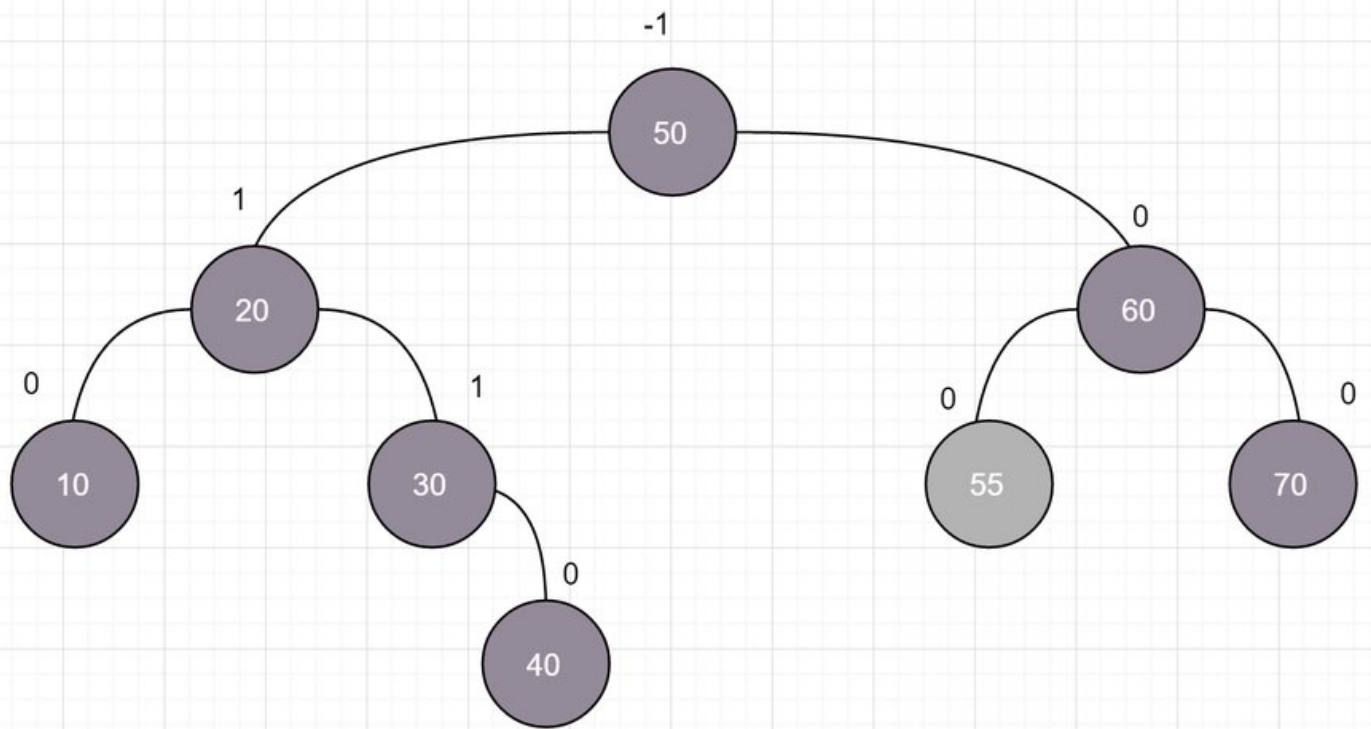
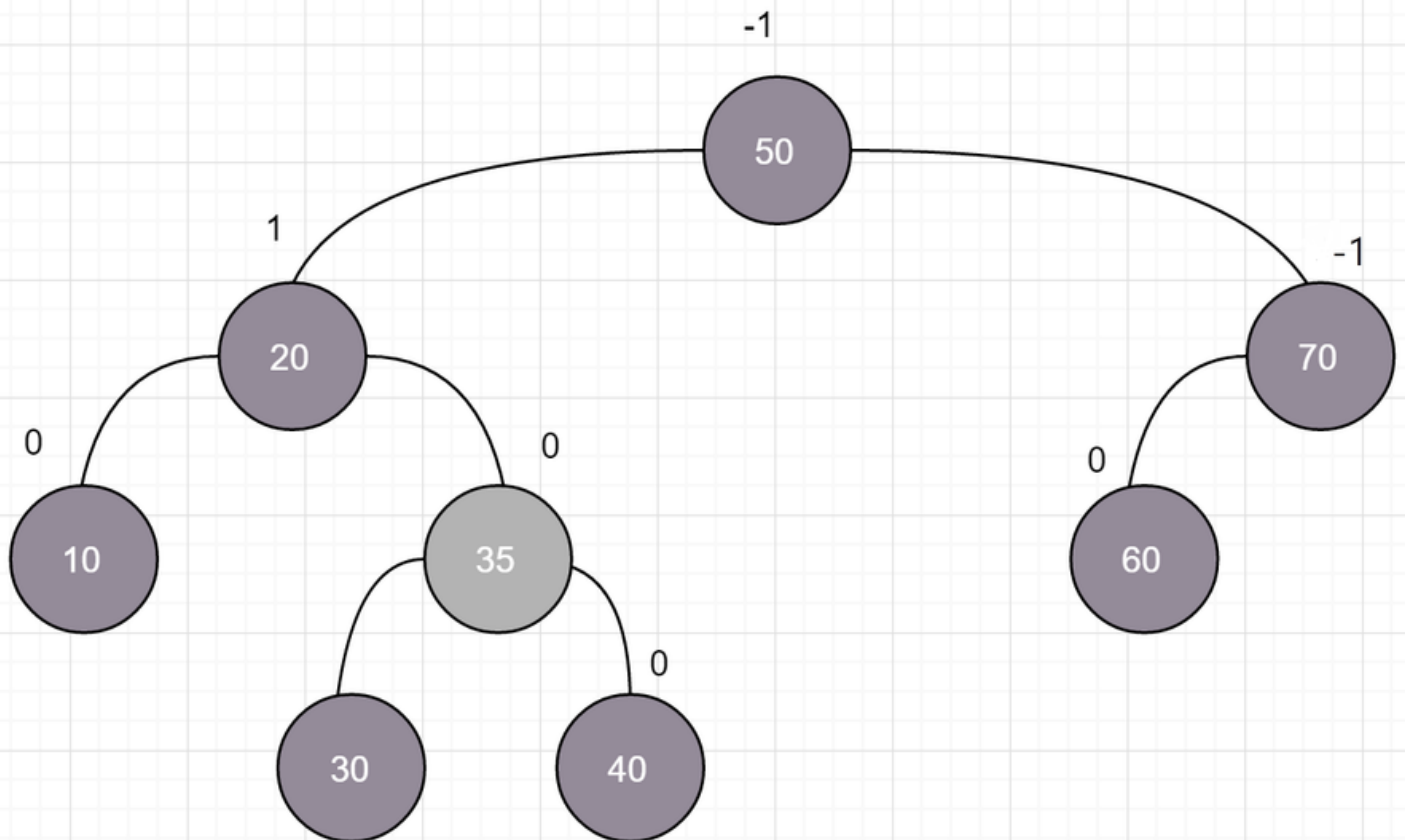


