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1. Consider a max heap, represented by the array: 40, 30, 20, 10, 15, 16, 17, 8, 4. Now consider that a value 43 is inserted into this heap. After insertion, the new heap is

A. None of the other options
B. 40, 43, 20, 10, 15, 16, 17, 8, 4, 30
C. 40, 30, 20, 10, 15, 16, 17, 8, 4, 43
D. 40, 30, 20, 10, 43, 16, 17, 8, 4, 15
E. [Correct Answer] [Your Answer] 43, 40, 20, 10, 30, 16, 17, 8, 4, 15

2. For a perfect tree of height h containing $n = 2^{h+1} − 1$ nodes, an efficient implementation of `BuildHeap` will call:

A. `sort`
B. `remove min`
C. [Correct Answer] [Your Answer] `HeapifyDown`
D. `HeapifyUp`
E. None of the other options

3. Complete the statement: In a maxHeap, the nodes on any _____

A. None of the other choices is accurate.
B. level from left to right are non-increasing.
C. path from root to leaf are non-decreasing.
D. level from left to right are non-decreasing.
E. [Correct Answer] [Your Answer] path from root to leaf are non-increasing.

4. What is the worst case running time of `insert (Object)` on a min heap? In answering this question you should assume the best possible implementation given the constraints, and also assume that every array is sufficiently large to handle all items (unless otherwise stated). The variable n represents the number of items.

A. [Correct Answer] $O(\log n)$
B. $O(n\log n)$
C. None of the other options
D. $O(n^2)$
E. $O(1)$
F. [Your Answer] $O(n)$

5. For a minHeap implementation, assume we use the 0th index of the array to store the root (instead of index 1). Given an element at position i, what would be the position of its right child (if one exists)?

A. None of other options
B. $2i - 1$
C. [Correct Answer] [Your Answer] $2i + 2$
D. $2i + 1$
E. $2i$