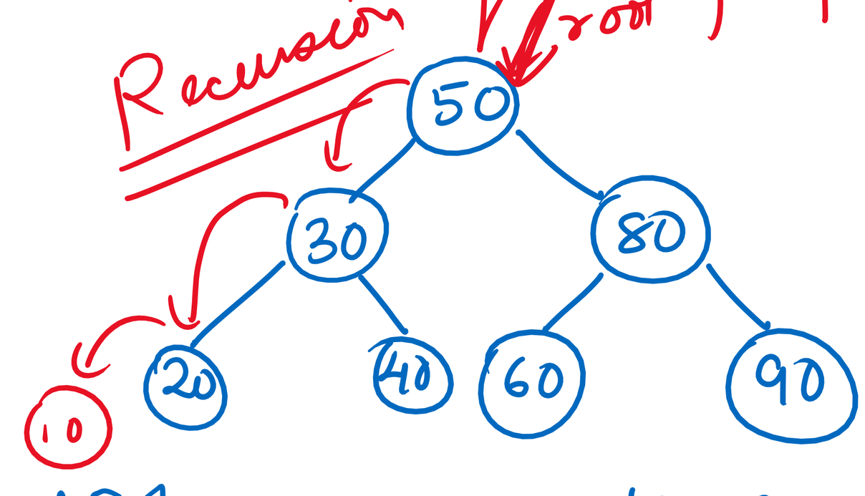
Binary Search Trees : (BST) (L<N<R)

It is a special type of Binary Tree where each node follows a unique property. { Left < Node < Right }

Recursion, root



(90) (10)

(i) Insert → log(n)
(ii) Search → log(n)
(iii) Delete

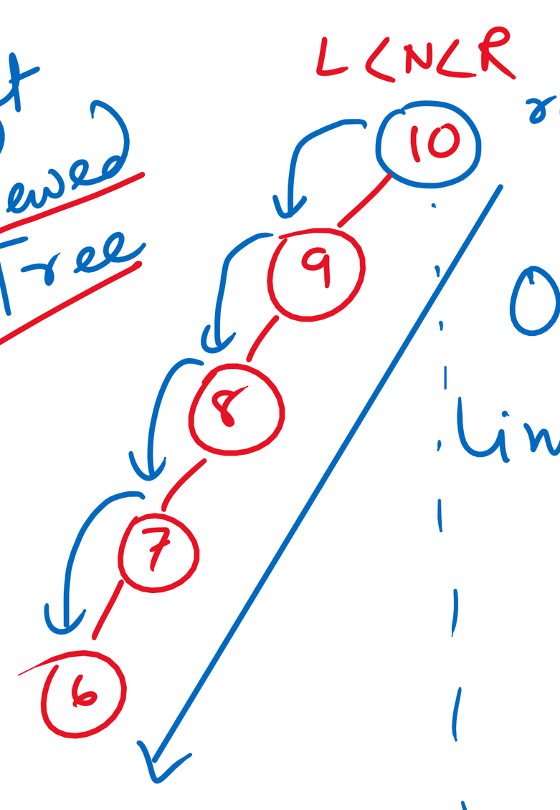
(In-order:) Ascending Order

int[] arr1 = 10, 9, 8, 7, 6
int[] arr2 = 6, 7, 8, 9, 10

BST → height is not balanced.

(x)

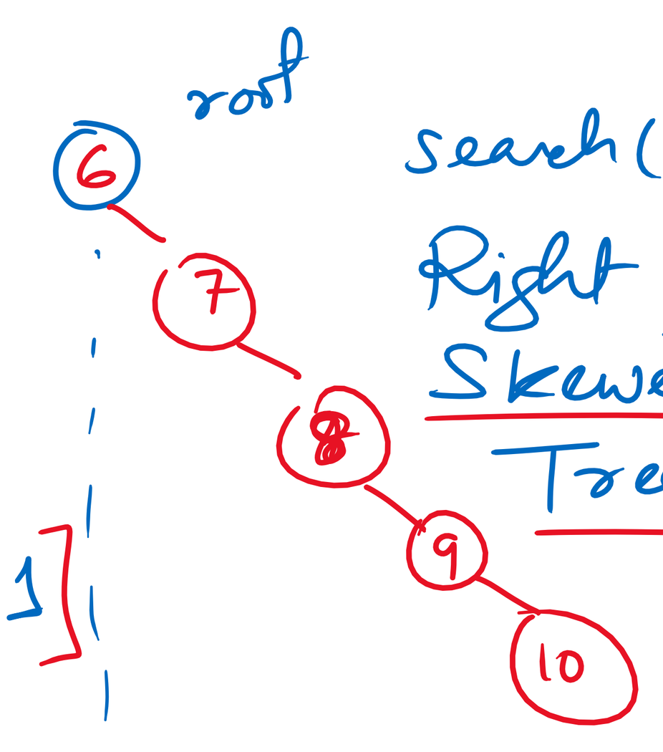
Left Skewed Tree — L<N<R, root, Search(6)

