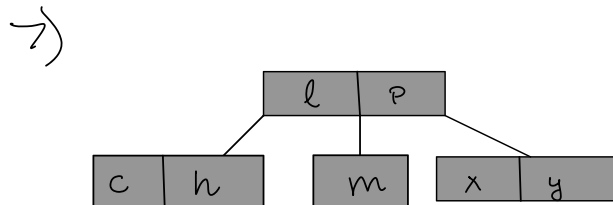
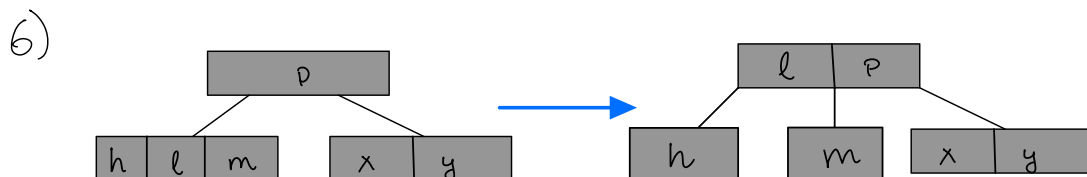
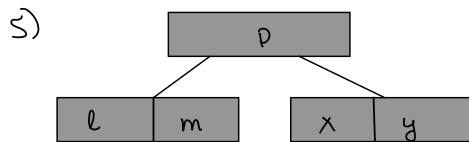
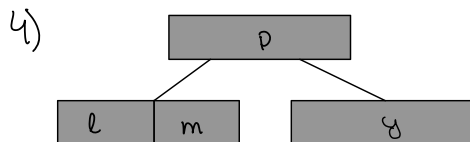
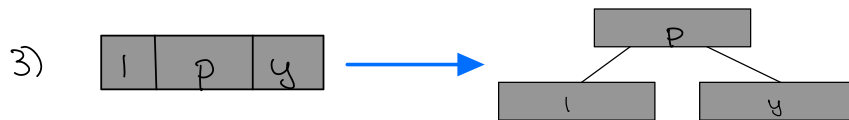
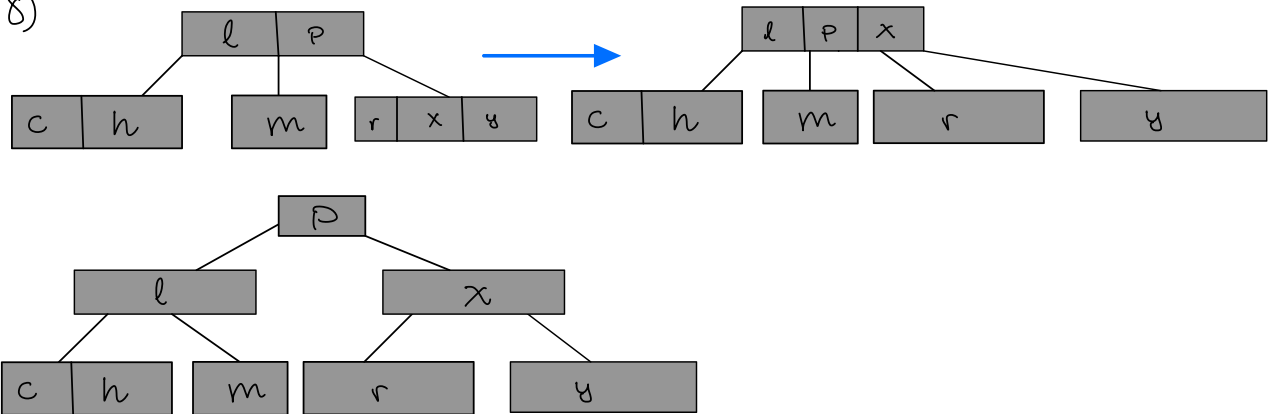


