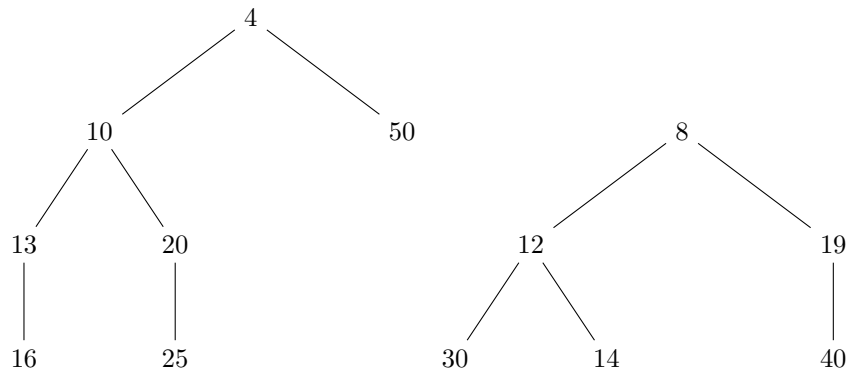# Homework 3

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 mod 13.

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(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 tbale using double hashing with $h_2(x) = 11$ - (x mod 11).

(5) **(20 pts)** Given an array of strings, group anagrams together in O(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
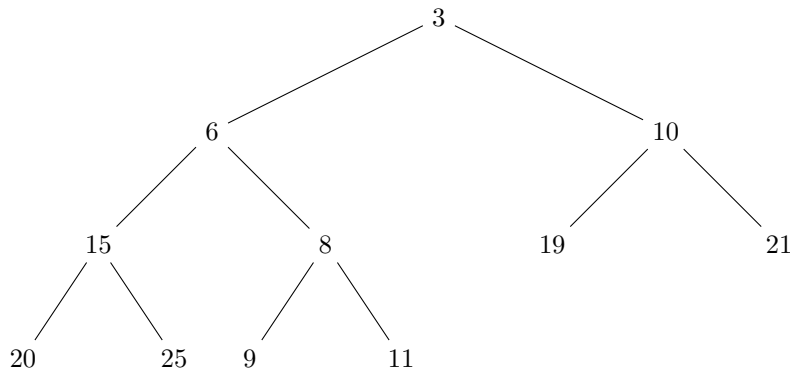
(8) **(10 pts)** Show the merge of the following two leftist heaps.

```
              4                                      8
           /     \                                /     \
         10       50                            12       19
        /  \                                   /  \        |
      13    20                               30    14      40
       |     |
      16    25
```

(9) **(10 pts)** Show the result of merging the two binomial queues
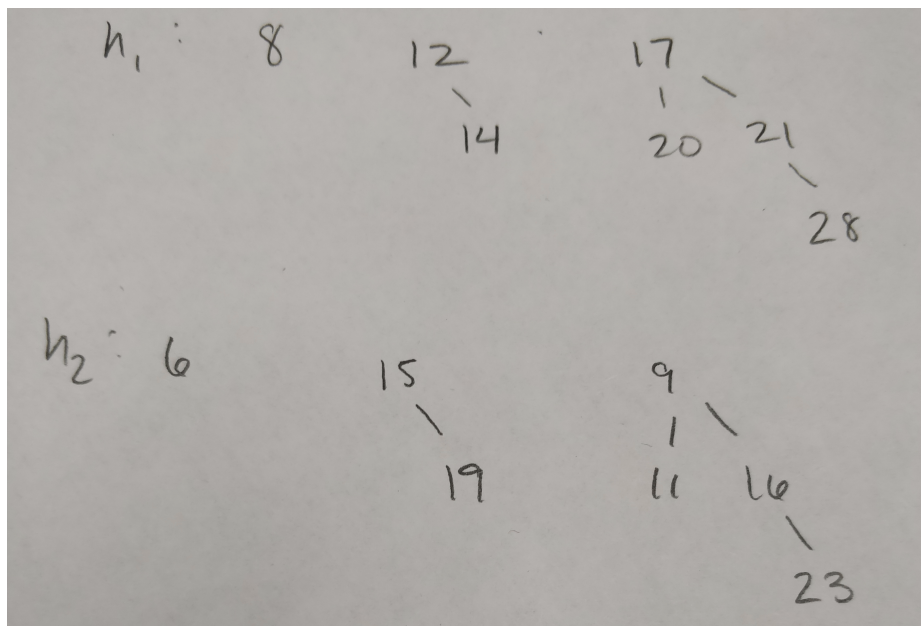
(10) **(20 pts)** Given a non-empty array of integers, return the k most frequent elements in O(n) time.