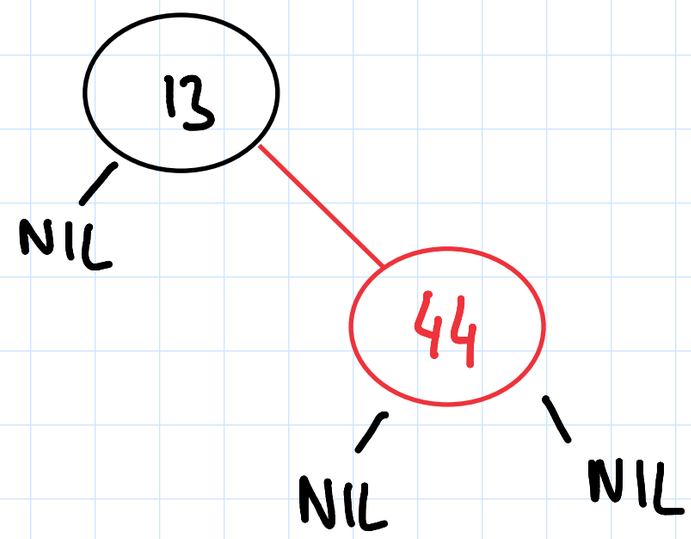
ADS Homework 10

Problem 10.1

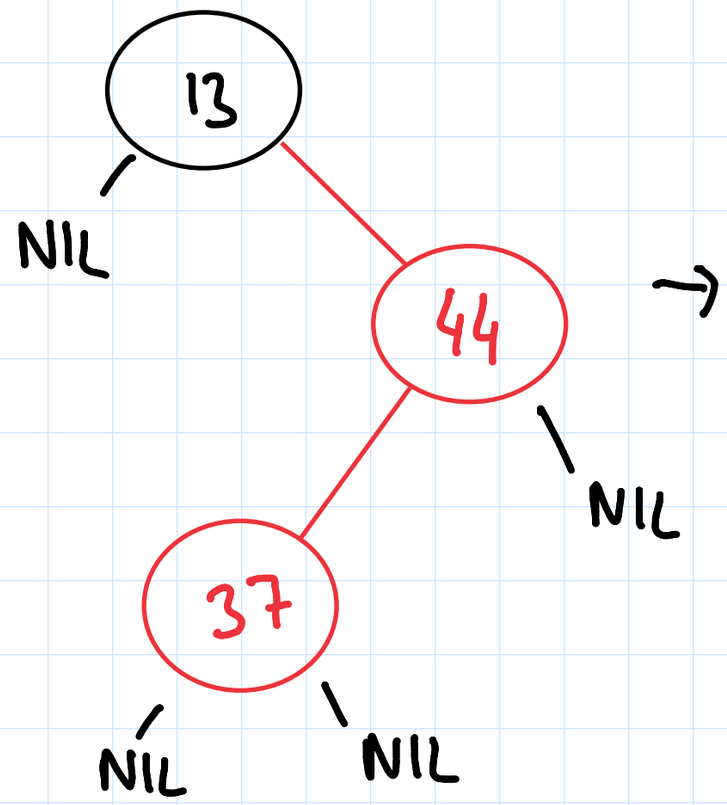
a)

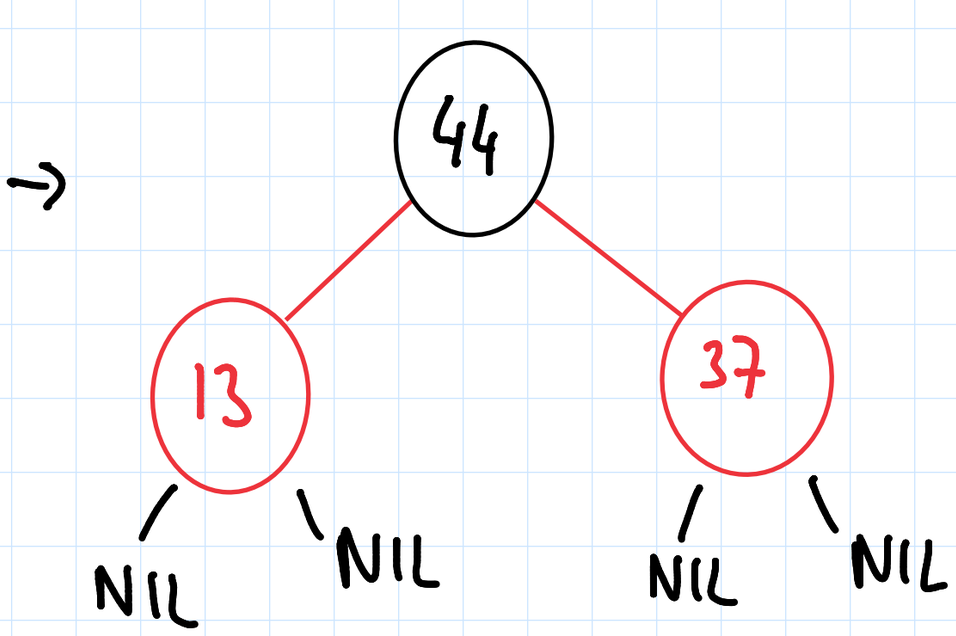
1)

