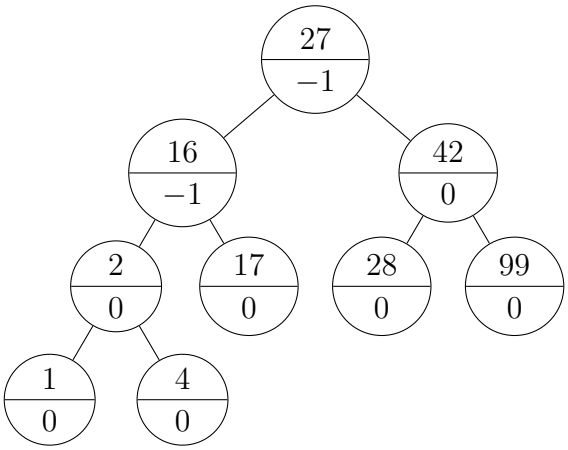
Assignment 3 Problem 1

Problem 1 [0+2+2=4 marks]

a) **Practice** (not worth any marks): Starting with an empty AVL tree, insert the following keys in order: 27 99 17 28 42 16 1 2 4.

You should obtain the AVL tree given in the next part.

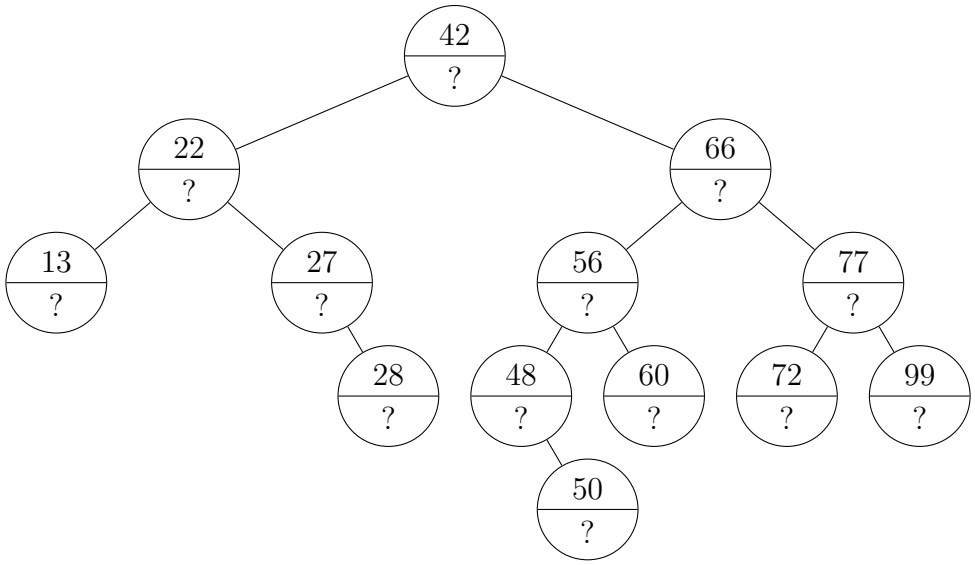
b) Given the following AVL tree:
Note: this tree shows balance factors instead of height.



Insert the following keys in order: $8^\star$, 22, 21, $18^\star$.

Show the resulting AVL trees with **balance factors** (not height) for each node after the elements marked with star ($\star$) are inserted.
Note: you should only show 2 trees.

c) Consider the following AVL tree:

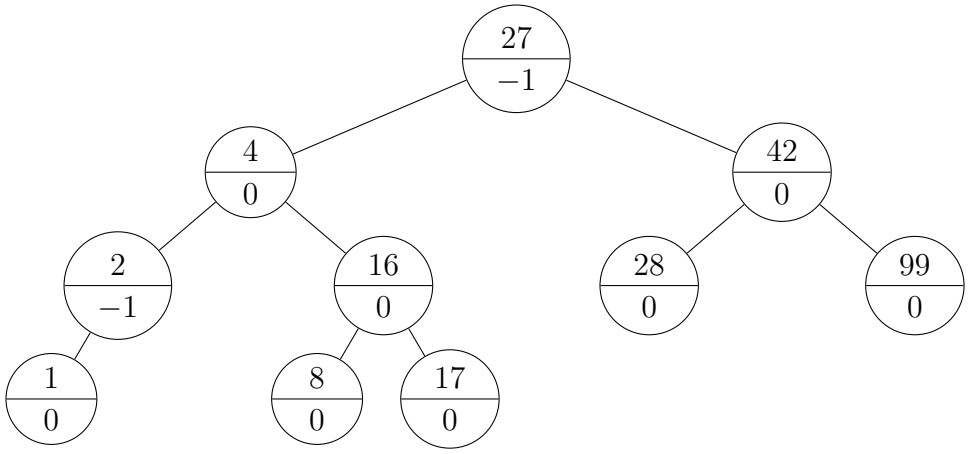


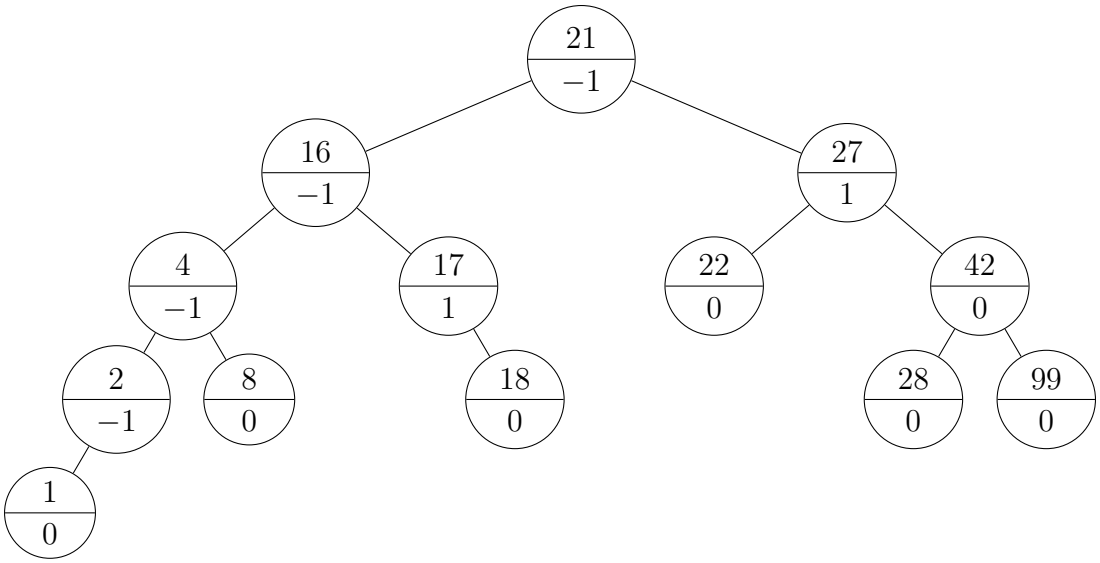
Given the above tree, delete the following keys in order:

$$66,\ 13^{\star},\ 72,\ 77,\ 56^{\star},\ 42^{\star}$$

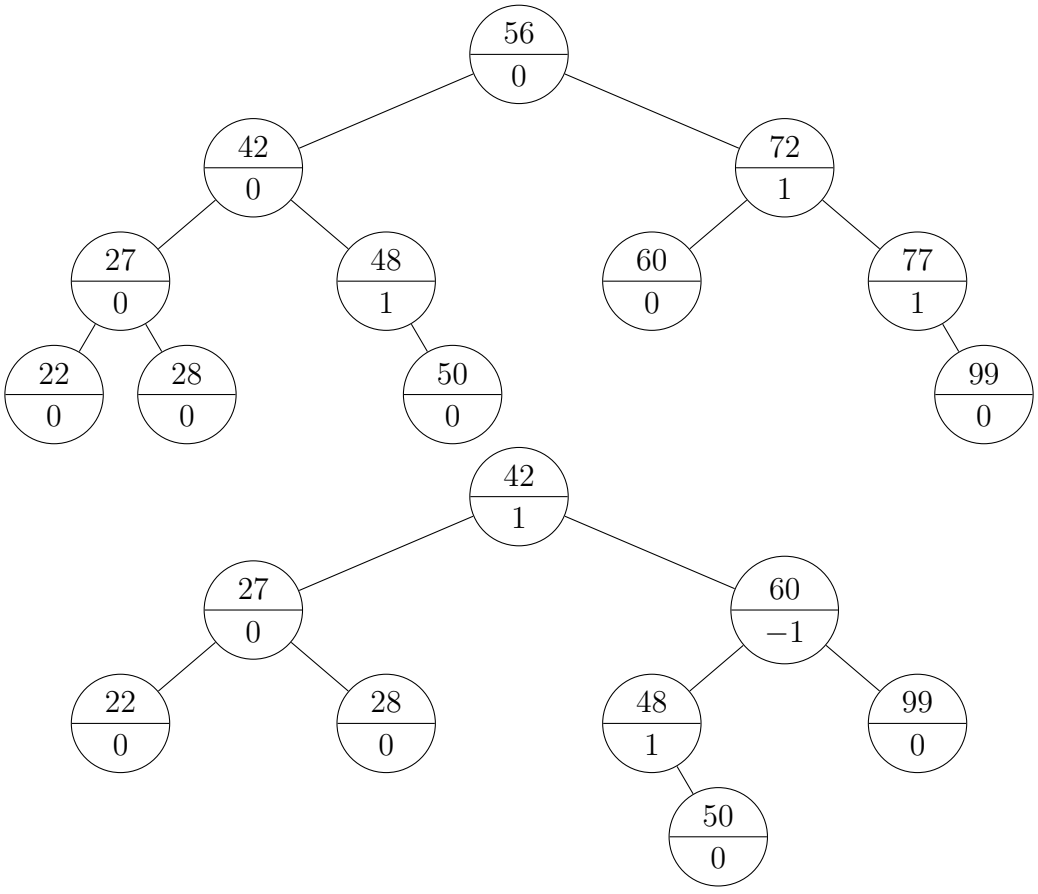
Show the resulting AVL trees with **balance factors** (not height) for each node after the elements marked with star ($\star$) are deleted. If you have a choice of which element to move up, pick the inorder successor.
Note: you should only show 3 trees.

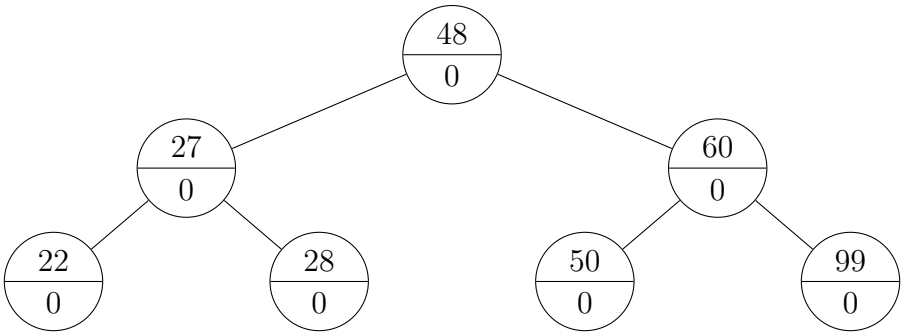
b) Solution:




21
−1
16
−1
27
1
4
−1
17
1
22
0
42
0
2
−1
8
0
18
0
28
0
99
0
1
0

c) Solution:


56
0
42
0
72
1
27
0
48
1
60
0
77
1
22
0
28
0
50
0
99
0
42
1
27
0
60
−1
22
0
28
0
48
1
99
0
50
0


48
0
27
0
60
0
22
0
28
0
50
0
99
0