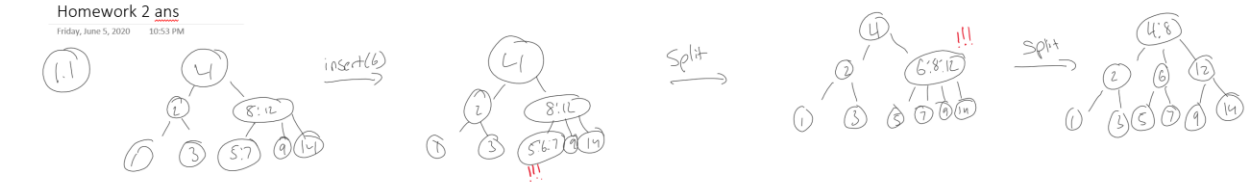
Homework 2 answer key

Homework 2 ans

Friday, June 5, 2020 10:53 PM



2

2.1 43, 49

2.2 73, 85

3 -1

4 All Nodes have 0 . . .

All leaves are . . .

A 2 node is like . . .

(5) Given a 2-3 tree w/ ℓ levels there are @ least $n_{min}(\ell) = \sum_{i=0}^{\ell-1} 2^i$ nodes and @ most $n_{max}(\ell) = \sum_{i=0}^{\ell-1} 3^i$ nodes

By formula given $n_{min}(\ell) = 2^{\ell}-1$ $n_{max}(\ell) = \frac{(3^{\ell}-1)}{2}$

Solving for ℓ in each case we have

$\ell \geq \log(n_{min}(\ell)+1)$ & $\ell = \lfloor \log_3(2n_{max}(\ell)+1) \rfloor$

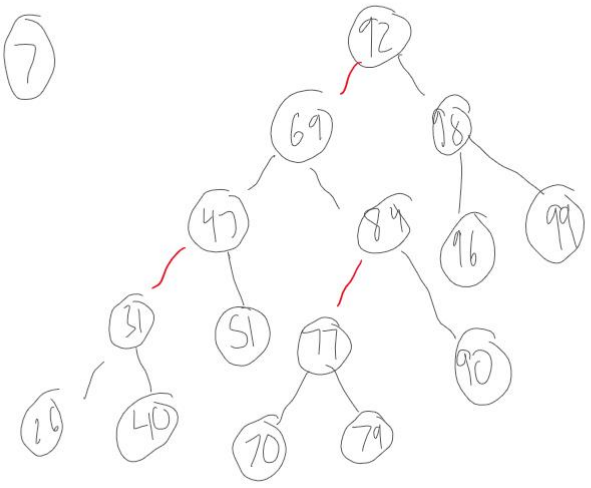
Thus

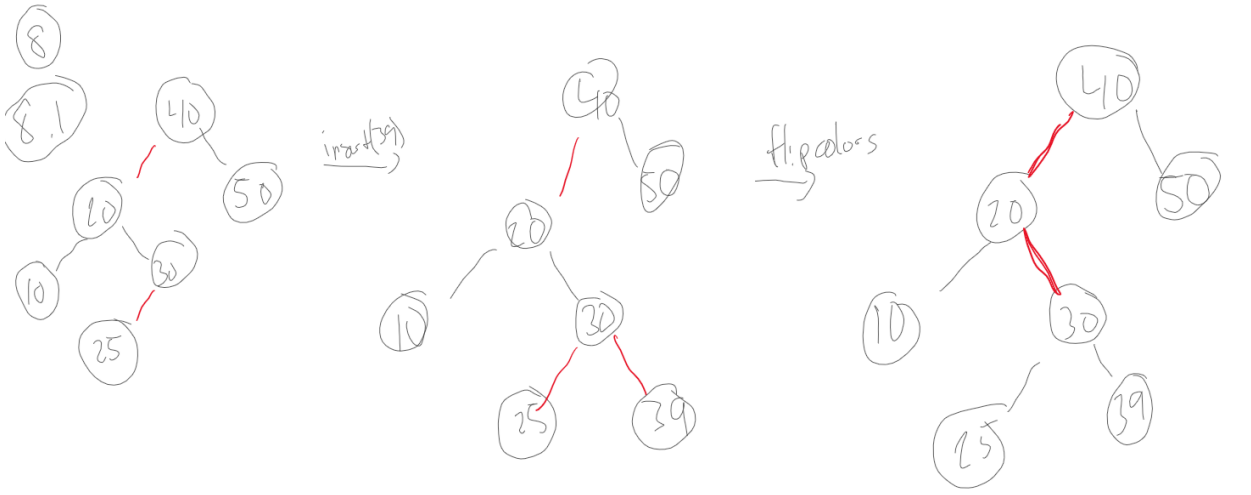
$$\log_3(2n+1) \leq \ell \leq \log_2(n+1)$$