2)

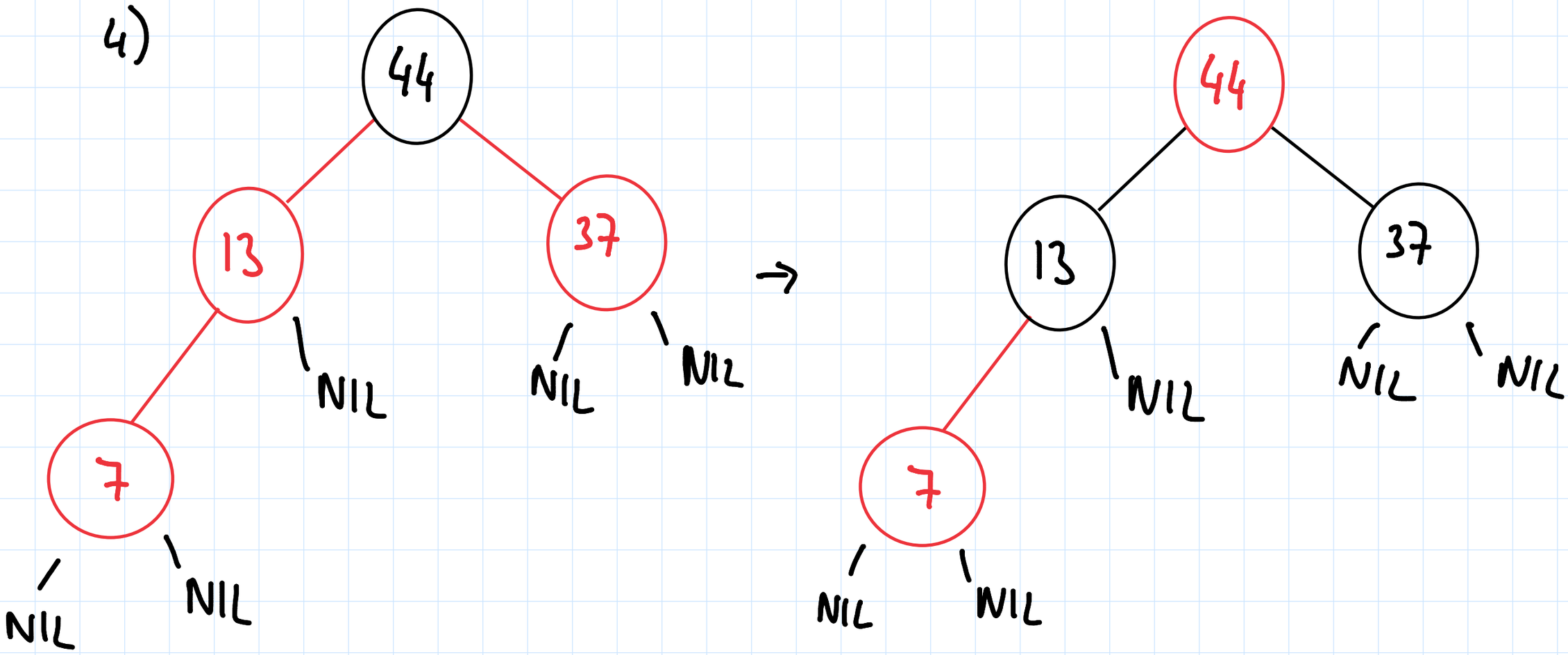


3)