2-3 Trees

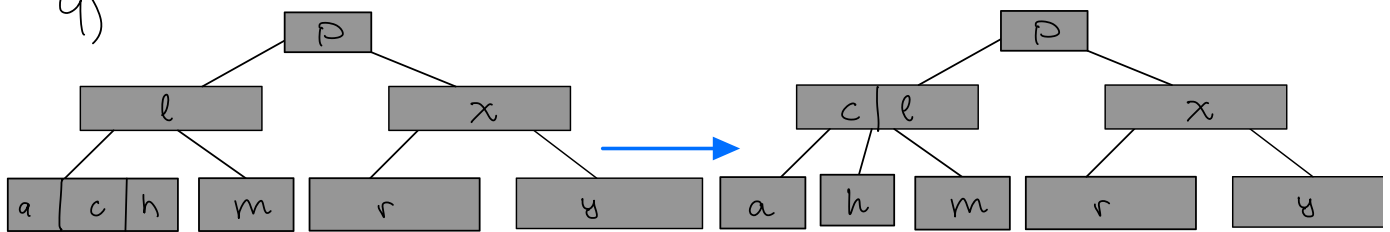
1) Draw the 2-3 trees that result when you insert the keys Y L P M X H C R A E S T B C A in that order into an initially empty tree. Show all intermediate and final trees after each insertion.



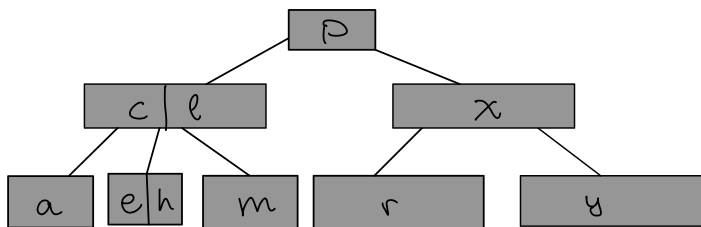
8)



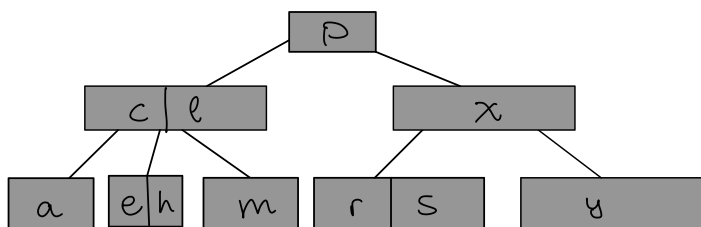
9)



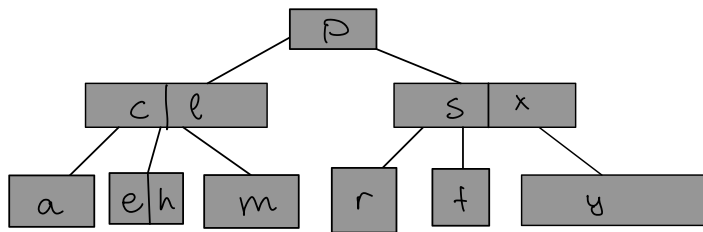
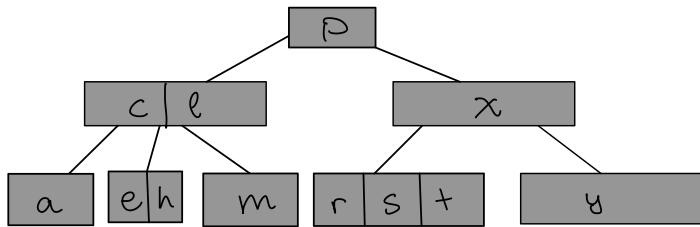
10)



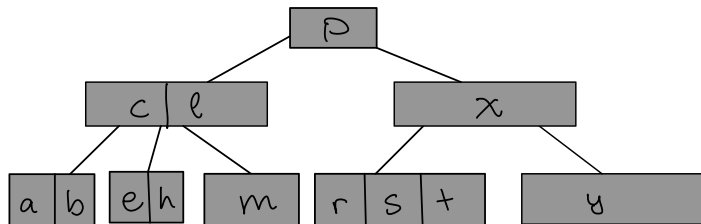
11)



12)

