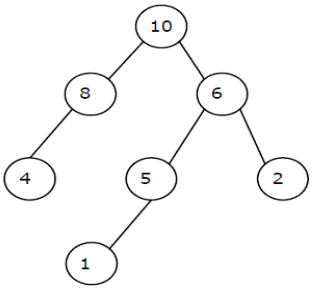
Handwriting Assignment #1

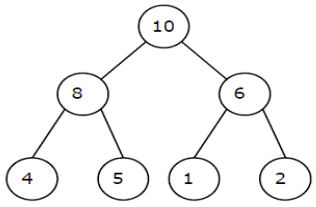
Due to 13th Oct.

1. Which of the following is a max-heap?

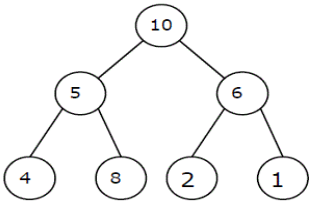
(A)



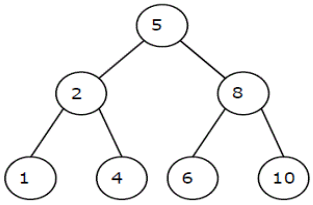
(B)



(C)



(D)



2. What is the worst-case runtime complexity (in big-Oh notation) of insertion into a binary heap with N elements?
3. What is the worst-time runtime complexity of building (by insertion) a binary heap with N elements?
4. What is the height (in big-Oh notation) of a binary heap with N elements?
5. What is the worst-time runtime complexity of sorting an array of N elements using heapsort?
6. What is the worst-time runtime complexity of finding the largest element in a min-heap with N elements?
7. Draw the following list of numbers as a heap with the first number as the root: 77, 66, 55, 44, 60, 33, 55
8. What is the minimum and maximum numbers of elements in a heap of height h?
9. Illustrate the operation of Max-Heapify(A, 3) on the array A = <27, 17, 3, 16, 13, 10, 1, 5, 7, 12, 4, 8, 9, 0>.

10. Illustrate the operation of Heapsort on the array
    A = <5, 13, 2, 25, 7, 17, 20, 8, 4>.

11. Is an array which is sorted in ascending order a min-heap?

12. A priority queue can be implemented as a heap because
    a. The root can be easily be identified as the topmost priority.
    b. The heap is not always sorted so any value can be the top priority.
    c. The heap always has a left bottom node that can be the top priority.
    d. None of the above.