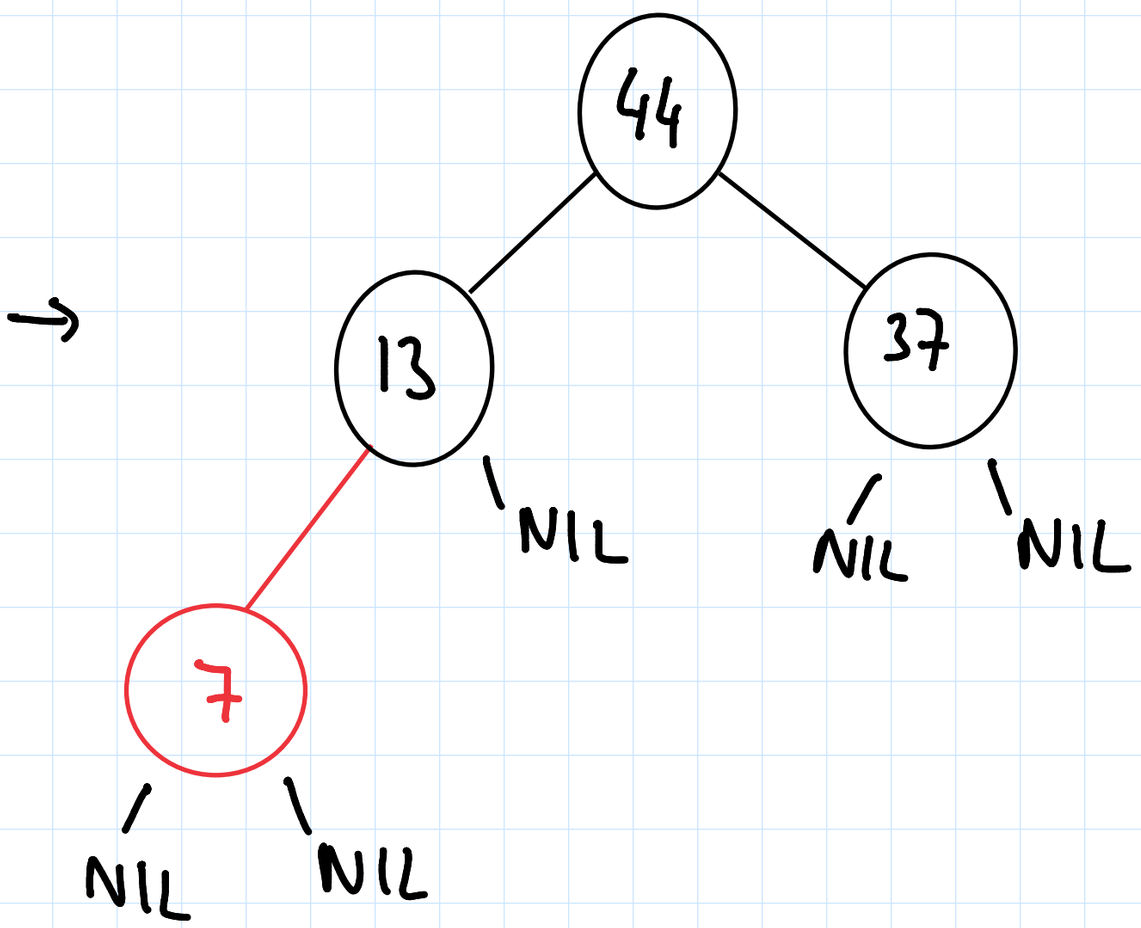




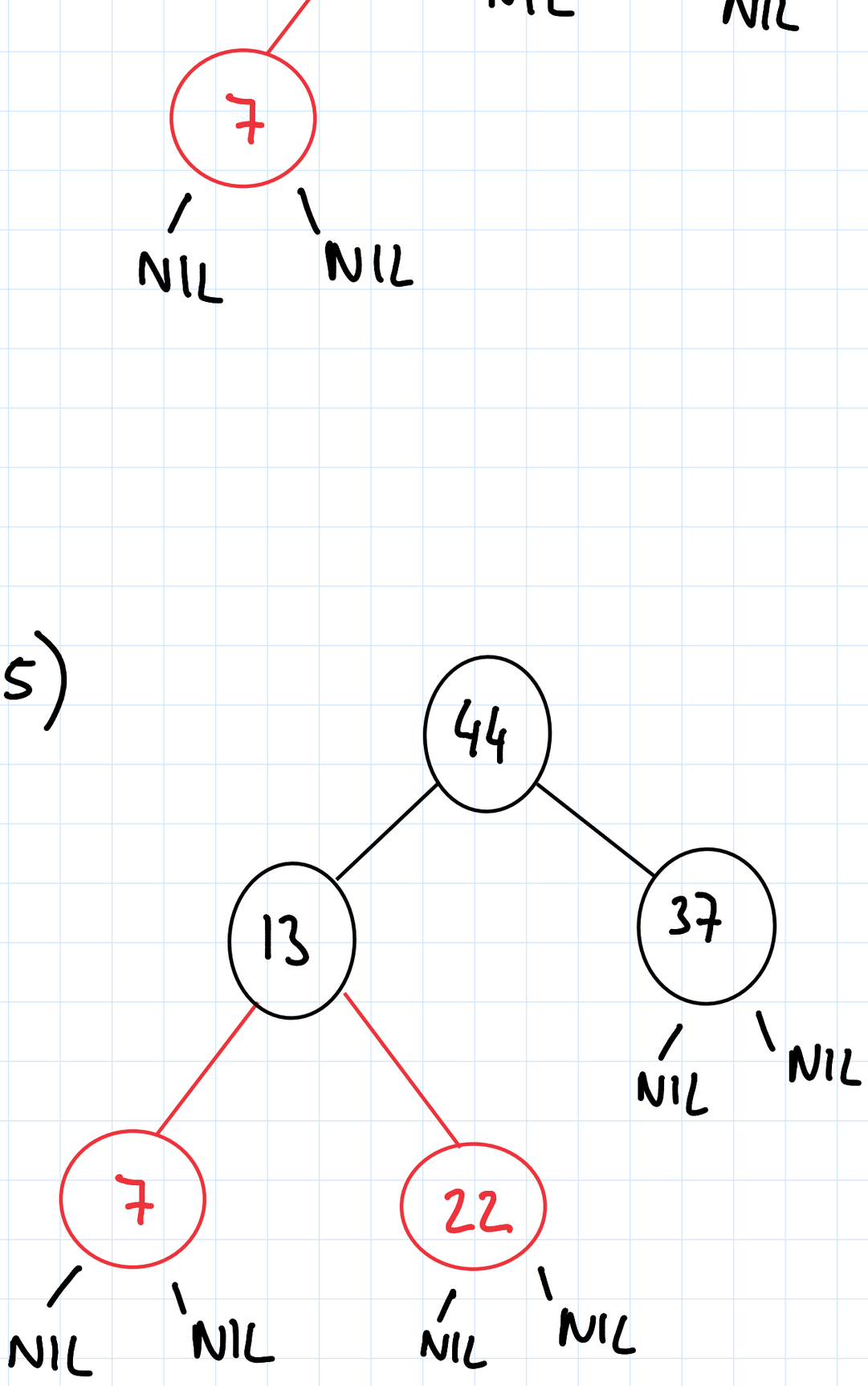
4)


44
13
37
NIL
NIL
NIL
7
NIL
NIL

44
13
37
NIL
NIL
NIL
7
NIL
NIL


44
13
37
NIL
NIL
NIL
7
NIL
NIL

5)


