MA/CSSE 473 Day 22 Announcements and Summary

Announcements:

1. HW9 due yesterday (with a grace day until tonight at 11:59 PM because of the break, no late days beyond that);
2. HW 10 due Thursday.
3. Exam 2 Tuesday Nov 4 in class
4. No one told me about final exam conflicts, so I expect everyone to be there at the scheduled Monday evening time.
5. In my office today: hours 6 and 8; some of that time I will be seeing my advisees..

Main ideas from today:

1. A binary *max heap* is a complete binary tree with the additional property that …

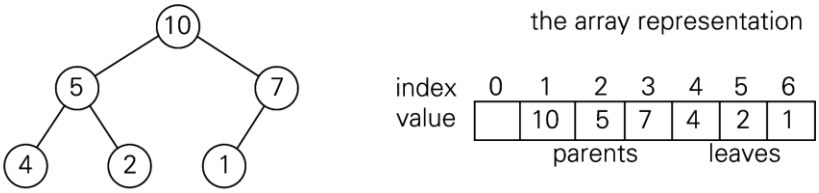

FIGURE 6.10 Heap and its array representation

2. Describe the details of the representation of a binary (max) heap by an array.

   Runtime for `insert` and `removeMax`: (why?)

3. Give a brief overview of how heapsort works.

4. **Next three questions:** In a full binary heap (thus N is one less than a power of 2) represented as an array, let *depth(i)* be the depth of the node whose subscript in the array is i, and let *height(i)* be the height of the node whose subscript in the array is i.

5. Give a simple formula (as a function of i) for *depth(i).*

6. Show that the sum of the depths of all of the nodes in the tree is Θ (N log N).

7. depth(i) + height(i) = _____

8. Which is the faster of the two approaches for building the initial heap for HeapSort, and why?

9. How can we use a "precalculation" with the adjacency matrix of a graph to count paths of length 2 in that graph?

10. List several examples of algorithms where using additional space allows us to solve a problem faster.