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

2. 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 parent (assume $i \neq 0$)?

A. [Correct Answer] [Your Answer] $\left\lfloor \frac{i-1}{2} \right\rfloor$
B. $\frac{i-1}{2}$
C. $\left\lceil \frac{i-1}{2} \right\rceil$
D. $\left\lfloor \frac{i}{2} \right\rfloor$
E. None of other options

3. Which of the following is not a Dictionary data structure? (do not worry about the efficiency)

A. Heap
B. Array
C. Binary Search Tree
D. [Correct Answer] [Your Answer] All of these could be used to implement a dictionary.
E. Hash Table

4. What is the worst case running time of `findMin` on a min heap (a function that finds and reports the minimum key, but does not remove it)? 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. $O(n\log n)$
B. $O(\log n)$
C. $O(n)$
D. [Correct Answer] [Your Answer] $O(1)$
E. None of the other options
F. $O(n^2)$

5. Consider a max heap, represented by the array: 40, 30, 20, 10, 15, 16, 17, 8, 4. Now consider that a value 38 is inserted into this heap. After insertion, the new heap is

A. None of the other options
B. 40, 38, 20, 10, 15, 16, 17, 8, 4, 30
C. 40, 30, 20, 10, 15, 16, 17, 8, 4, 35
D. [Correct Answer] [Your Answer] 40, 38, 20, 10, 30, 16, 17, 8, 4, 15
E. 40, 30, 20, 10, 38, 16, 17, 8, 4, 15