HW6  
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436201525

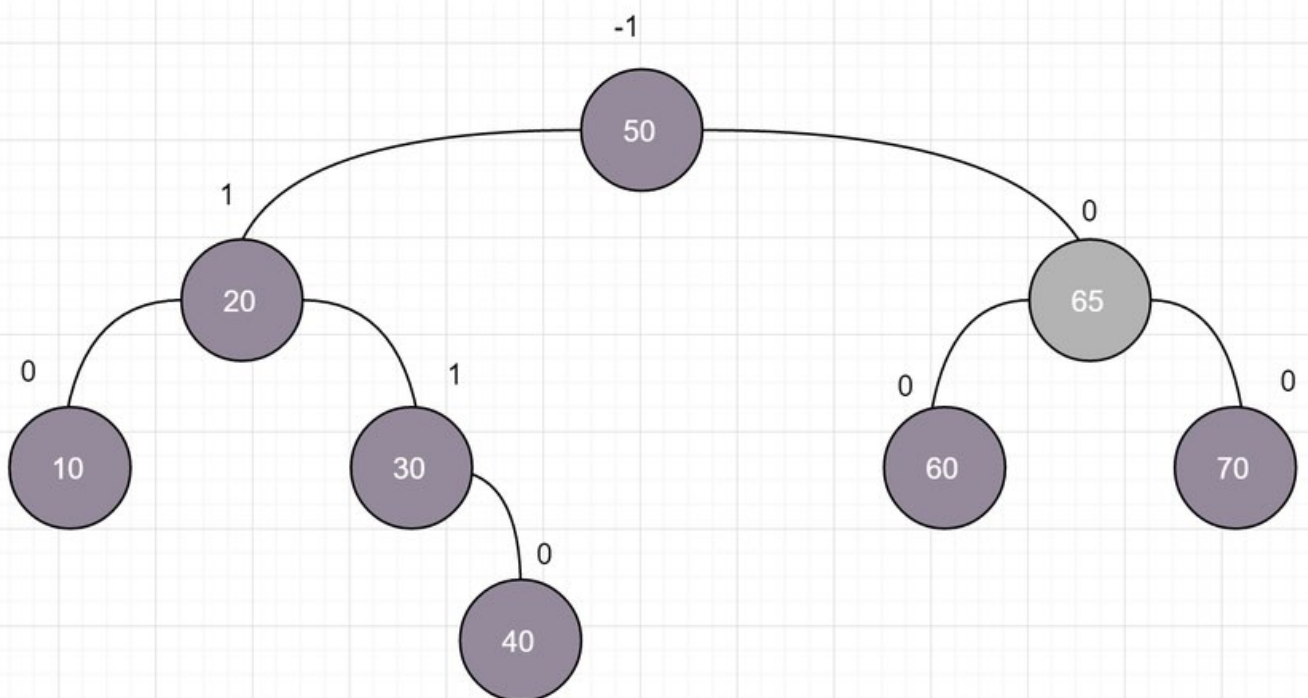
Problem 1:  
insert 55: (Right rotation)



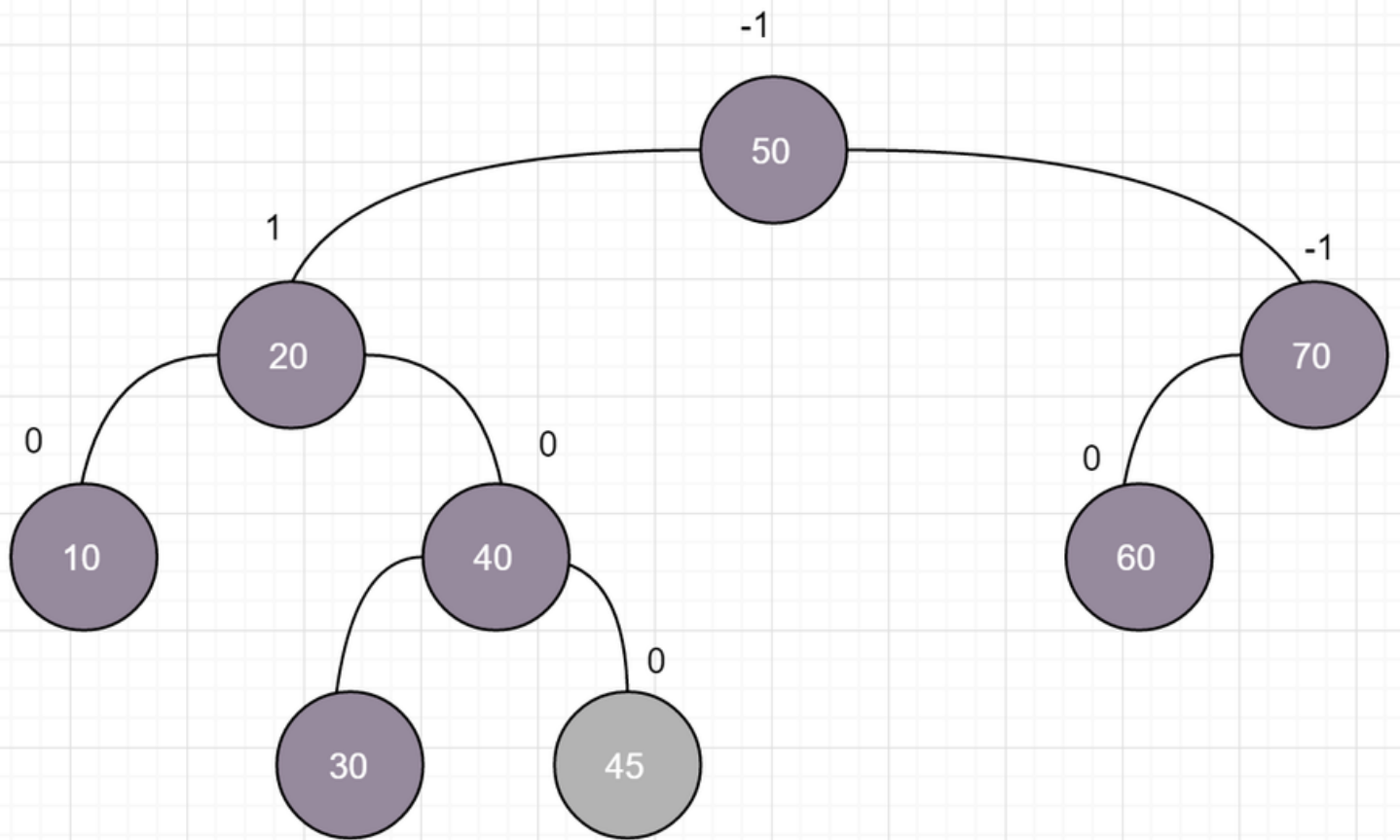
insert 35: (Left-Right rotation)



