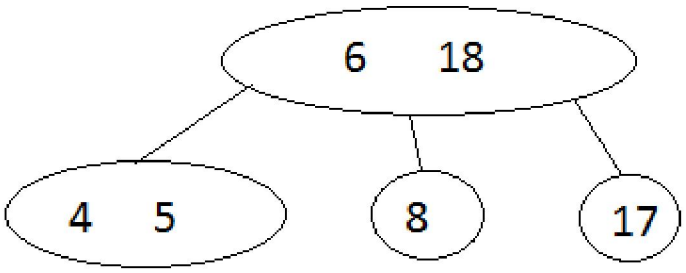
Assignment 8

R-3.8

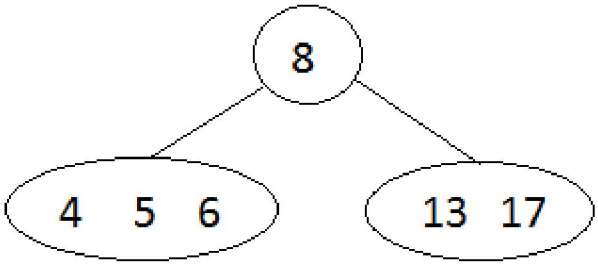
No, the tree in the figure is not a (2,4) tree, because all external nodes don't have the same depth

R-3.10

1) 5, 8 , 13, 17, 4, 6



2) 13, 4, 8, 5, 6, 17



In conclusion, the (2,4) tree structure changes with the order in which the items are inserted.

C-4.11

Algorithm getWinner(S, C)

```
Input sequence S containing all the votes                          
Output the winner Id                                               
H ← create new hashtable                                           1
Foreach vote Є C do                                                k
    H.insertItem(vote,0)                                           k
Foreach vote Є S do                                                n
    count ← H.removeElement(vote)                                  n
    count ← count +1                                               n
    H.insertItem(vote,count)                                       n
winnerId ← null                                                    1
maxVotes ← 0                                                       1
foreach item(c, count) Є H                                         k
    if count > maxVotes then                                       k
        maxVotes ← count                                           k
        winnerId ← c                                               k
return winnerId                                                    1
```

Total running time is O(n)

C-4-22

Algorithm findPair(A, B, k)

Input sequence A containing integers, sequence B containing integers, integer value k

Output Boolean value indicating if there a pair (a,b) which sums to k

H ← create new hashtable	1
Foreach v ∈ B do	n
H.insertItem(v, v)	n
Foreach a ∈ A do	n
b ← H.findElement(v)	n
if b ¬ = No_Such_Key then	n
return true	n
return false	1

Total running time is O(n)