44
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37
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NIL
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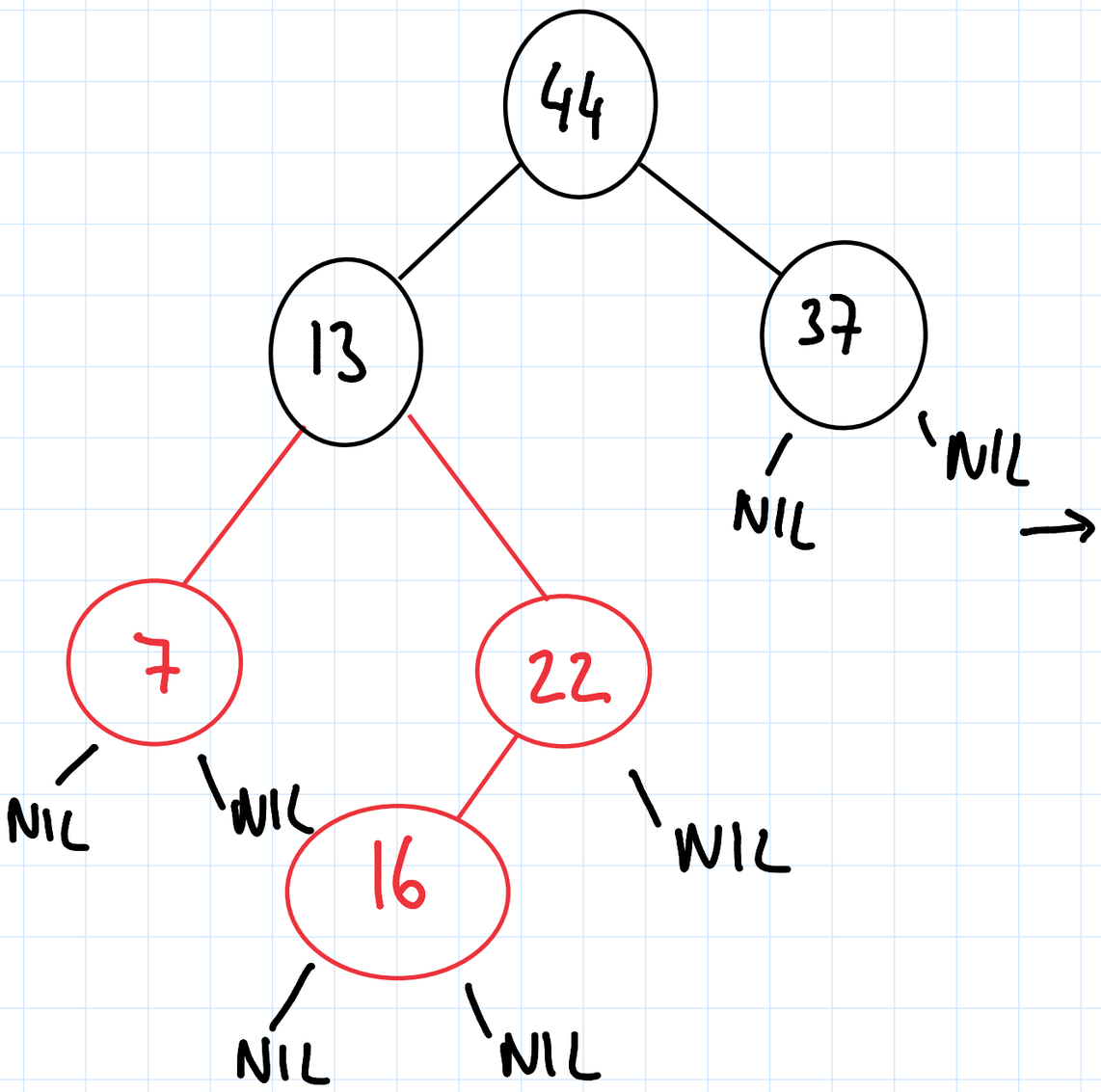
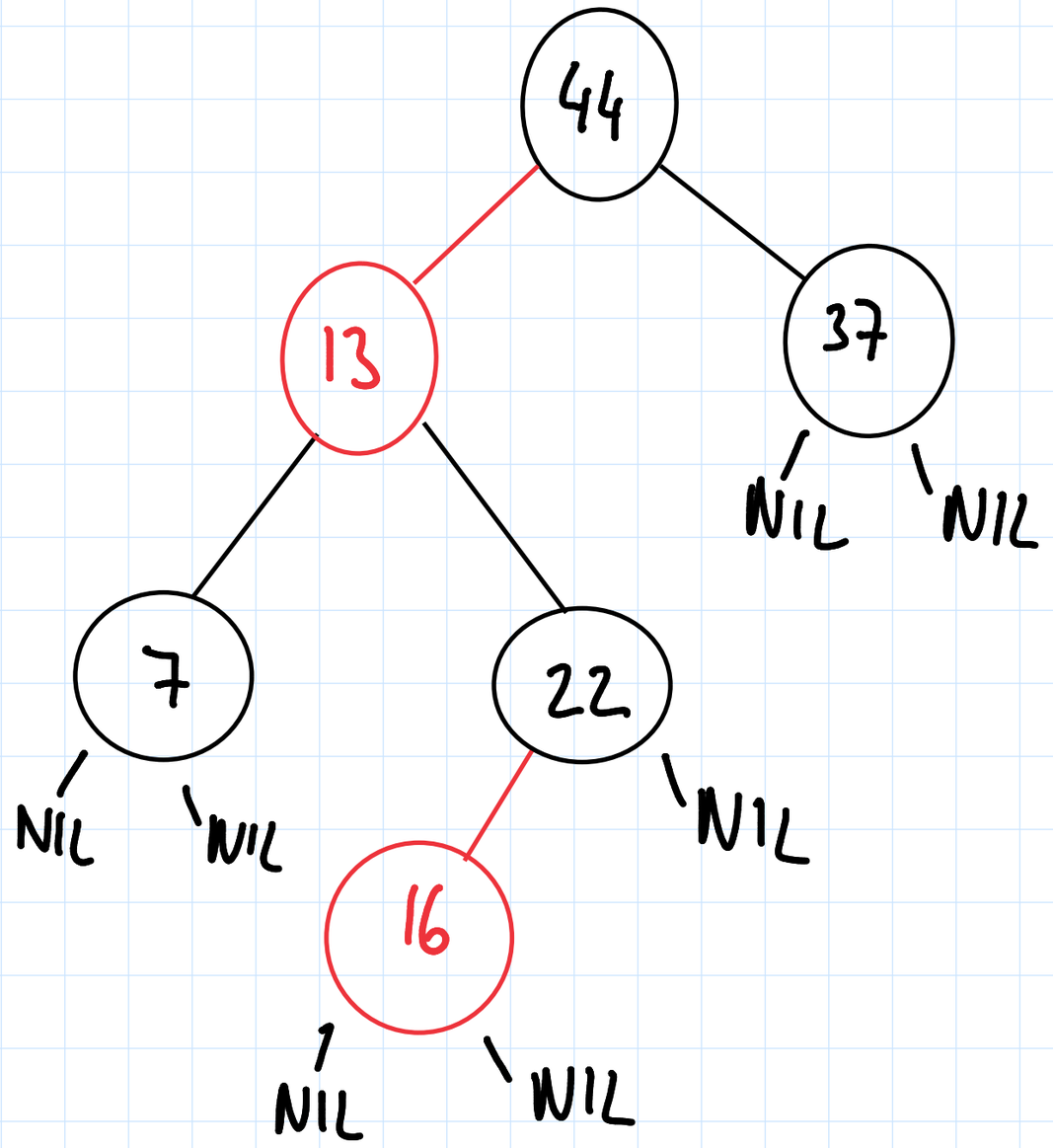
7
22
NIL
NIL
NIL
NIL