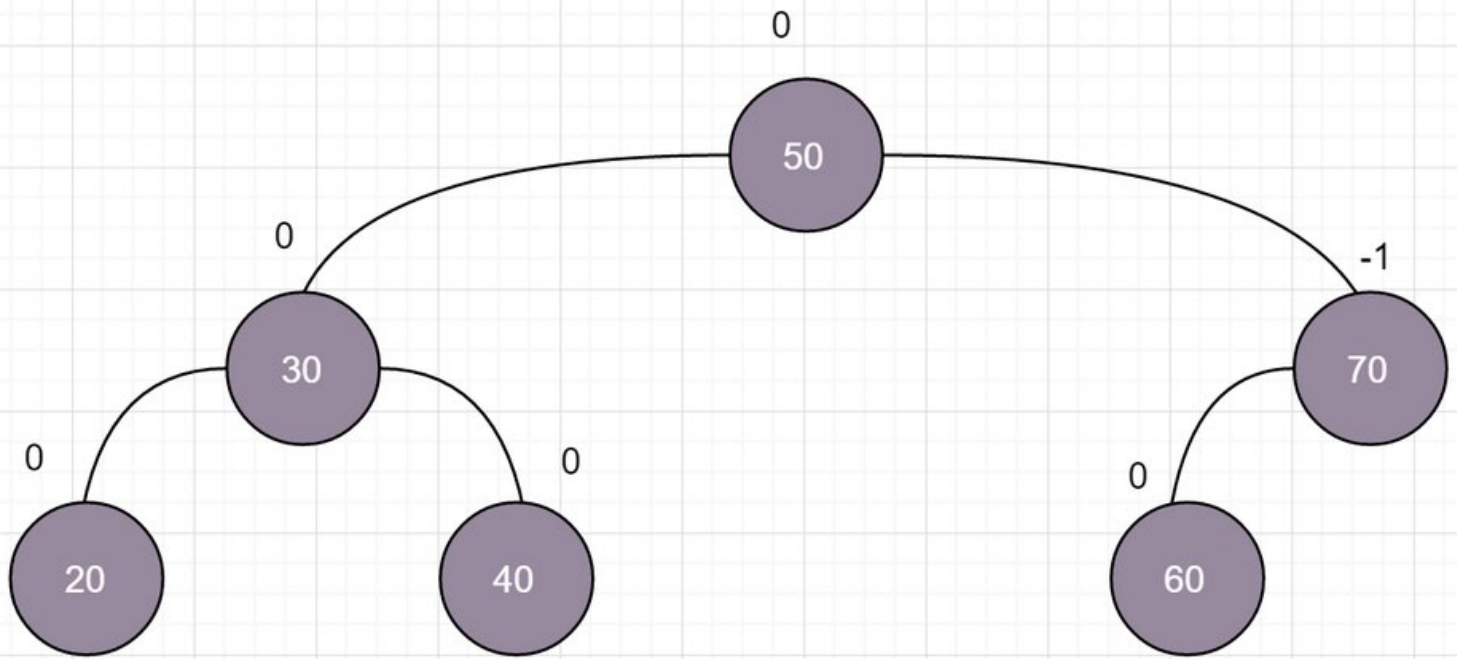
insert 65: (Right-Left rotation)



