

# TIC2001 Data Structure and Algorithm Quiz 2

Name: \_\_\_\_\_ Student #: A\_\_\_\_\_

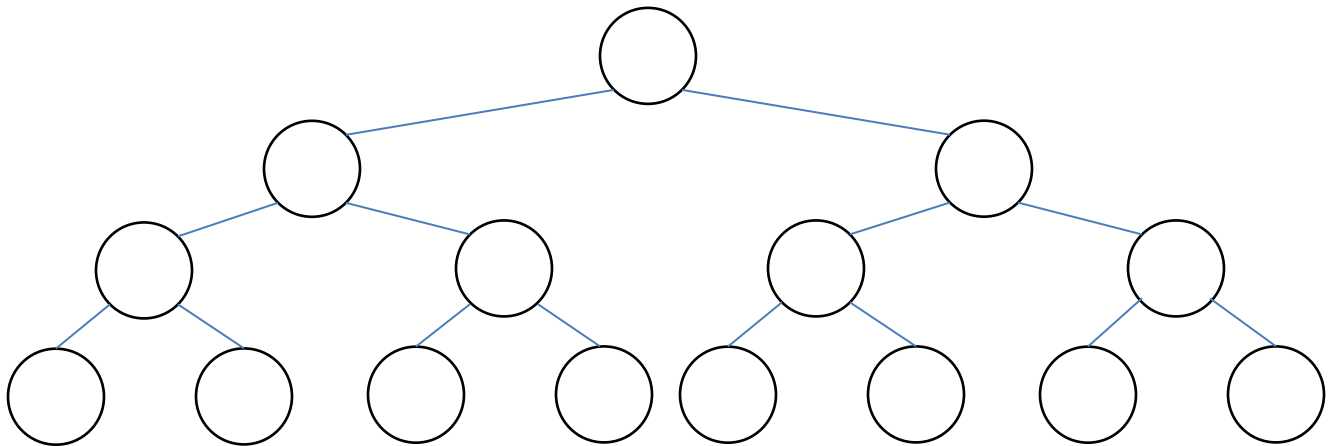
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Every operation in this quiz has to follow our lecture notes and notations. You don't need to use up all the bubbles, and you can add more bubbles if necessary.

## Question 1: AVL BST

Insert the following numbers by the given order into an AVL BST.

50, 20, 70, 10, 30, 60, 90, 40

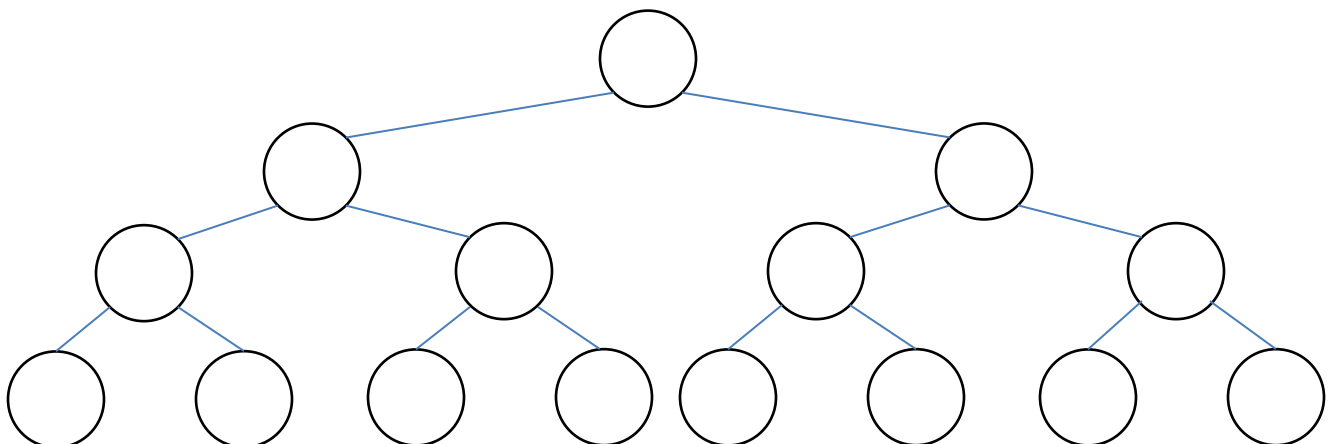


Insert 35 into the tree ABOVE **BEFORE (WITHOUT)** any rotation.