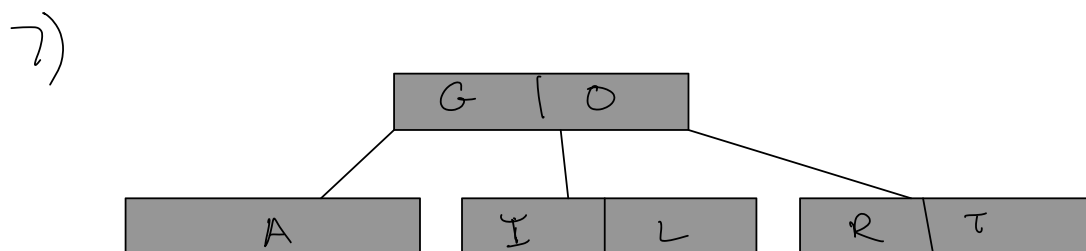
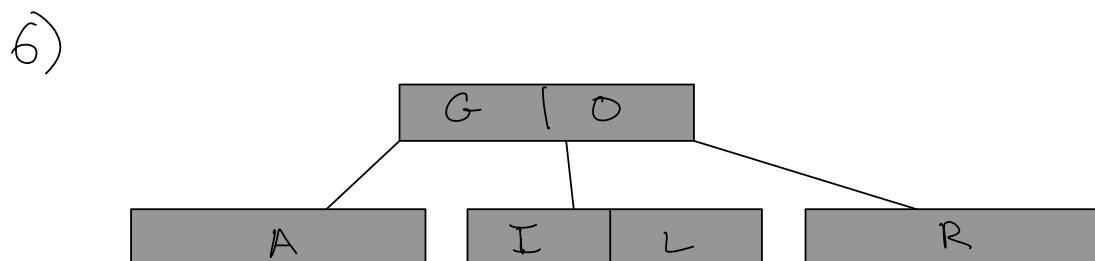
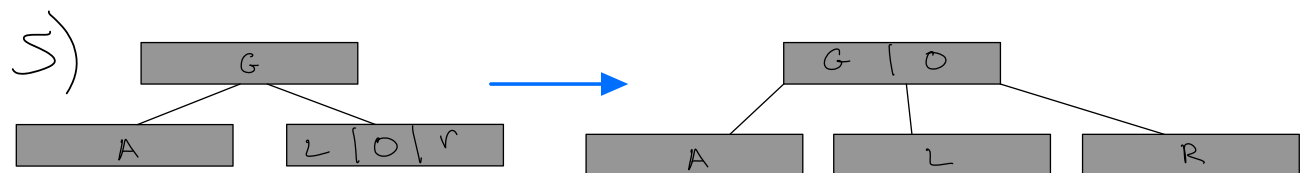
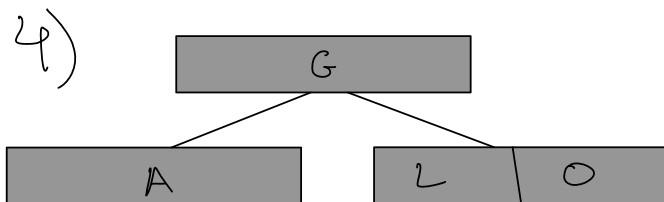
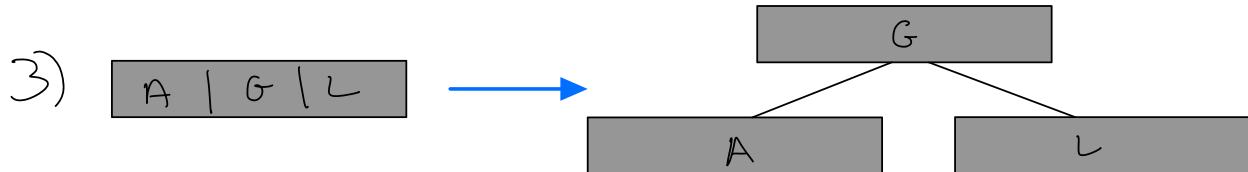
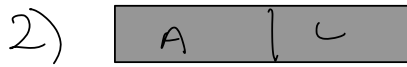


