CS & IT ENGINEERING

Algorithms

Heap Algorithm & Backtracking and Branch-Bound

DPP Discussion Notes

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01 Question

02 Discussion

Q.1

[MCQ]

Consider the statements.

S1: Merge-sort, quick-sort and bubble sort are comparison-based sorting algorithms

S2: A reverse-sorted array (i.e. .....decreasing order) is always max-heap

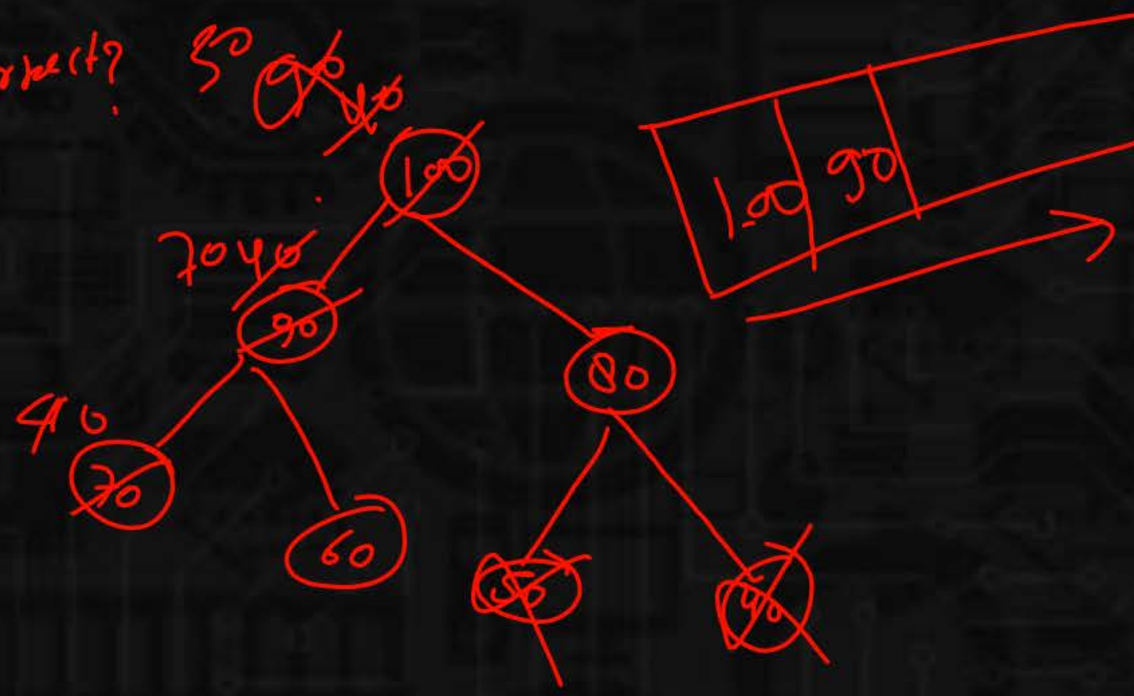
Which of the following statement is correct?

A. Only S1 is true

B. Only S2 is true

C. Both S1 and S2 are true

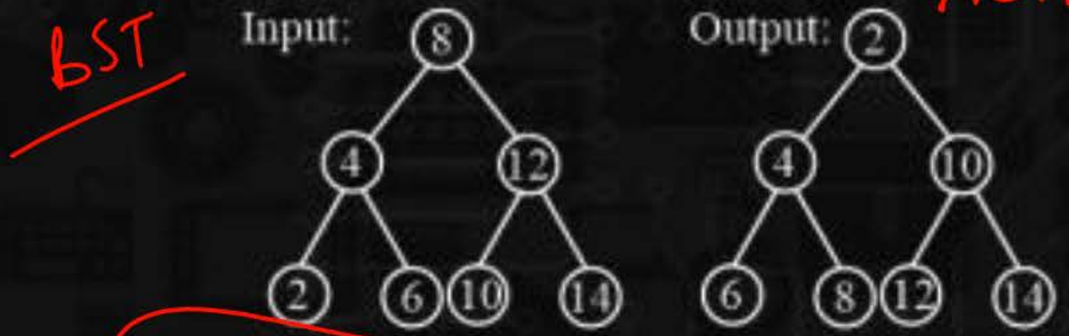
D. Neither S1 nor S2 is true.



Q.2

Consider a binary search tree which is also a complete binary tree. The problem is to convert the BST into a minheap with the condition that, all the values in the left subtree of a node should be less than all the values in the right subtree of the node. This condition is applied on all the nodes in the process of converting BST into minheap.