Which is the lowest node that lost the height-balance property? \_\_\_\_\_

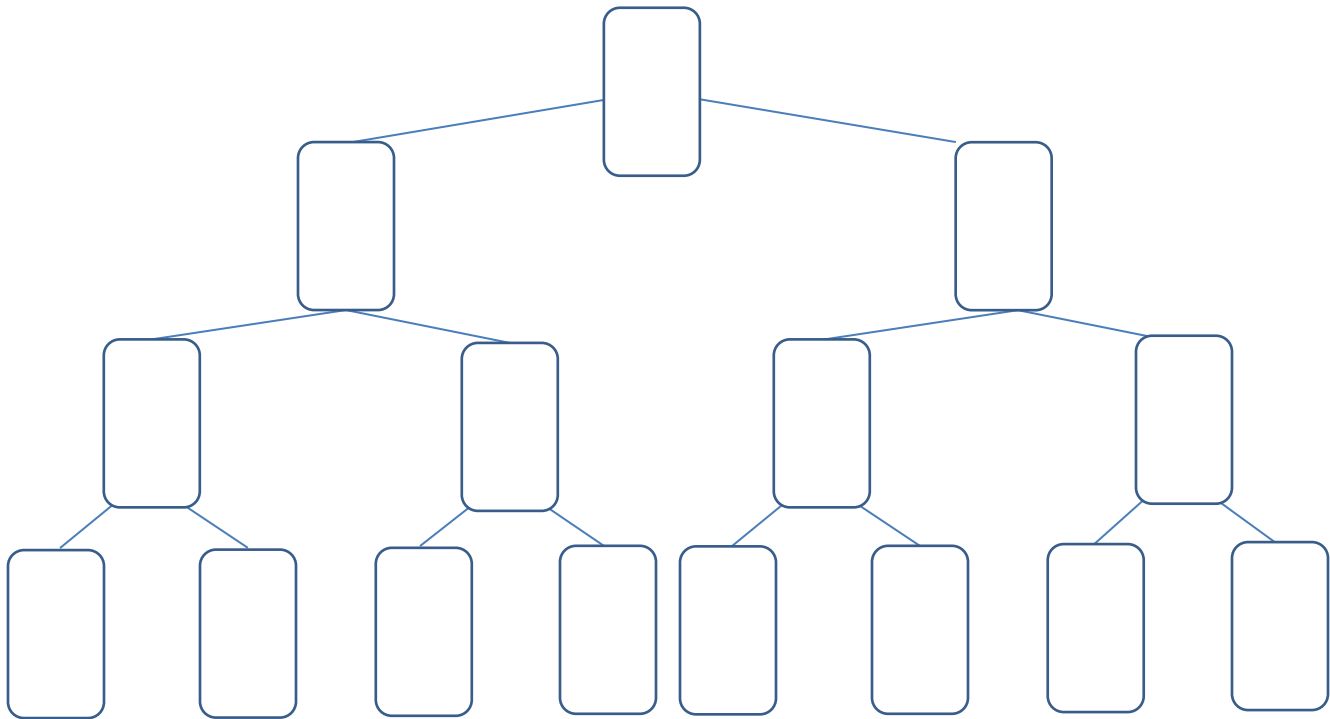
How many rotation(s) do you need? \_\_\_\_\_

Perform the rotation(s) to balance the tree and draw your final balanced tree below:

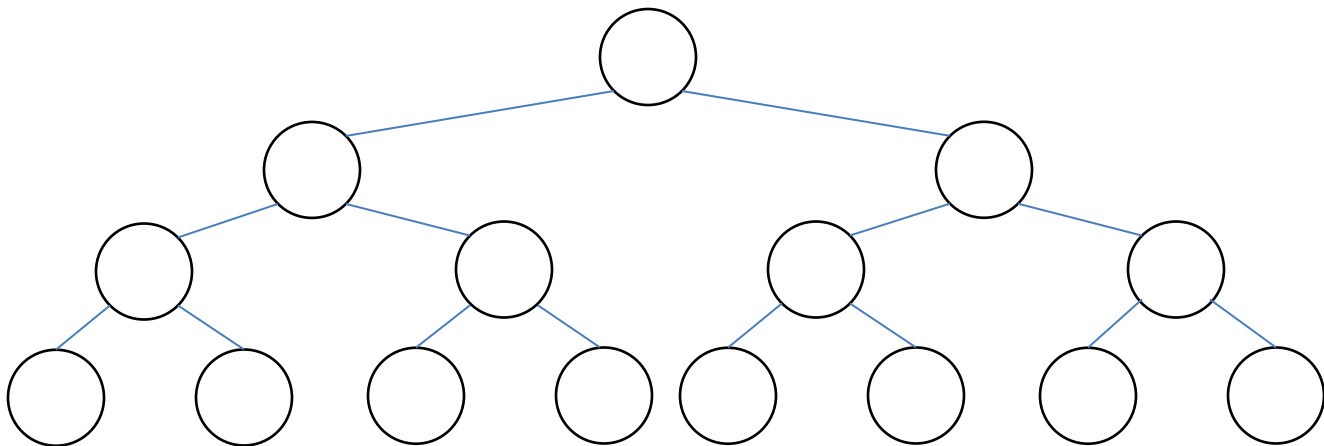


## Question 2: Binary Heap (MaxHeap)

Insert the following numbers according to the given order into the binary heap (Maxheap). Perform bubbling if necessary. The first two are done for you to show you how to do bubbling: **50, 60**, 40, 20, 35, 70, 1, 25, 5, 2, 9, 55, 54



Delete the node 35, and restore the heap property. Show your final heap below.



## Question 3: Consultation Booking System.

Before the final exam, a lot of students want to see the lecturer for consultations and he has an online system for them to book time slots. Each student can request a time  $t$  at the system and it will accept the request if there is no other booking(s) within the range of  $t \pm 20$  minutes; otherwise, the system will reject the request. E.g. if the system already has two booking of 15:00 and 14:00, a request for 14:15 will be rejected but a request of 15:30 will be accepted. Which data structure is the best for this system? And give one important reason to support your answer.