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Assessment Report
Week 6 Coachable Quiz

Shiva Reddy
shivajreddy@outlook.com

Joined on June 07, 2023
Completed in 2 hours and 2 minutes

- **SCORES**
- SKILL RATINGS
- SCORECARD
- CHALLENGE SOLUTIONS
- MULTIPLE CHOICE ANSWERS

Scores

Scores	Average	Qualifying	Final
	88%	70%	**97%**
Coding challenges	×50%		**100%**
Multiple choice	×50%		**93%**
Open-ended			N/A

Cheating	Overall
	No issues
✂ Pasted code	Not detected
🗎 Plagiarism	Not detected
→ Leaving tab	2 times
⚠ AI detection	Not detected

Skill ratings   Learn more about these

Python3	Data Structures	Algorithms
Advanced	Beginner	Beginner
⚡⚡⚡	⚡⚡⚡	⚡⚡⚡

Scorecard

Algorithm skills	Code quality	Python3 skills	Recommenda
☆☆☆☆☆	☆☆☆☆☆	☆☆☆☆☆	👍

Private notes to share with your team...

Challenge solutions   Expa

Week 6 Coding Quiz A ⧉	Cheating not detected	10/10
Run solution | Unit tests		Python3
		▶ Video 1 2
		🌐 United States

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| **Week 6 Coding Quiz C** ⧉ | | Cheating not detected | 10/10 |
| Run solution │ Unit tests | | | |

Python3
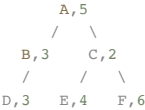▶ Video
🌐 United States

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Multiple choice answers

1. Suppose I wanted to find the sum of the values of the nodes in each subtree. For example in the tree below

```
        A,5
       /   \
     B,3    C,2
     /      /   \
   D,3    E,4    F,6
```

I'd want to return {'A': 23, 'B': 6, 'C': 12, 'D': 3, 'E': 4, 'F': 6}.

What tree traversal would I use to accomplish this?

   ✕ Preorder

2. Suppose I wanted to print out the K smallest values in a binary search tree. For example in the tree below

```
        5
       /   \
      3     7
     /     /   \
    2     6     8
```

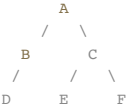If K = 3, I'd want to return [2, 3, 5].

What tree traversal would I use to accomplish this?

   ✔ Inorder

3. Suppose I wanted to print out the tree in a zigzag order. Here, "zigzag order" is defined as:
Traverse the first level of the tree left to right
Traverse the second level of the three right to left
Traverse the third level of the tree left to right
...

For the tree below,

```
        A
       /   \
      B     C
     /     /   \
    D     E     F
```

I'd want to return [['A'], ['C', 'B'], ['D', 'E', 'F']]. What traversal would I use to accomplish this?

   ✔ Breadth First Search

4. Suppose I wanted to print out the K largest values in a binary search tree. For example in the tree below

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What tree traversal would I use to accomplish this?

✔ Inorder

5. A path in a binary tree is a sequence of nodes where each pair of adjacent nodes in the sequence has an edge connecting them. A node can only appear in the sequence at most once. Note that the path does not need to pass thr the root.

The path sum of a path is the sum of the node's values in the path.

Given the root of a binary tree, I'd like to find the max path sum of any non empty path. For instance for the below tree
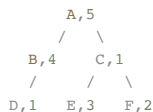
```
        -10
       /    \
      9      20
            /   \
           15    7
```
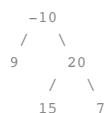
The optimal path is 15 -> 20 -> 7 with a path sum of 15+20+7=42.

What tree traversal would I use to accomplish this?

✔ Postorder

6. Suppose I have the following binary tree

```
        A,5
       /    \
      B,4     C,1
     /      /   \
    D,1   E,3   F,2
```

And I have the following recurrence relation

```
f(node) = (f(node.left) + f(node.right) + node.val) * 2
f(None) = 0 # If a node doesn't have right or left, count that as 0.
```

What's the output of the recurrence relation for the root node A?

✔ 78

7. In an n-ary tree, each node can have up to n children. Suppose I have an n-ary tree node class:

```
class Node:
  def __init__(self, val):
    self.val = val
    self.children = []
```

How would I perform a postorder traversal where I print all the node values? Assume that self.children always orders t children from left to right and that there are no duplicate nodes in self.children.

✔
```
def postorder node: Node None  () -> :
  for in    children  node.children:
     postorder(children)
   print(node.val)
```

8. Will this function work? If not, why not? Assume the initial input is always n >= 0, and that n is an integer.

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```
def function(n: int) -> int:
  if n == 0:
    return 0
  return function(n) + n
```

✔ No. The subproblem doesn't get smaller.

10. Will this function work? If not, why not? Assume the initial input is always n >= 0

```
def function(n: int) -> int:
  if n == 0:
    return 1
  return function(n-1) + n
```

✔ Yes.

11. Will this function work? If not, why not? Assume the initial input is always n >= 0, and that n is an integer.

```
def function(n):
  if n == 0 or n == 1:
    return 1
  return function(n-3) + function(n-2) + function(n-1)
```

✔ No. The base case is missing or wrong.

12. Will this function work? If not, why not?

```
class Node:
  def __init__(self, val):
    self.val = val
    self.left = None
    self.right = None

def function(node: Node) -> int:
  left_sum = function(node.left)
  val = node.val
  right_sum = function(node.right)
  return left_sum + val + right_sum
```

✔ No. It will throw an Attribute Error ("'___' object has no attribute '___'")

13. Given the following undirected graph,

```
a -- b
|    |
c -- d
```

What is the correct adjacency matrix representation? The answer should have row and column order a, b, c, d, i.e.