13)

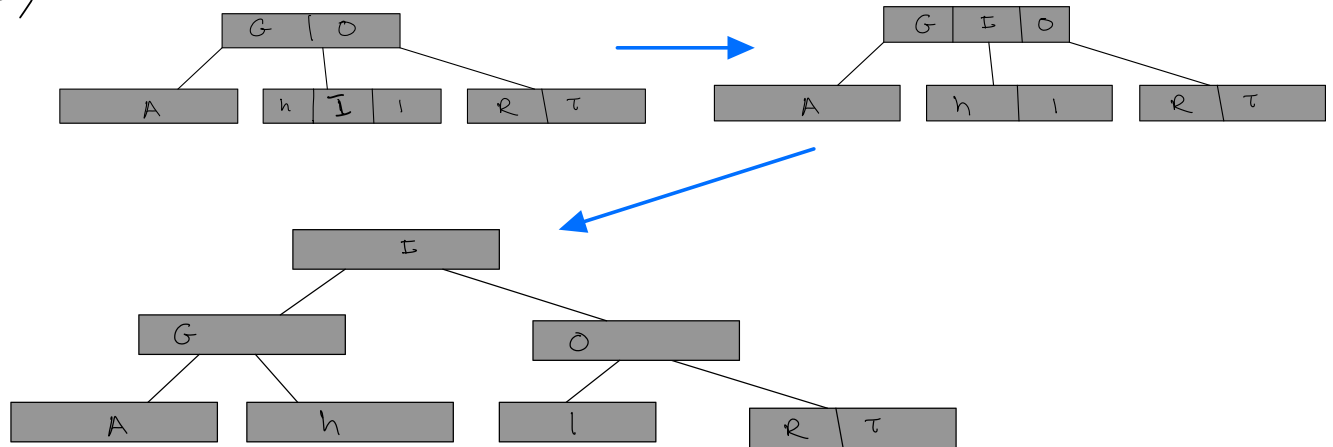


14) C already inserted
 15) A already inserted

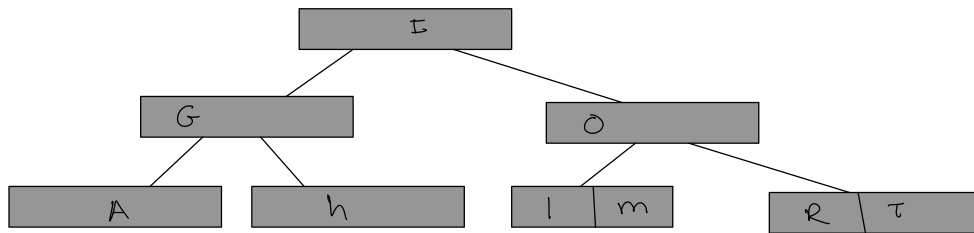
2) Draw the 2-3 trees that result when you insert the keys A L G O R I T H M S X Y Z in that order into an initially empty tree. Show all intermediate and final trees after each insertion.



