Quiz 7

(solutions)

1. What is the worst-case runtime complexity (in big-Oh notation) of insertion into a binary heap with N elements?

   $$O(\log N)$$

2. What is the worst-time runtime complexity of building (by insertion) a binary heap with N elements?

   $$O(N \log N)$$

3. What is the height (in big-Oh notation) of a binary heap with N elements?
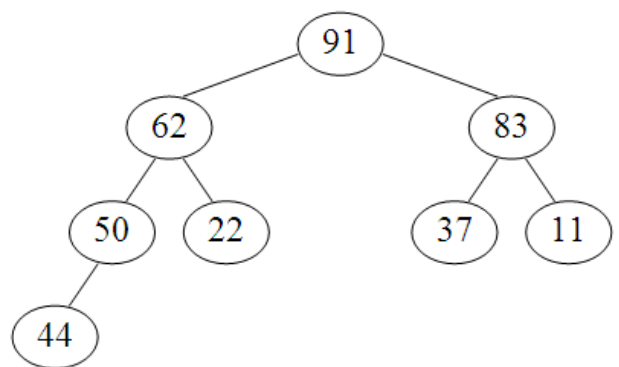
   $$O(\log N)$$

4. What is the worst-time runtime complexity of sorting an array of N elements using heapsort?

   $$O(N \log N)$$

5. What is the worst-time runtime complexity of finding the largest element in a min-heap with N elements?
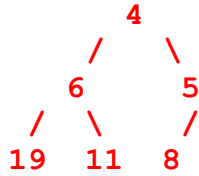
   $$O(N)$$

6. Consider the following **max-heap**. Show how to store the max-heap in the array below

0	1	2	3	4	5	6	7	8	9
	91	62	83	50	22	37	11	44	

7. Given a sequence of numbers: **19, 6, 8, 11, 4, 5**

   a) Draw a binary min-heap (in a tree form) by inserting the above numbers reading them from left to right

```
        4
      /   \
     6     5
    / \   /
  19  11  8
```

   b) Show a tree that can be the result after the call to deleteMin() on the above heap

```
       5
     /   \
    6     8
   / \
 19  11
```

   c) Show a tree after another call to deleteMin()

```
       6
     /   \
   11     8
   /
  19
```