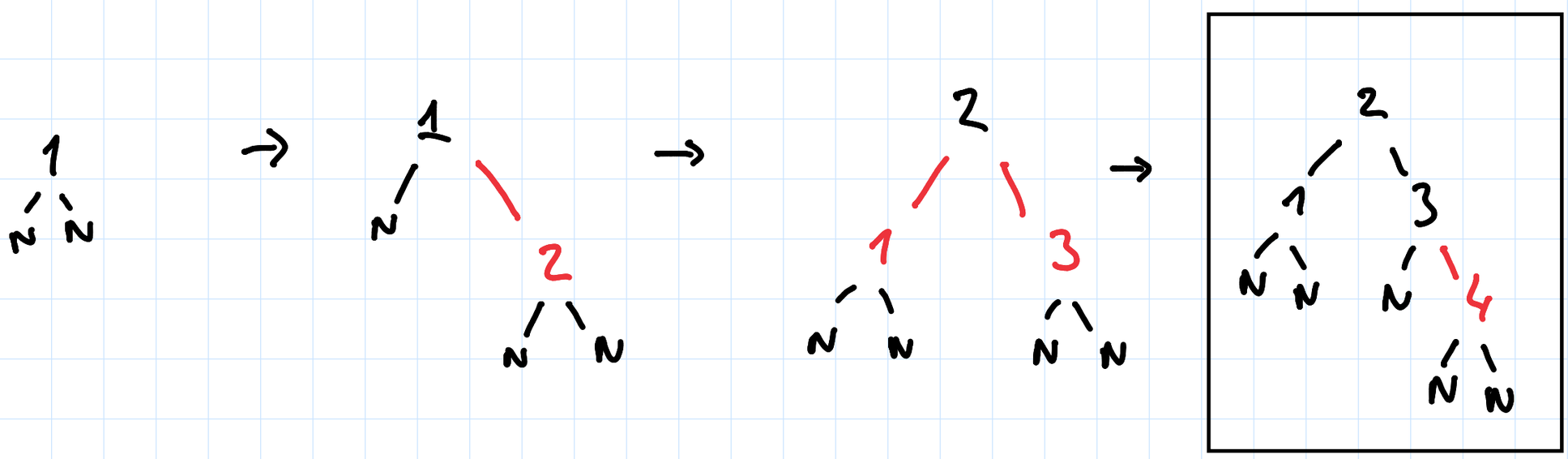
6)