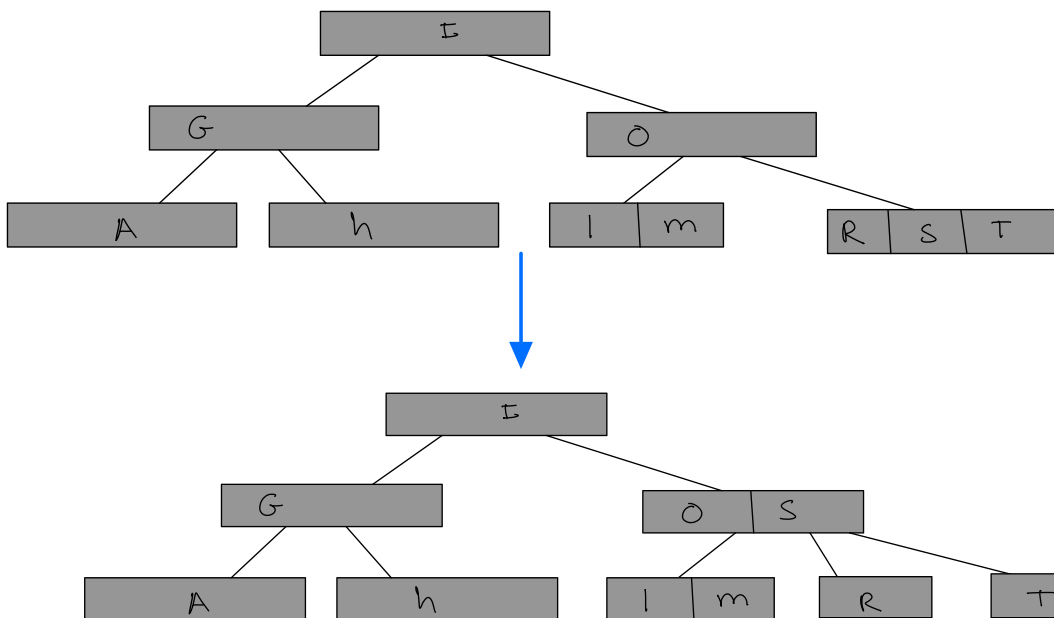
8)



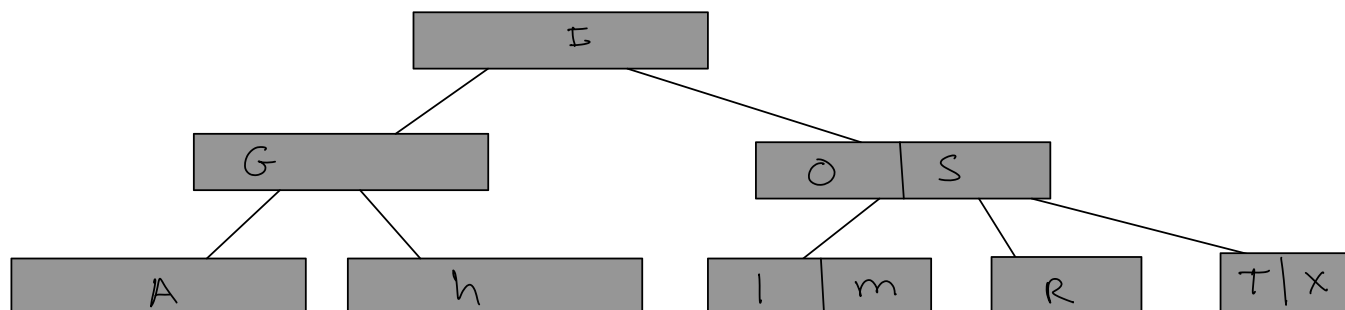
9)