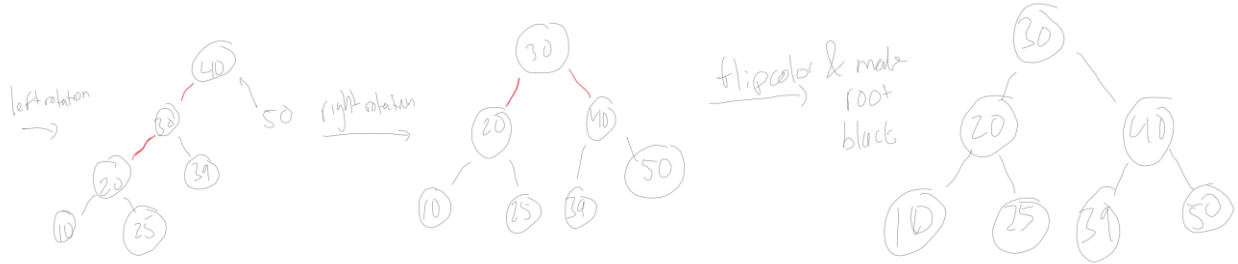
QED

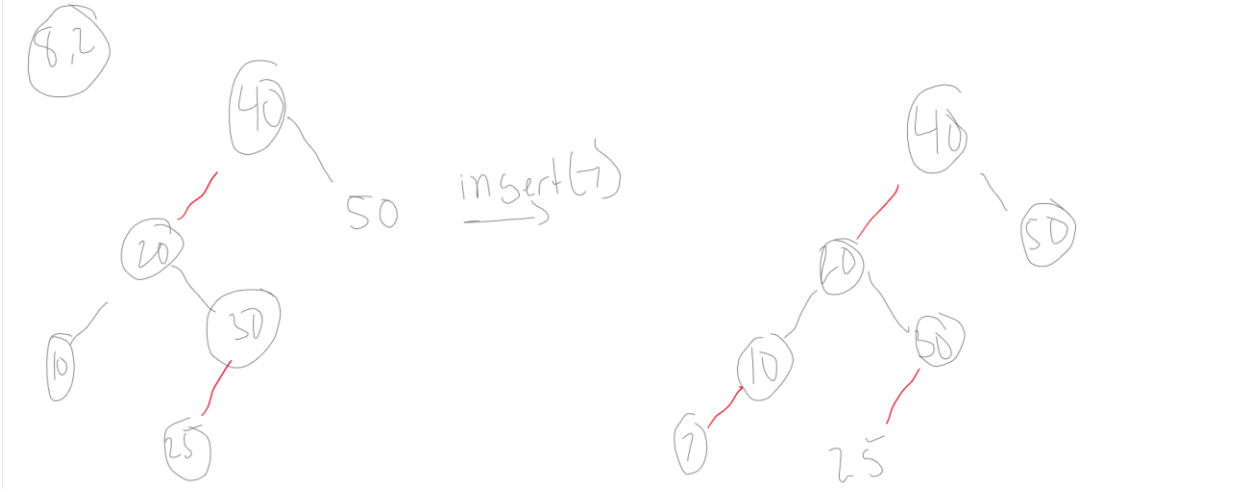
(6) False

(7)




8
8.1
40
20
50
10
30
25
insert(39)
40
20
50
10
30
25
39
flipcolors
40
20
50
10
30
25
39


left rotation
40
20
50
10
30
25
39
right rotation
30
20
40
10
25
39
50
flipcolor & make root black
30
20
40
10
25
39
50


8.2
40
20
50
10
30
25
insert(7)
40
20
50
10
30
7
25