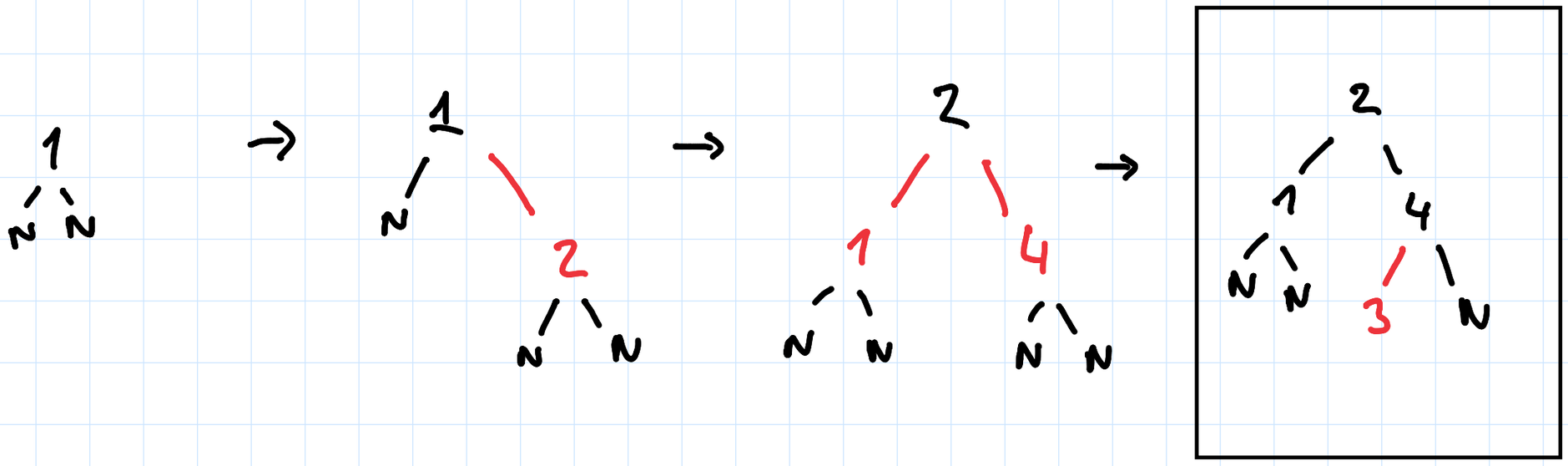


b)

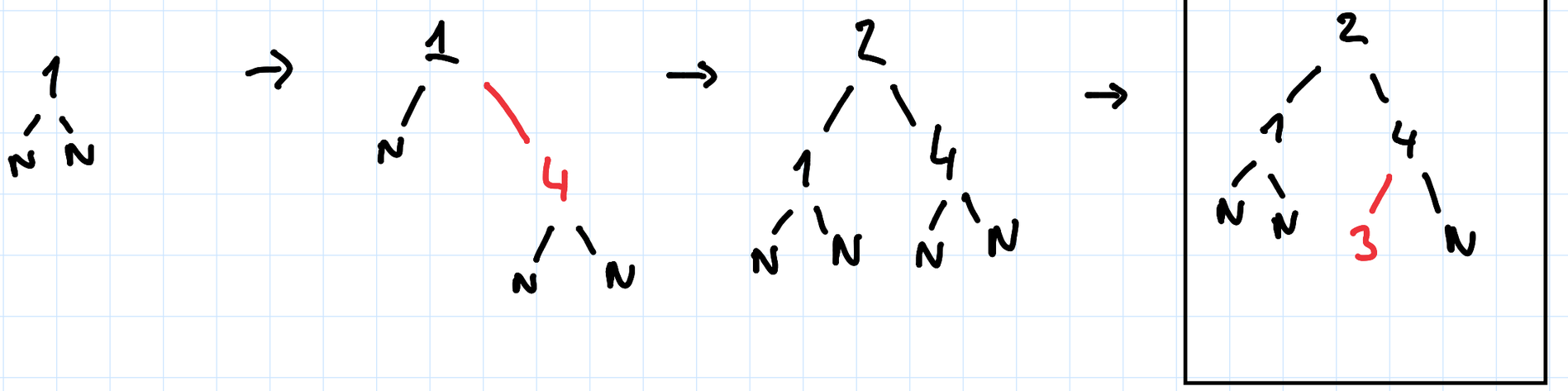
Insertion order: [1,2,3,4]