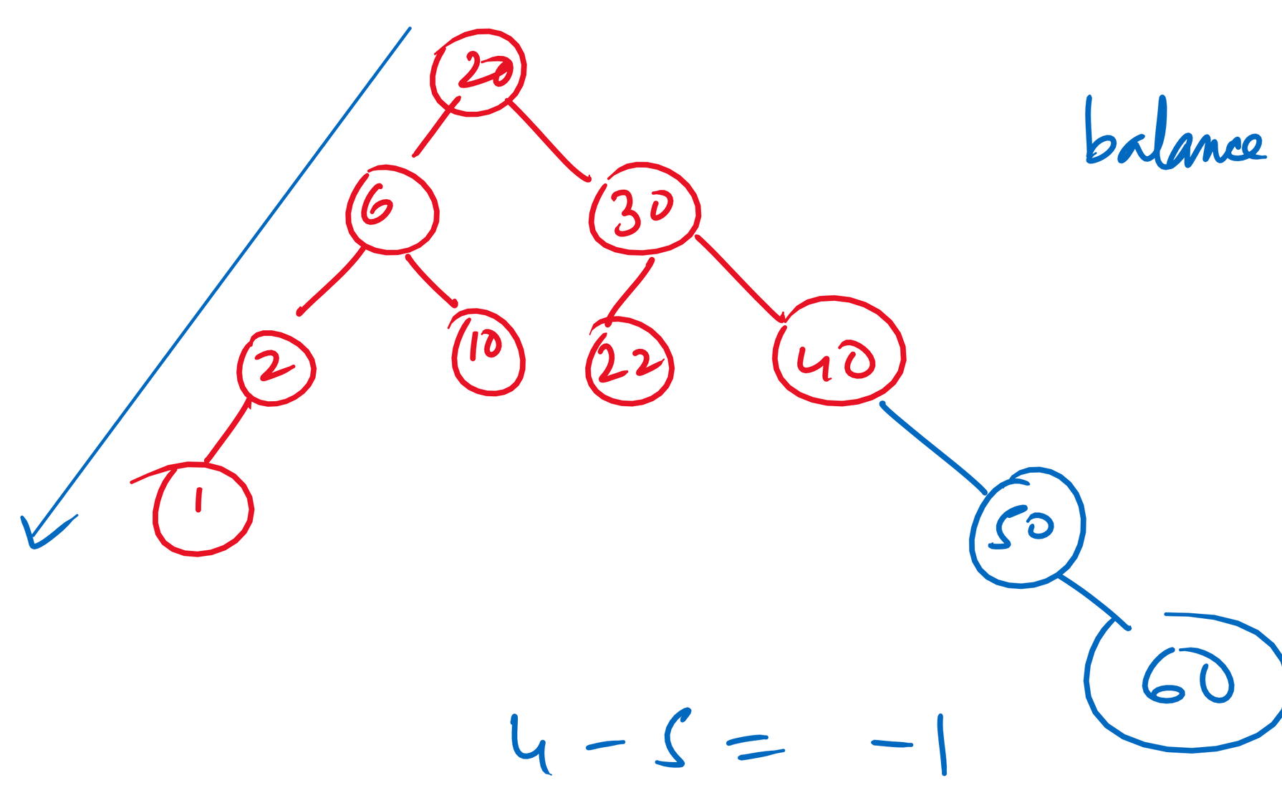


O(n) Linked list

Balance Factor
lh − rh
[0 & ±1]

root, search(10), Right Skewed Tree





balance factor = lh − rh
4 − 3
= 1

4 − 5 = −1

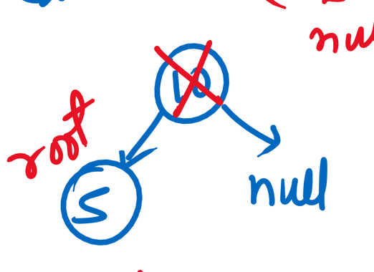
[(0 & ±1)]

BST → not strictly balanced.
→ AVL Tree
→ Red Black Tree] strictly h b.

Delete Operation in BST

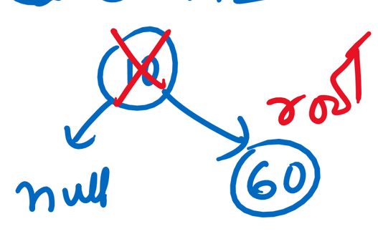
Case A : Node with only 1 children.

