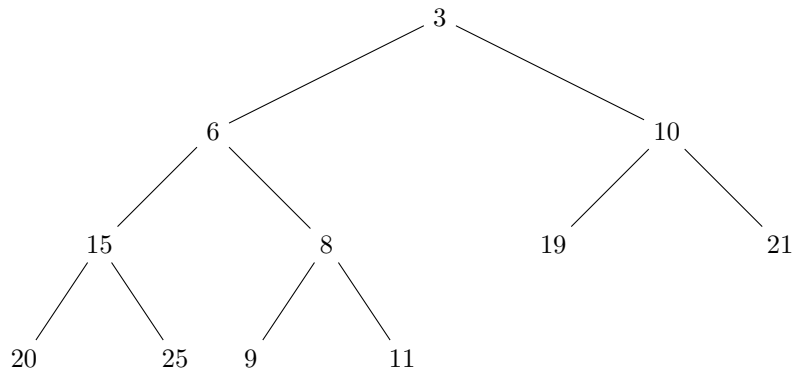


Homework 3

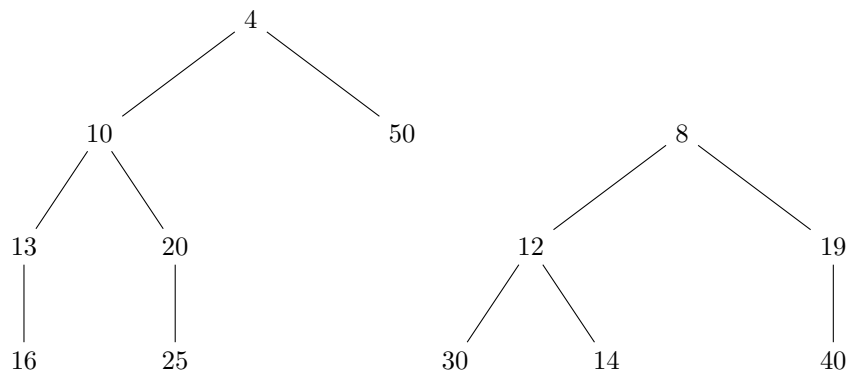
Due Date: March 11, 2019

Use a table size of 13 for the following hash questions 1-4 and
A given input of {3823, 8806, 8783, 2850, 3593, 8479, 1941, 4290, 8818, 7413}
with a hash function $h(x) = x \bmod 13$.

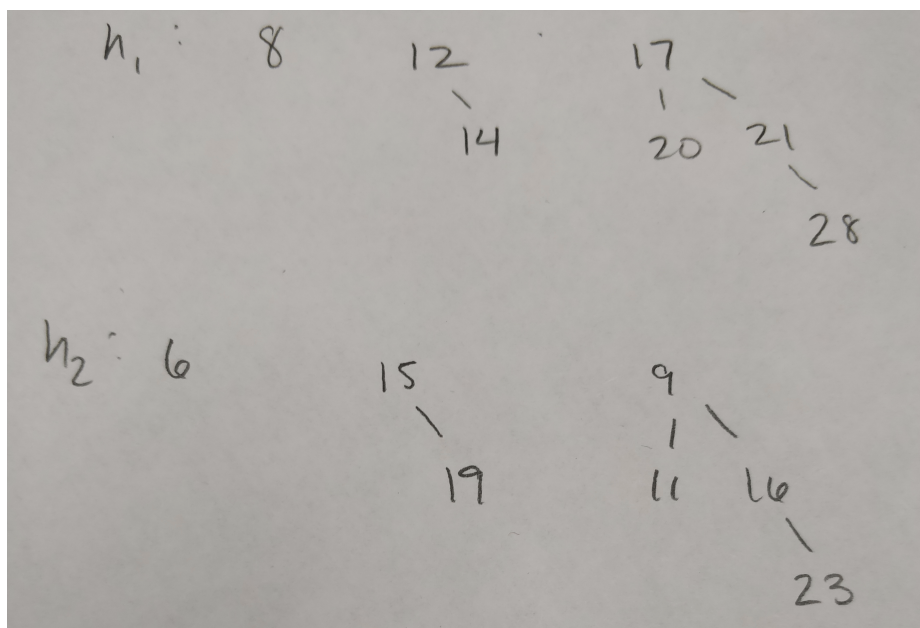
- (1) **(10 pts)** Show the resulting separate chaining table
- (2) **(10 pts)** Show the resulting table using linear probing
- (3) **(10 pts)** Show the resulting table using quadratic probing
- (4) **(10 pts)** Show the resulting table using double hashing with $h_2(x) = 11 - (x \bmod 11)$.
- (5) **(20 pts)** Given an array of strings, group anagrams together in $O(n \log n)$ time.
Example
Input: ["eat", "tea", "tan", "ate", "nat", "bat"],
Output: [["ate", "eat", "tea"], ["nat", "tan"], ["bat"]]]
- (6) **(10 pts)** Show the resulting binary heap after inserting the following values one at a time {42, 11, 28, 8, 13, 61, 18}
- (7) **(10 pts)** Show the result of deleteMin on the following heap



(8) (10 pts) Show the merge of the following two leftist heaps.



(9) (10 pts) Show the result of merging the two binomial queues



(10) (20 pts) Given a non-empty array of integers, return the k most frequent elements in $O(n)$ time.