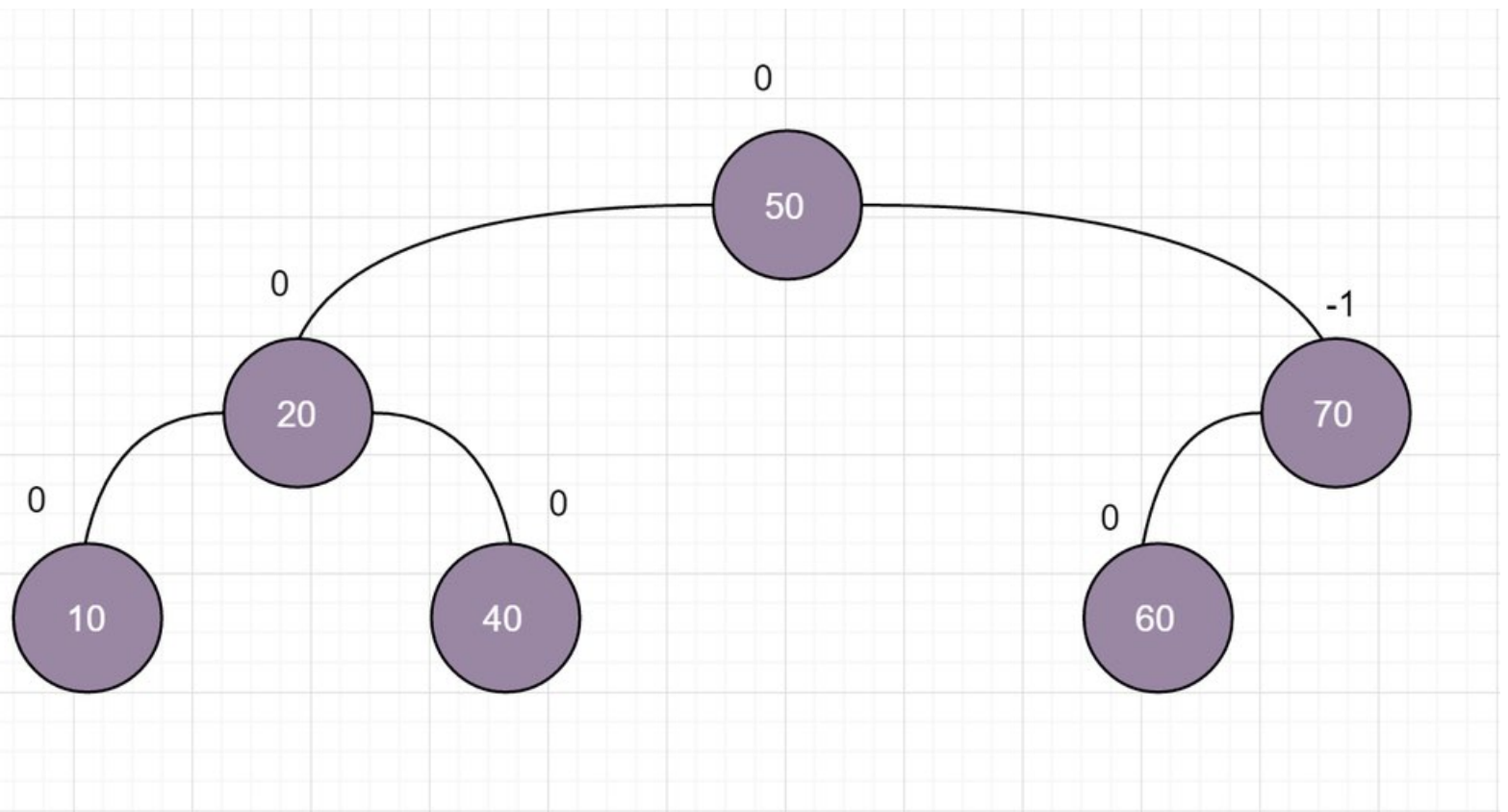
insert 45: (Left rotation)



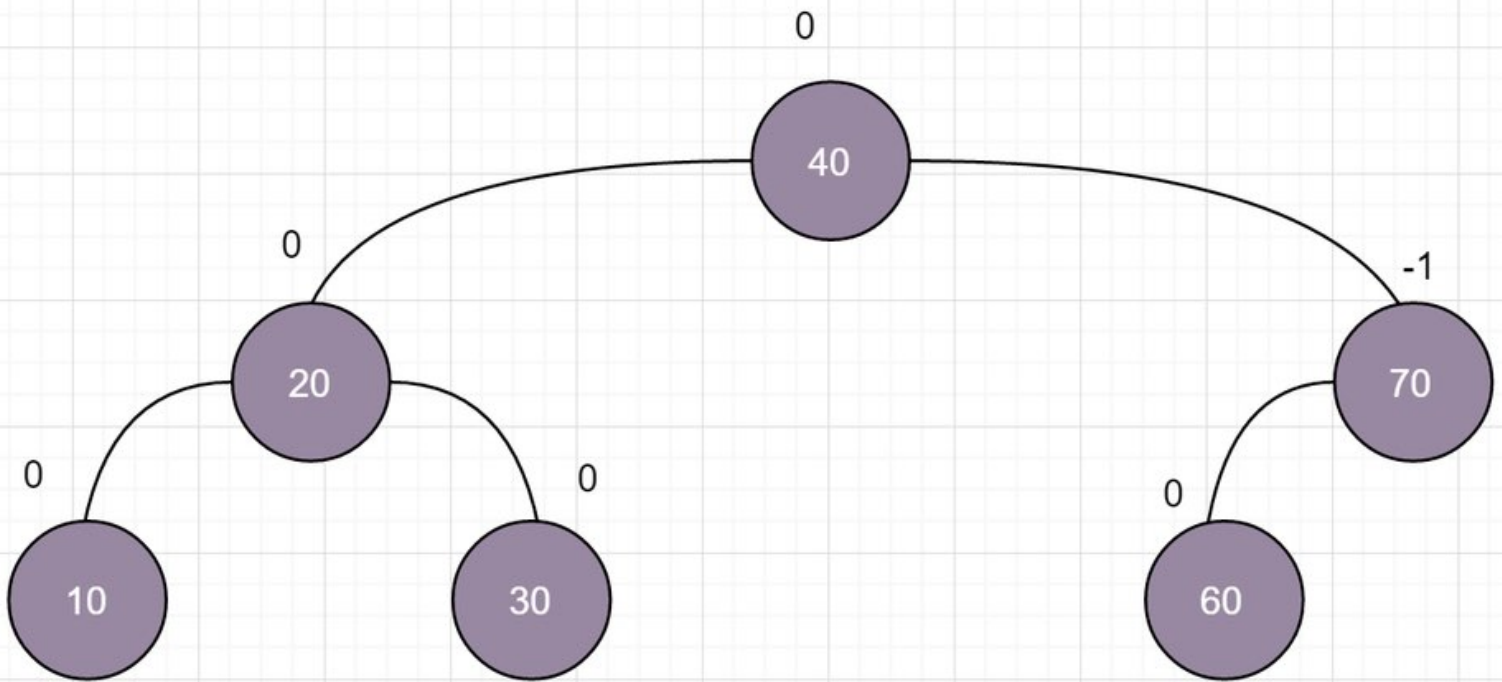
Delete 10: (Left rotation)