Case A1 (right is null)



Tree temp = r.l
root = null
return temp

(left is null) Case A2



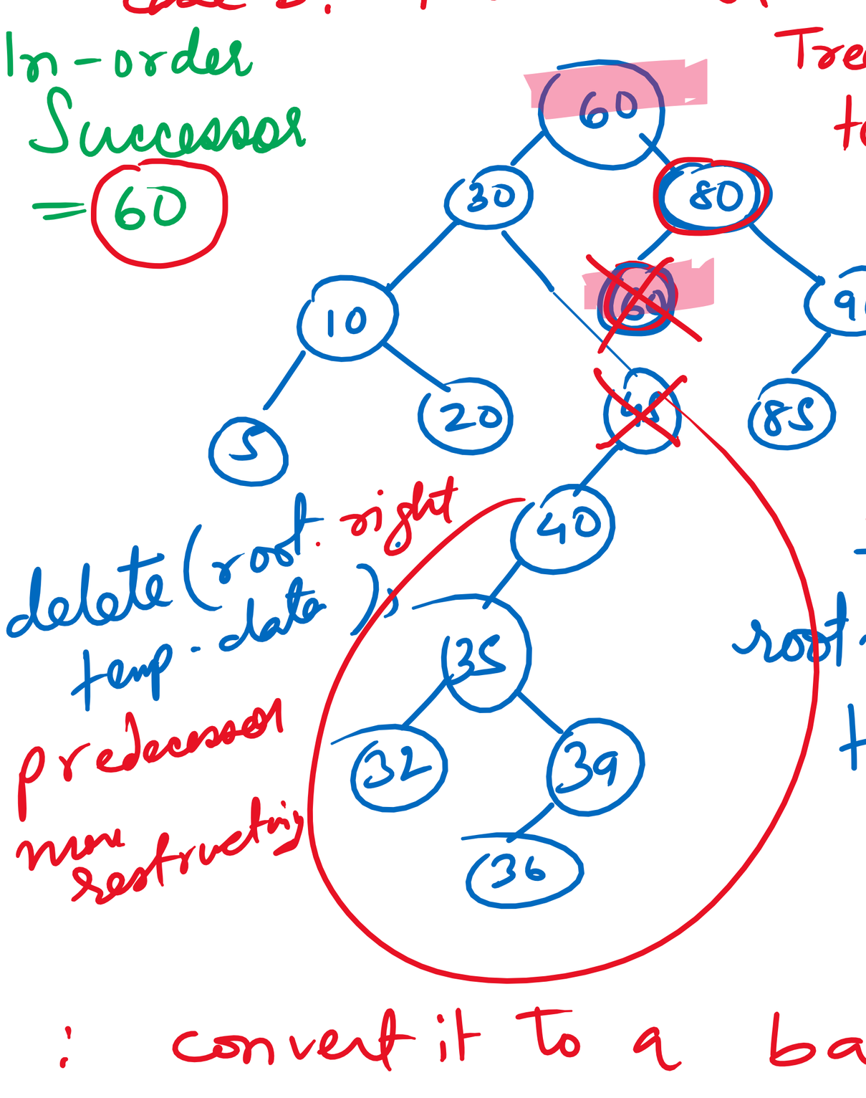
Tree temp = r.r
root = null
return temp

5, 10, 20, 30, 32, 35, 36, 39, 40, (45), (50), 60, 80, ...

Case B: Node with 2 Children

In-order Successor = (60)

TreeNode temp = r.r
findmin (80)



delete(root.right, temp.data)
predecessor
more restructuring

temp = 60;
root.data = temp.data;

* Given a sorted array : convert it to a balanced BST.

arr = { 1, 2, 3, 4, (5), 6, 7, 8, 9 } 10 (indices 0 1 2 3 4 5 6 7 8; s … mid−1 mid mid+1 … e; rec, rec)

(5)

root = arr[mid]

m = (s+e)/2 = 8/2 = 4

e, s, 0 — corner edge base case

(OOB) s > e

s + (e − s)/2

⇒ (2s + e − s)/2 = (s+e)/2

$2^{31} - 1$ Int Max
-2^{31} Int Min

(JDK) .exe
→ path (env vars)

JRE
Java Runtime Environment

(main Unit Testing)

WORA

java docs + javac — compiler — .class File

.java compiled .class (byte code)

(jit) just in time compiler

JVM

.class — .java

* How will you check whether a no is a power of 2?

2: 0010 true
5: 0101 false
8: 1000 true; 0111; 0000

if ( ) n & (n−1) == 0 &
else ( )

6: 0110 false
9: 1001 false
16: 10000 true; 01111; 00000

* Tries
* Back Tracking
* Heaps
* Graphs
* Dynamic Programming
* Greedy Algorithms

* Exception Handling
* File Handling & Input / Output Operations

Storage Class
static — globally
extern
register
auto

p (static — in c) s v m ( ) {
}

C+ (SIMULA) = C++ ?
C+ C++ = Java ?

Bjarne (Bjoy) Stroustrup → Denmark

Java 1995 James Gosling

Python 1991 Guido Van Rossum

Scala [(Ecma Script) → ES-6]

[[Spring Boot] → Java]
React → JS