```
    a  b  c  d
a [[w, x, y, z],
b  [...],
c  [...],
d  [...]]
```

and will have an entry of True if the two are connected. i.e. if a is connected to b then the following cells would be mar True (T).

```
    a  b  c  d
a [[?, T, ?, ?],
b  [T, ?, ?, ?],
```

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14. Given the following undirected graph,

```
a -- b
|    |
c -- d
```

What is a correct adjacency list representation?

✔
```
'a' 'b' 'c' 'b' 'a' 'd' 'c' 'a' 'd' 'd' 'b' 'c' { : [, ], : [, ], : [, ], : [, ] }
```
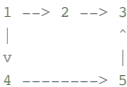
15. Given the following directed graph,

```
a --> b
^     |
|     v
c <-- d
```

What is a correct adjacency list representation?

✔
```
'a' 'b' 'b' 'd' 'c' 'a' 'd' 'c' { : [], : [], : [], : [] }
```

16. Which of the following is NOT a property of a minimum spanning tree?

✕ The tree spans all the nodes in the graph.

17. What is a valid topological ordering for the following graph?

```
1 --> 2 --> 3
|           ^
v           |
4 -------> 5
```

✔ [1, 2, 4, 5, 3]

18. Consider a binary tree where each node has a value, and each node can be colored red or blue. What is the recurre
relation for the number of ways to color the nodes of a binary tree of height h such that no two adjacent nodes have t
same color? Here two nodes are adjacent if they have the same parent node.

✔ f(h) = 2*f(h-1)

19. Is there a valid topological ordering for this graph? If not, why not?

```
1 <-- 2
|     ^
v     |
4 --> 5
```

✔ No, there is a cycle.

20. Which of the following is always true?

The "main diagonal" is the diagonal that starts at cell (0, 0) and ends at cell (n, n).

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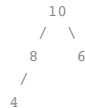Completed in 2 hours and 2 minutes

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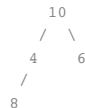- CHALLENGE SOLUTIONS
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(a)

```
      10
     /  \
    8    6
          \
           4
```

(b)

```
      10
     /  \
    8    6
   /
  4
```

(c)

```
      10
     /  \
    4    6
   /
  8
```

(d)

```
       4
      / \
    8    6
   /
  10
```

✔ b

22. A 3-ary max heap is like a binary max heap, but instead of 2 children, nodes have 3 children. A 3-ary heap can be represented by a list l as follows:
   1. The root is stored in the first location, l[0]
   2. Nodes in the next level, from left to right, is stored from l[1] to l[3].
   3. The nodes from the second level of the tree from left to right are stored from l[4] location onward.
   4. An item x can be inserted into a 3-ary heap containing n items by placing x in the location l[n] and pushing it u tree to satisfy the heap property.

Which one of the following is a valid sequence of elements in a list representing a 3-ary max heap?

✔ 9, 5, 6, 8, 3, 1

23. In a binary min heap containing n numbers, the smallest element can be found in this runtime:

✔ O(1)

24. What does the following function do?

```python
class Node:
    def __init__(self, data):
        self.left = None
        self.right = None
        self.data = data

def f(root, node):
    if root is None:
        root = node
    else:
        if root.data < node.data:
            if root.right is None:
                root.right = node
```

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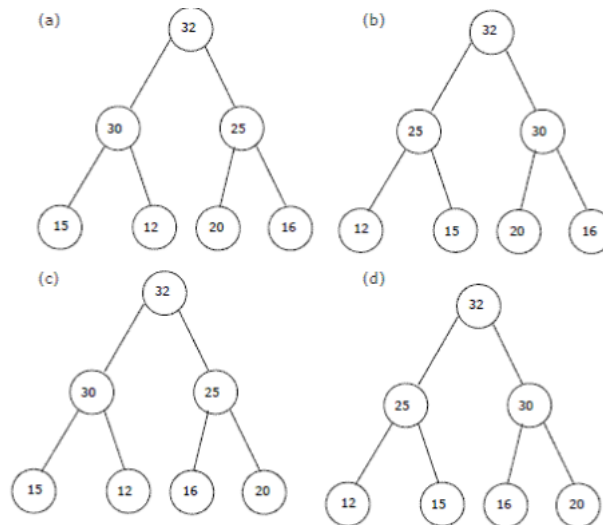Completed in 2 hours and 2 minutes

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25. The elements 32, 15, 20, 30, 12, 25, 16 are inserted one by one in the given order into a max heap. Which of the follo
is the resultant max heap?

✔ a

26. Consider a binary max heap implemented using a list. Which one of the following list represents a binary max heap

✔ [26, 15, 17, 14, 11, 9, 13]

27. Suppose we have a binary max heap where the elements are stored in a list as [25, 14, 16, 13, 10, 8, 12] initially. Wha
the content of the list after two delete operations?

✔ [14,13,12,8,10]

28. What is the runtime of inserting an element into (a) a max heap and (b) a min heap?

✔ a: O(log n), b: O(log n)

29. What's the runtime of the following code block, where n is the length of starting_list?

```
import heapq

starting_list = [2, 4, 1, 3, 5]
resultant_list = []
heap = []

for element in starting_list:
    heapq.heappush(heap, element)
while heap:
    resultant_list.append(heapq.heappop(heap))
```

✔ O(n log n)

30. Given the following adjacency list representation of a graph.

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What is the postorder starting from (1)? If there are multiple children, process the smallest one first. I.e. 2 before 3.

✔ 5 4 3 2 6 7 8 1

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