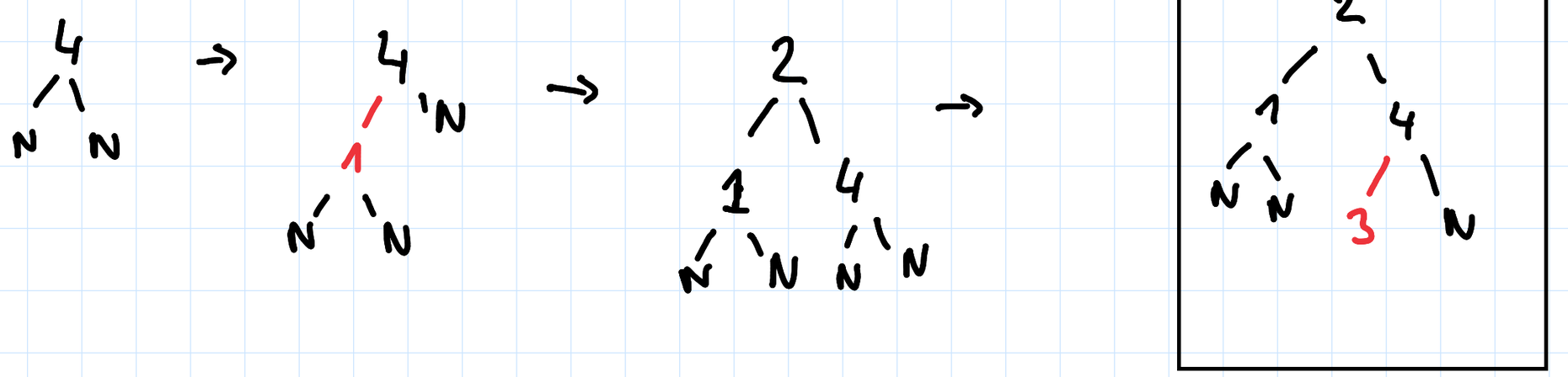
Insertion order: [1,2,4,3]



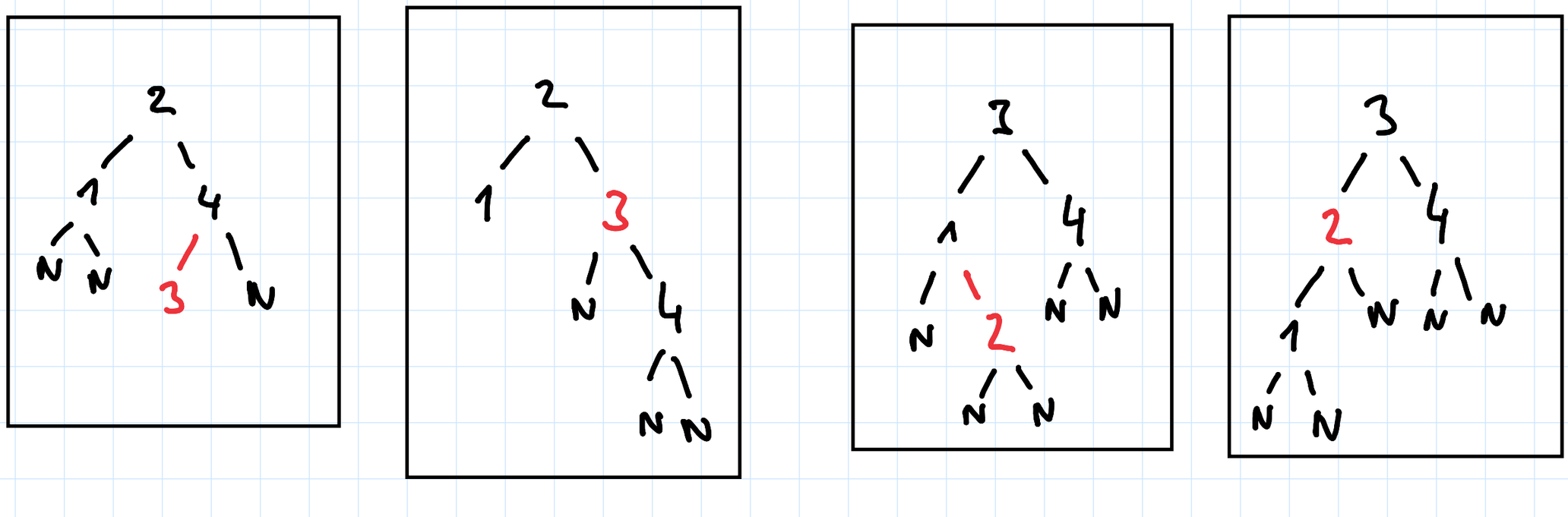
Insertion order: [1, 4, 2, 3]



Insertion order: [4, 1, 2, 3]



We can clearly observe that if 1 or 4 are at the root, they will bubble down (1's left branch is NIL, 4's right branch is NIL). This means that either 2 or 3 has to be root, producing the possibilities:



Notice that we can swap around the two elements in the longest subtree, but one the smaller number must be red, as to maintain the properties.