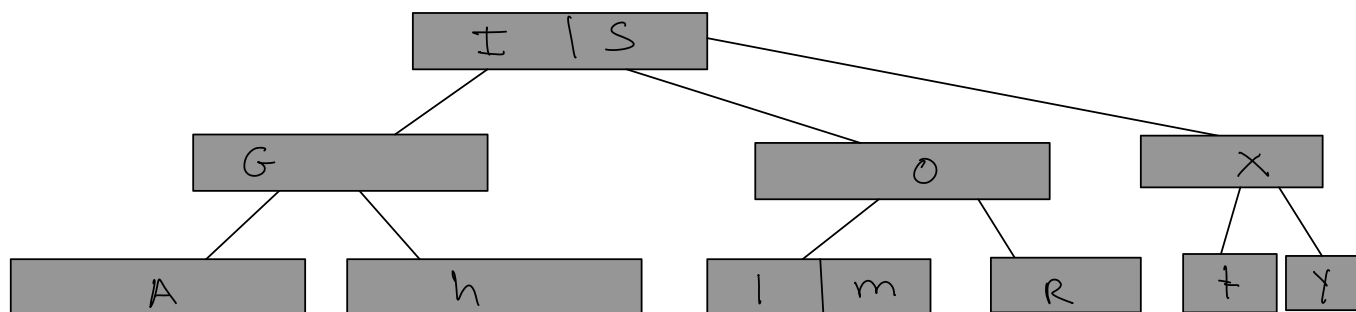
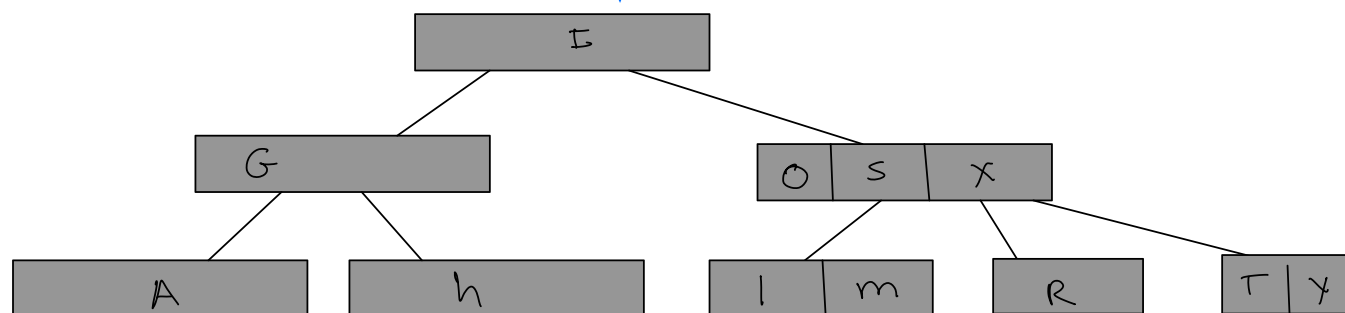
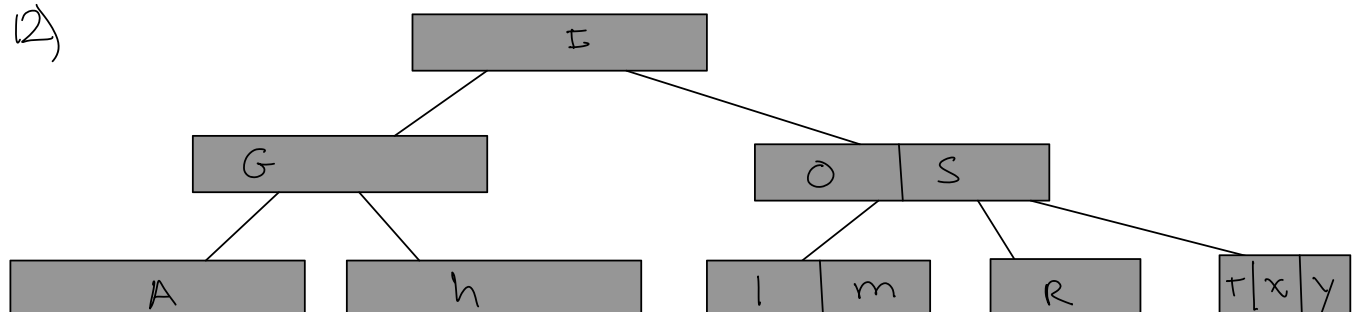
10)



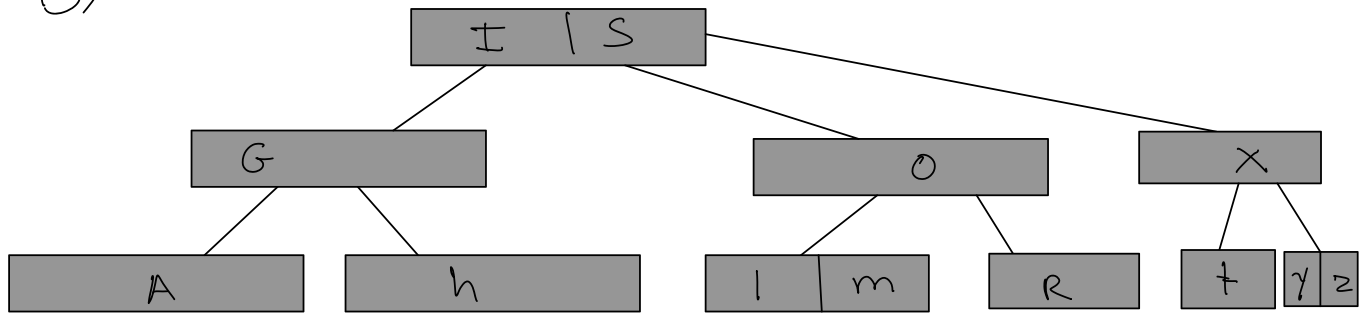
11)



