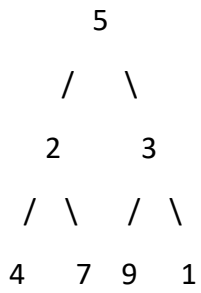
Average of Levels of Binary Tree LeetCode

Given the root of a binary tree, return *the average value of the nodes on each level in the form of an array*. Answers within 10^{-5} of the actual answer will be accepted.

Example:



Output:

Level 1: 5

Level 2: 2.5

Level 3: 5.25

Approach 1: Function to calculate the average values of levels in a binary tree

The **averageOfLevels** function calculates the average values of each level in the binary tree. It uses a queue for level-order traversal and calculates the average for each level as it processes the nodes.

Here's how the function works:

- It initializes a queue (**q**) and pushes the root node into the queue.
- It also initializes a variable **average** and a vector **ans** to store the average values for each level.
- The function enters a while loop that continues as long as the queue is not empty.
- Inside the loop, it gets the number of nodes at the current level (**size**).
- It initializes a sum for the current level (**sum**) and processes each node at the current level.
- For each node, it adds the value of the node to the **sum** and enqueues its left and right children if they exist.
- After processing all nodes at the current level, it calculates the average for that level (**average = sum / size**) and appends it to the **ans** vector.

- The loop continues to the next level, and the process repeats until all levels are processed.
- Finally, the function returns the vector **ans** containing the average values for each level.

Time Complexity: O(N), where N is the number of nodes in the binary tree. You visit each node once during the level-order traversal.

Space Complexity: O(W), where W is the maximum width of the binary tree at any level due to the queue and the ans vector.