Problem Set 4

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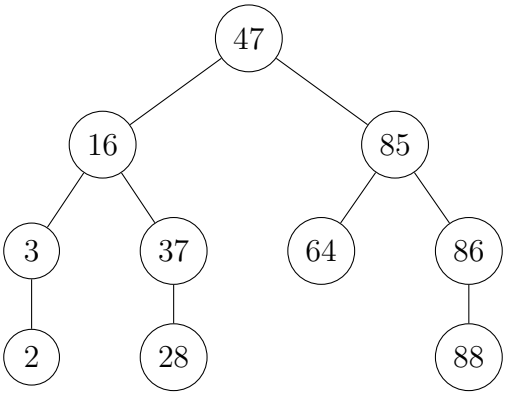
Collaborators: None

Problem 4-1.

(a) Node(37): Scew = 2 - 0 = 2 Node(16): Scew = 1 - 3 = -2

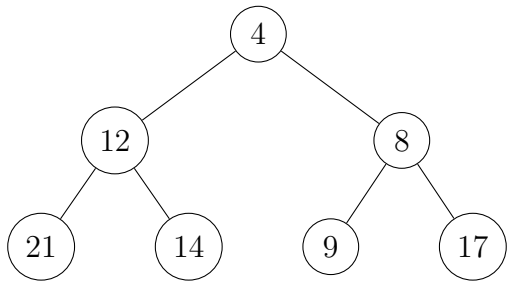
(b)



(c) Just do a rotation.

Problem 4-2.

(a)



Minheap

(b) Maxheap

(c) Swap (13, 0) and then (2, 0)

(d) Minheap

Problem 4-3.

(a)
- Build a heap according to score: $O(|A|)$
- Delete max k times: $O(klog|A|)$

(b) Use heap tree properity to search the heap.

Problem 4-4. s_i: address of farm c_i: capacity b_j: name of building d_j: demand of building

•A hash table to record $(s_i, node)$ pair.

•For each node, a hash table to record $(b_j, "")$ pair.

•An max heap to store all node based on c_i.

Build: $O(n)$ Power on: Find a node corrsponding to the condition $O(logn)$, add the name to the hash table of the node. Change the capacity to $c_j - d_j$ Power off: Find the node $O(logn)$, delete it in the hash table: $O(1)_{am}$ Customers: Use hash table to find the node and return the hash table of the node.

Problem 4-5.

Problem 4-6.

(a)

(b)

(c)

(d) Submit your implementation to `alg.mit.edu`.