

## Question-01: CO1

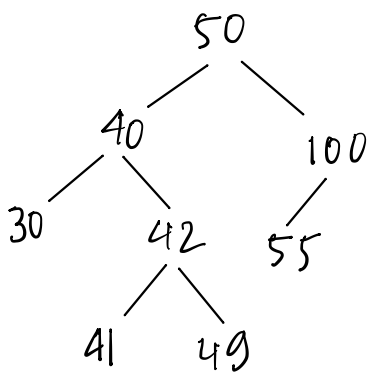
(i) (a) 1, 2, 4, 8, 16

(ii) (b) The tree's height might increase and rebalancing may be needed if it becomes unbalanced.

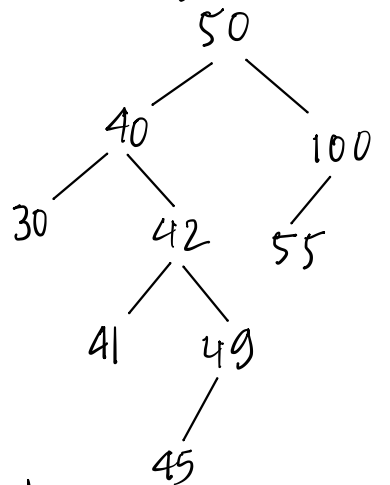
(iii) FCE DBA

(iv)

original



After inserting 45



This tree is unbalanced

Inorder traversal

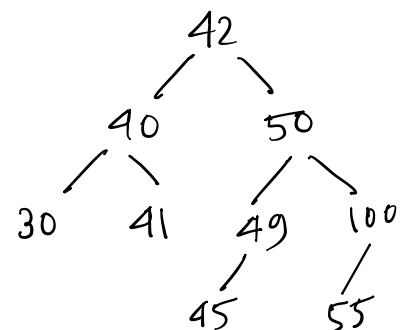
30, 40, 41, 42, 45, 49,  
50, 55, 100

Balancing

total node = 9

$\therefore \text{root} = 9/2 = 4\text{th element}$

After Balancing



(c) The root after balancing : 45

(v) (c) Inserting an element to the end of the array.

(considering the array represents heap)

(vi) (b) 31

(vii) (b) Node with value 87

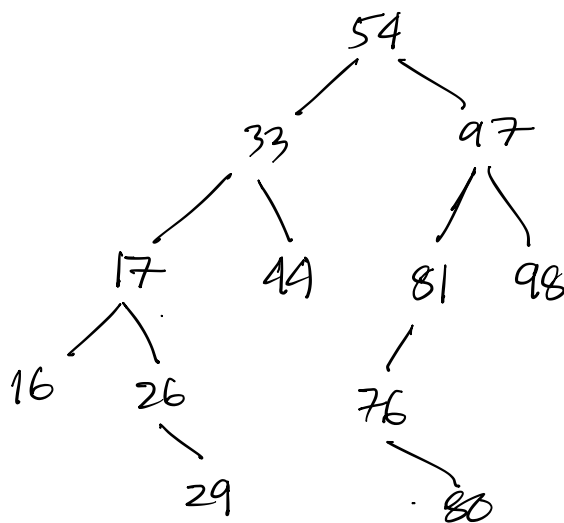
(viii) (c) -2

(ix) (a) Node 20 is the parent of Node 7

(x) (b) 3

Question 04: CO2

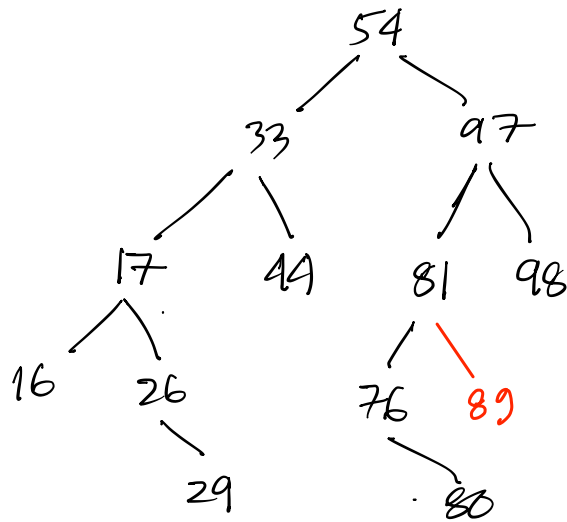
Given



Ⓐ Pre Order: root, left, right

$\therefore 54, 33, 17, 16, 26, 29, 44, 97, 81, 76, 80, 98,$

Ⓑ After inserting 89:



Ⓒ height of left subtree from root : 4  
" " right " " " : 4

$\therefore$  difference  $\leq 1$  ; Here, difference is 0

$\therefore$  The tree is balanced

Ⓓ In the jupyter notebook file of the folder of solution of this semester.