What will be the worst-case time complexity (tightest) of given problem, if we can take auxiliary space of O(n)? [MCQ]

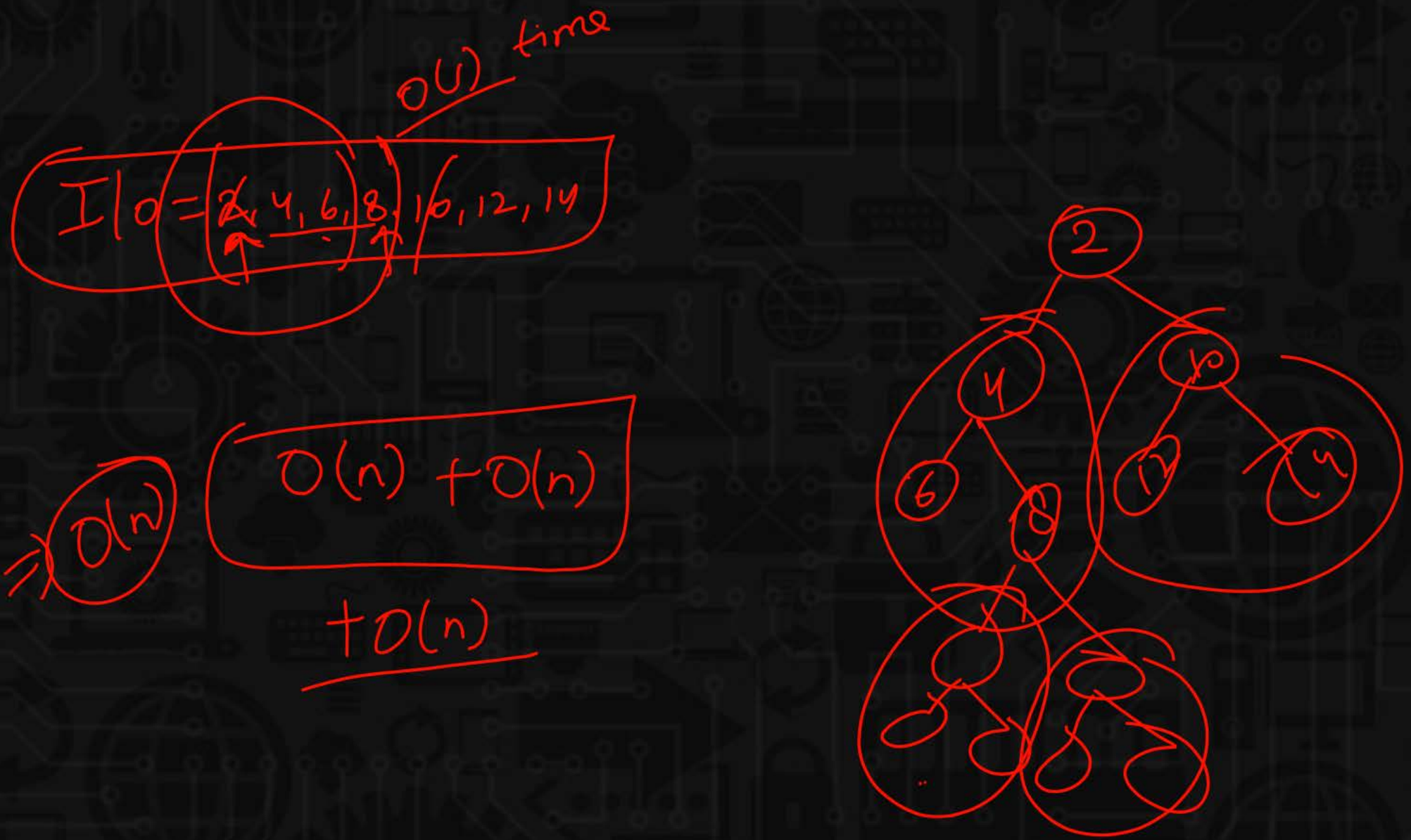


A. O (n)

B. O (n^2)

C. O (log n)

D. O (n log n)


O(1) time
I/O = 2, 4, 6, 8, 10, 12, 14
O(n)
O(n) + O(n)
+O(n)
2
4
10
6
8
12
14

LRR

90, 94, 94.2 95 96 97 99

100 104 105 106 115, 120, 130

Q.3

How many different min-heap are possible with keys 1, 2, 3, 4, 5?

[MCQ]

A. 5

B. 6

C. 4

D. 8

Q.4 What is the maximum number of exchanges required to order an array of 5 elements using the selection sort? ___ [MCQ]

5-1=4

⇒ O(1)

⇒ 1

n # Swaps = n-1

n # Comparisons = $\frac{n(n-1)}{2}$

$O(n^2)$

A. 1

B. 2

C. 3

D. 4

Q.5

Number of undirected graph (not necessarily connected) can be constructed by given set

V = [1, 2, 3, 4] of 4 vertices are ____. **[NAT]**

64

If n nodes then total # graph $= 2^{n(n-1)/2}$

$= 2^{4\times3/2} = 2^6 = 64$

Q.6

The number of spanning trees of an undirected completed graph with 7 nodes is ____

[NAT]

16807

n nodes

$= n^{n-2}$

$= 7^5$

16807

Q.7

[MCQ]

Consider the following statements

S1: Backtracking is an algorithm technique for solving problems reclusively by trying to build a solution incrementally.

S2: Time complexity of N - Queens algorithm is O(n!). Which statement is true?

A. only S1

B. only S2

C. Both S1 and S2 are true

D. Neither S1 nor S2 is true


THANK YOU GW
SOLDIERS !