Delete 30: (No rotation)



Delete 50: (No rotation)



Problem 2:

a:  $\text{Bal}(A) = -1$ ,  $\text{Bal}(B) = 1$

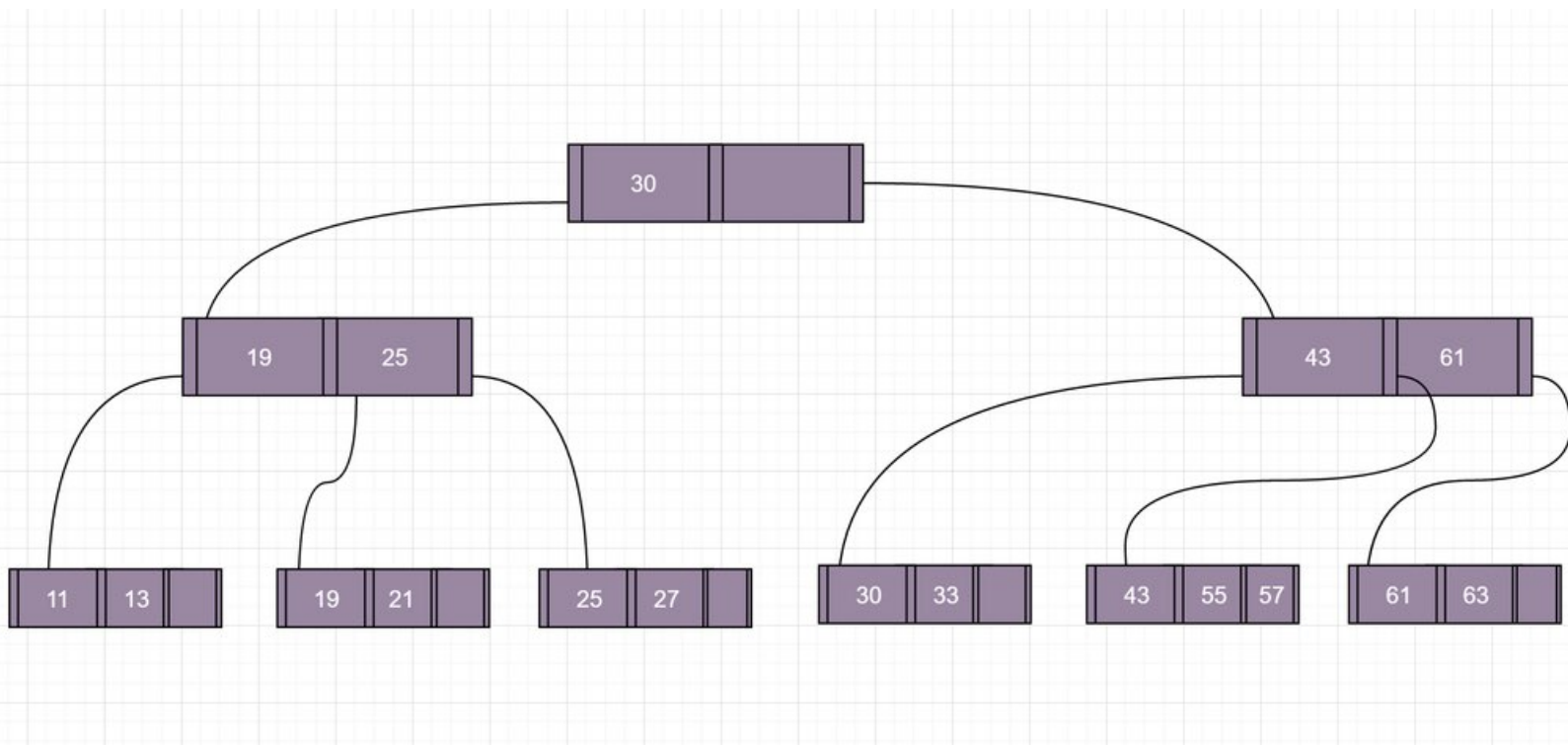
b:  $\text{Bal}(A) = 0$ ,  $\text{Bal}(B) = 0$

c:  $\text{Bal}(A) = 1$ ,  $\text{Bal}(B) = 0$ ,  $\text{Bal}(C) = 0$

d:  $\text{Bal}(A) = 0$ ,  $\text{Bal}(B) = 0$ ,  $\text{Bal}(C) = 0$

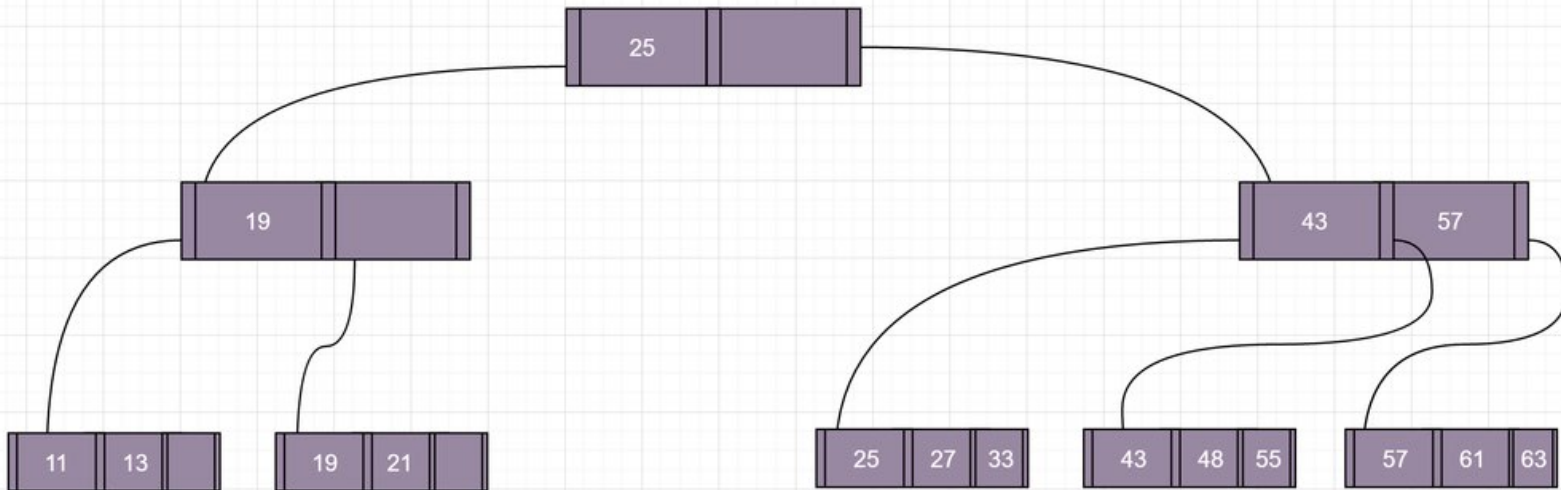
Problem 3:

Insert 30:

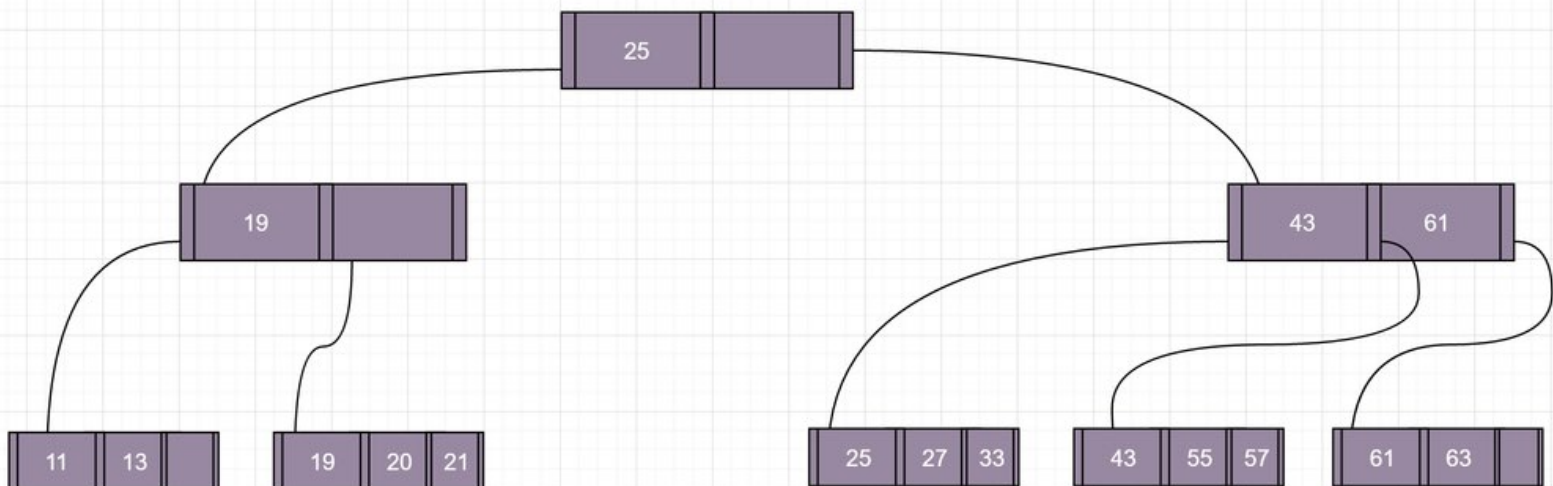




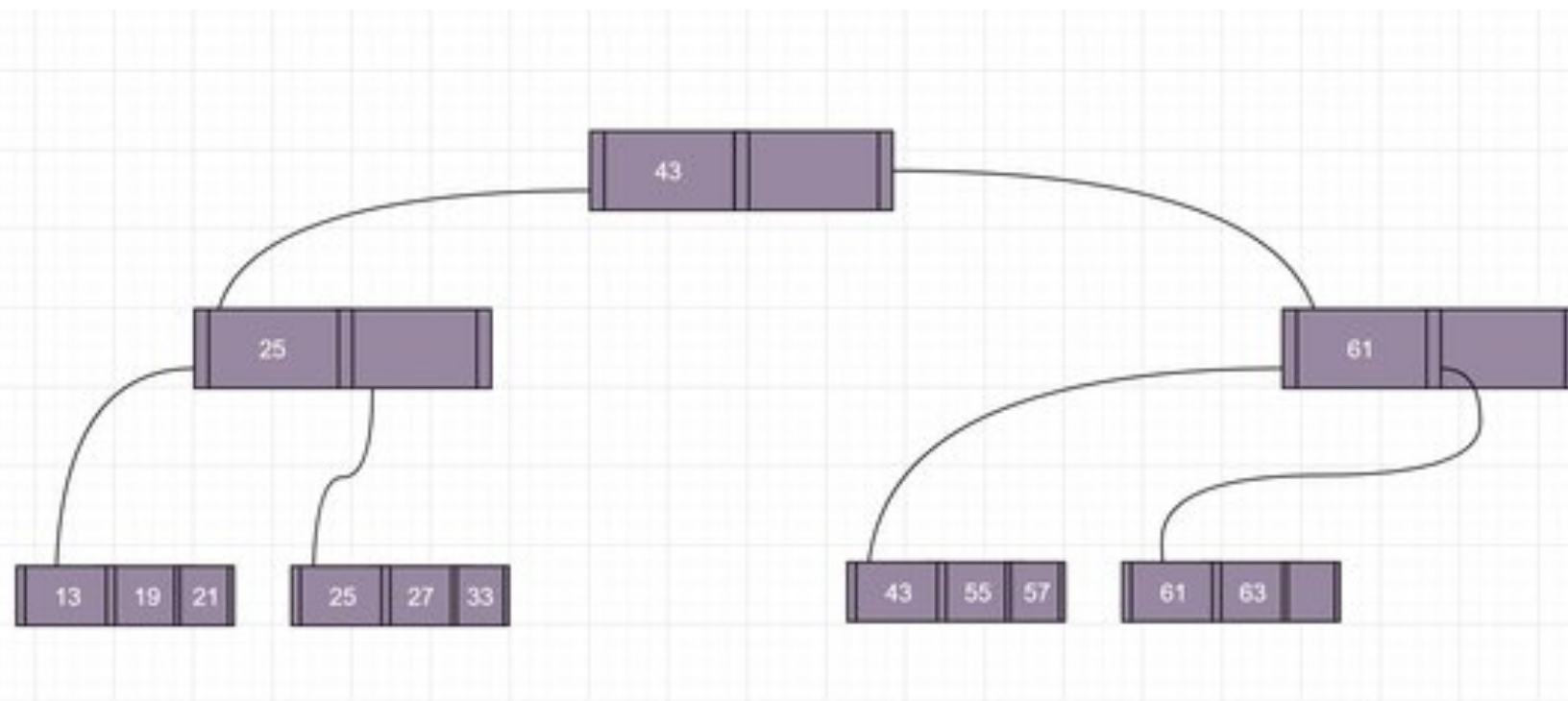
insert 48:



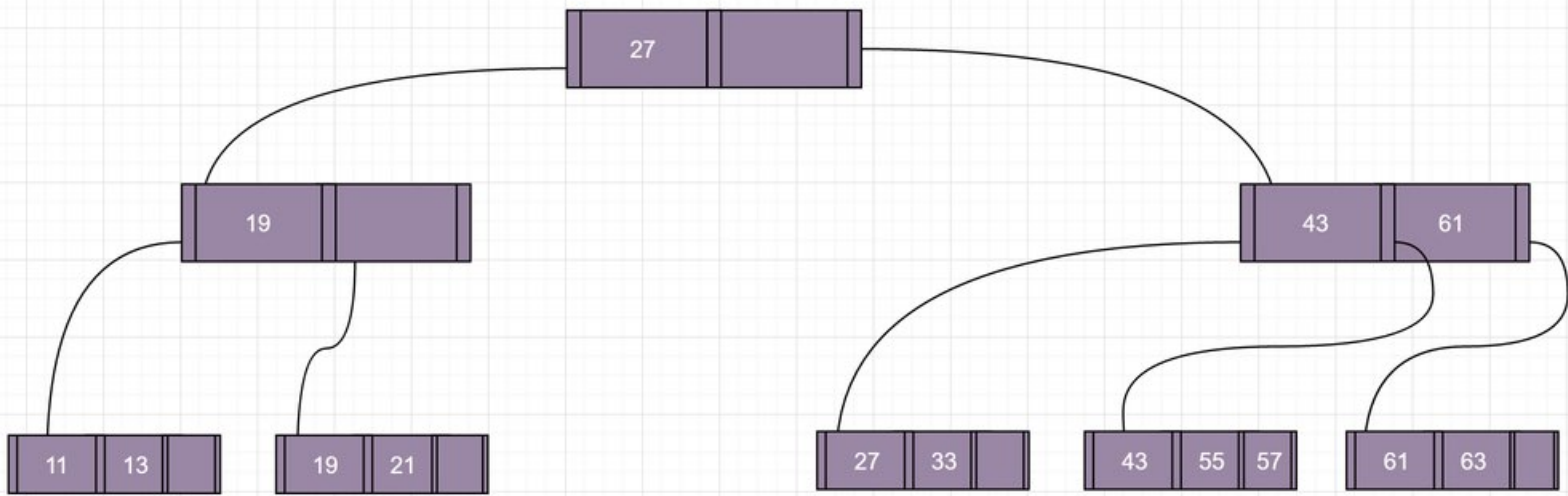
insert 20:



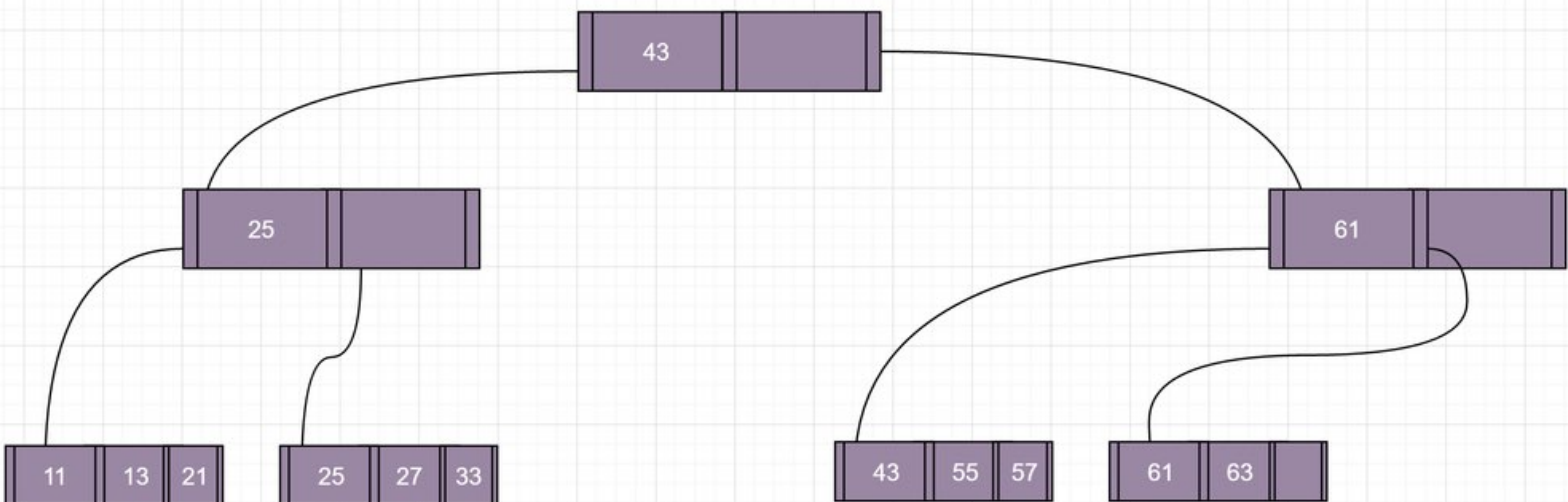
Delete 11:



Delete 25:



Delete 19:



#### Problem 4:

4.1:

key	407	801	815	704	814	935	721
$h(k):$ $(key \% 100)$ $\% 7$	0	1	1	4	0	0	0

407	1
801	1
814	2
815	2
704	1
935	7
721	4

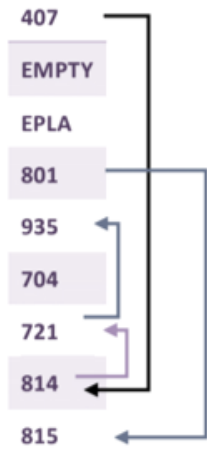
4.2:

key	407	801	815	704	814	721	935
$h(k): key \% 7$	$(4+0+7)\%7$ $=4$	$(8+0+1)\%7$ $=2$	$(8+1+5)\%7$ $=0$	$(7+0+4)\%7$ $=4$	$(8+1+4)\%7$ $=6$	$(7+2+1)\%7$ $=3$	$(9+3+5)\%7$ $=3$

815 -> null
null
801->null
721->935->null
407->704->null
null
814->null

4.3:

key	407	801	815	704	814	721	935
$h(k):$ $(3 \times (k \% 100)) \% 7$	0	3	3	5	0	0	0



Problem 5:

key	1	6	11	14	3	12	5	28	9
$h(k):$ $k\%9$	1	6	2	5	3	3	5	1	0

9	1
1	1
11	1
3	1
12	2
14	1
6	1
5	3
28	8

what is the aggregate (overall) number of collisions?

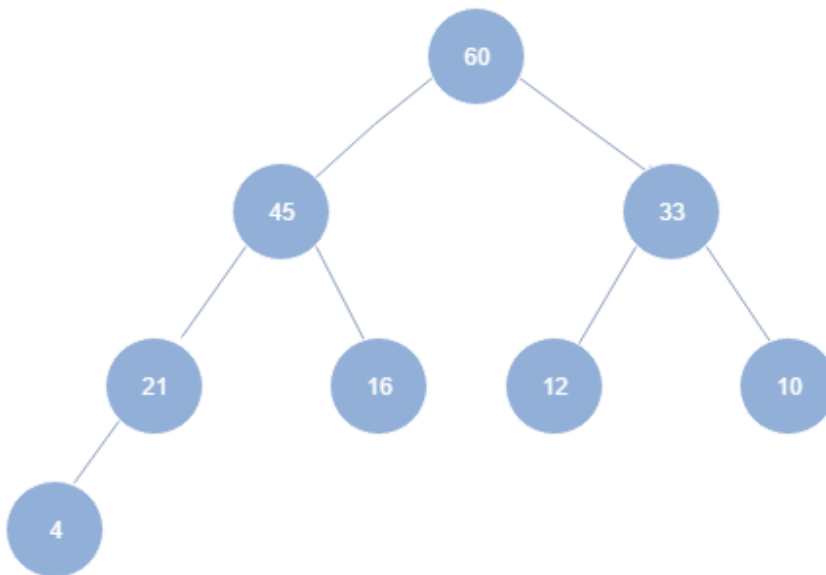
$$1+2+8=10$$

how many times will an element try to move to location that is already occupied?

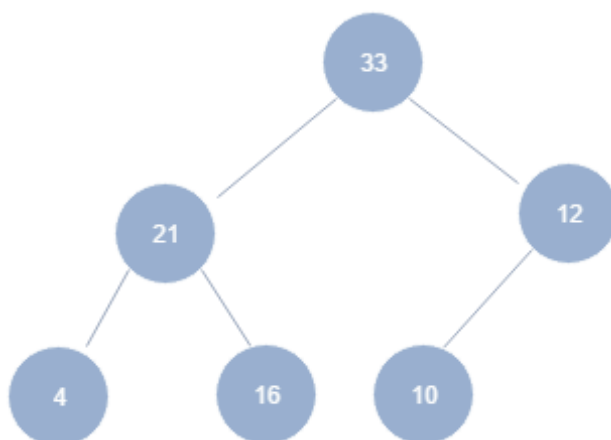
3 Nodes

Problem 6:

6.1:



6.2:



6.3:

(a):

Max heap.

(b):

0	1	2	3	4	5	6
-	28	23	18	12	20	15

(c):

0	1	2	3	4	5	6
-	28	23	18	12	20	15

0	1	2	3	4	5	6
-	15	23	18	12	20	15

0	1	2	3	4	5	6
-	23	20	18	12	15	28

0	1	2	3	4	5	6
-	15	20	18	12	15	28

0	1	2	3	4	5	6
-	20	15	18	12	23	28

0	1	2	3	4	5	6
-	12	15	18	12	23	28

0	1	2	3	4	5	6
-	18	15	12	20	23	28



0	1	2	3	4	5	6
-	12	15	12	20	23	28

0	1	2	3	4	5	6
-	15	12	18	20	23	28

0	1	2	3	4	5	6
-	12	12	18	20	23	28

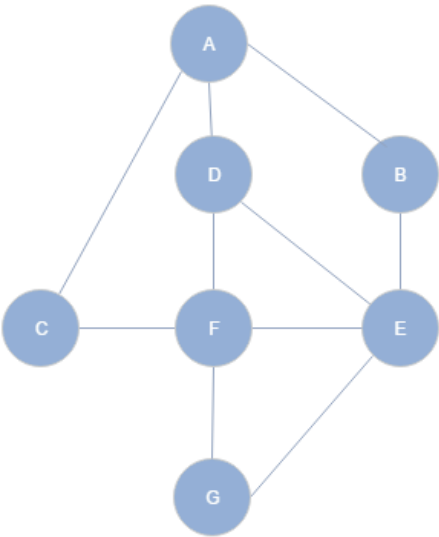
0	1	2	3	4	5	6
-	12	15	18	20	23	28

0	1	2	3	4	5	6
-	12	15	18	20	23	28

Problem 7:

7.1:



7.2:



7.3:

BFS:

A B C D E F G

DFS:

A D F G E C B