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1. In our array-based implementation of a Heap (with a root index of `1`), the **left-child of the right-child** of the node at index i, if it exists, can be found at what array location?

A. $4i + 1$
B. $2i + 1$
C. [Correct Answer] [Your Answer] $4i + 2$
D. $2i + 2$
E. $4i + 3$

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

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

3. Consider a max heap, represented by the array: 40, 30, 20, 10, 15, 16, 17, 8, 4. Now consider that a value 35 is inserted into this heap. After insertion, the new heap is

A. 40, 35, 20, 10, 15, 16, 17, 8, 4, 30
B. None of the other options
C. 40, 30, 20, 10, 15, 16, 17, 8, 4, 35
D. 40, 30, 20, 10, 35, 16, 17, 8, 4, 15
E. [Correct Answer] [Your Answer] 40, 35, 20, 10, 30, 16, 17, 8, 4, 15

4. Fill in the blanks: For a perfect tree of height h containing $n = 2^{h+1} - 1$ nodes, an efficient implementation of `BuildHeap` will call _____ at most _____ times.

A. `HeapifyUp`, h
B. `HeapifyUp`, n
C. [Your Answer] `HeapifyDown`, h
D. [Correct Answer] `HeapifyDown`, n

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