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CS 161

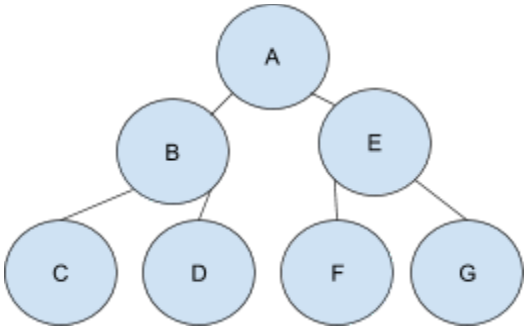
Homework 2

R-4.17

a. True because the properties of WAVL tree will hold in true in the subtree of a WAVL tree.
b. True because if an external node has a sibling that isn't external, then that means that the sibling has external children meaning its rank will be 1.

R-5.11

Preorder = Yes, assuming that the heap T is a min-heap



Inorder = No, if we're assuming that T is a min-heap, then the left subtree will always be listed before its parent but if its a min-heap then the child must be greater than the parent. Therefore it could not be sorted

Postorder = No, because both children will be listed before its parent.

C-6.1

Note: Assume that the value -1 is the marker

search(k):

```
i ← h(k)
while A[i] ≠ NULL do
        if A[i].key = -1 then
```

```
                    i++
            if A[i].key = k then
                    return A[i]
            i ← (i + 1) mod N
    return NULL
insert(k,v):
    i ← h(k)
    while A[i] ≠ NULL do
            if A[i].key = k then
                    A[i] ← (k,v)
            i ← (i + 1) mod N
    A[i] ← (k,v)
remove(k):
    i ← h(k)
    while A[i] ≠ NULL do
            if A[i].key = k then
                    temp ← A[i]
                    A[i] = -1
                    return temp
            i ← (i + 1) mod N
    return NULL
```

A-6.8

The most efficient scheme would be to use a Hash-table. You would use a well-made hash function in order insert your customers into the hash table. Then you would a search for your customers by using the SSN you found out from the bank to find any overlapping SSNs. Which means that the approximate complexity would be based on the insert and search which simplifies to O(n + m) time.