NetID: hxie13 QuizID: 856714 Score: 3 / 5 Answer Source: PrairieLearn

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

2. What characteristic of Heaps allow them to be stored efficiently in an array?

A. [Correct Answer] Heaps are complete trees.
B. Heaps contain comparable keys.
C. [Your Answer] None of the other choices is a sufficient explanation.
D. Heaps are binary trees.
E. Heaps are perfect trees.

3. 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. 40, 30, 20, 10, 38, 16, 17, 8, 4, 15
B. [Correct Answer] [Your Answer] 40, 38, 20, 10, 30, 16, 17, 8, 4, 15
C. 40, 38, 20, 10, 15, 16, 17, 8, 4, 30
D. 40, 30, 20, 10, 15, 16, 17, 8, 4, 35
E. None of the other options

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

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 parent (assume $i \neq 0$)?

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