Started on	Monday, December 4, 2023, 3:59 PM
State	Finished
Completed on	Monday, December 4, 2023, 4:04 PM
Time taken	4 mins 22 secs
Grade	**10.00** out of 10.00 (**100**%)

Question 1
Correct
1.00 points out of 1.00

Which of the following are not true of a max-heap held in an array A?

a. Each node is the root of its own heap.
b. The largest element can be found in O(1) time.
c. The smallest element is contained in the last half of the array.
d. The smallest element can be found in O(n) time.
e. All of the above are true. ✔
f. None of the above are true.

Your answer is correct.
The correct answer is:
All of the above are true.

Question 2
Correct
1.00 points out of 1.00

What is the height of a heap with exactly 2^n nodes?

a. 2n
b. n ✔
c. None of the above
d. n-1
e. lg n

Your answer is correct.
The correct answer is:
n

Question 3
Correct
1.00 points out of 1.00

If the array {12, 6, 8, 3, 7, 5} is meant to represent a max heap, which node violates the heap property?

a. The node containing 12
b. The node containing 6 ✔
c. The node containing 8
d. The node containing 3
e. The node containing 7
f. The node containing 5

Your answer is correct.
The correct answer is:
The node containing 6

Question 4
Correct
1.00 points out of 1.00

If the array {12, 6, 8, 3, 7, 5} is meant to represent a max heap, and If Max-Heapify is called on the node that violates the heap property, what is the resulting correct max heap?

a. {12, 8, 6, 3, 7, 5}
b. {12, 6, 8, 3, 7 ,5}
c. {12, 8, 7, 6, 5, 3}
d. {12, 7, 8, 3, 6, 5} ✔
e. None of the above.

Your answer is correct.
The correct answer is:
{12, 7, 8, 3, 6, 5}

Question 5
Correct
1.00 points out of 1.00

Is an array sorted in descending order a max heap, and is an array storing a correct max heap sorted in descending order?

a. The sorted array is a max heap, but the max heap does not necessarily contain the numbers sorted in descending order. ✔
b. The max heap contains the numbers sorted in descending order, but the sorted array is not necessarily a max heap.
c. Both of the above are true.
d. Neither of the above are true.

Your answer is correct.
The correct answer is:
The sorted array is a max heap, but the max heap does not necessarily contain the numbers sorted in descending order.

Question 6
Correct
1.00 points out of 1.00

Why is the time complexity of Max-Heapify O(h) and not Θ(h)?

a. The worst case is that the height of the heap is O(lg n)
b. Θ(h) implies an upper and lower bound of h swaps. In many cases there will be 0 swaps, so h is only an upper bound, not a lower bound. ✔
c. Max-Heapify will always swap at least 2 nodes.
d. All of the above.
e. None of the above.

Your answer is correct.
The correct answer is:
Θ(h) implies an upper and lower bound of h swaps. In many cases there will be 0 swaps, so h is only an upper bound, not a lower bound.

Question 7
Correct
1.00 points out of 1.00

What is the time complexity to compute a median if Heapsort is used to sort the array and the middle item is returned?

a. O(n)
b. O(n lg n) ✔
c. $O(n^2)$
d. $O(n^3)$
e. None of the above

Your answer is correct.
The correct answer is:
O(n lg n)

Question 8
Correct
1.00 points out of 1.00

If one unit of space is the amount of memory required to hold 1 item being sorted, and n items are being sorted, how much space does Heapsort use?

a. n+1 ✔
b. 2n
c. n lg n
d. n^2
e. None of the above

Your answer is correct.
The correct answer is:
n+1

Question 9
Correct
1.00 points out of 1.00

What is the time complexity of the maximum operation (the operation that returns the largest element in the queue) of a priority queue?

a. O(1) ✔
b. O(n)
c. O(2n)
d. O(n lg n)
e. $O(n^2)$

Your answer is correct.
The correct answer is:
O(1)

Question 10
Correct
1.00 points out of 1.00

What is the time complexity of Heapsort on an already-sorted array?

a. O(1)
b. O(n)
c. O(2n)
d. O(n lg n) ✔
e. $O(n^2)$

Your answer is correct.
The correct answer is:
O(n lg n)