12)

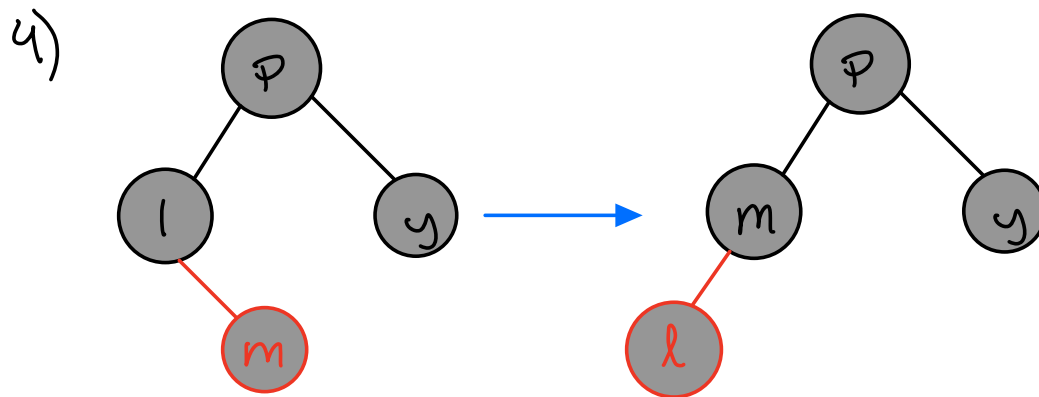
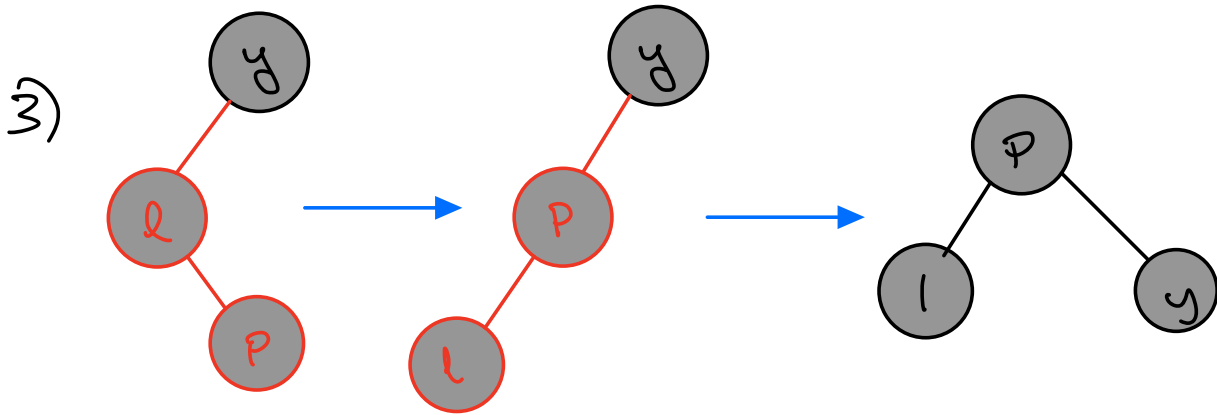
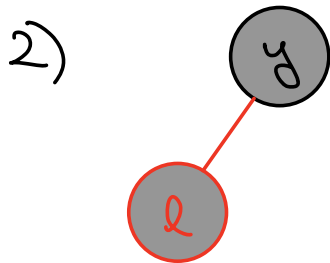


3)

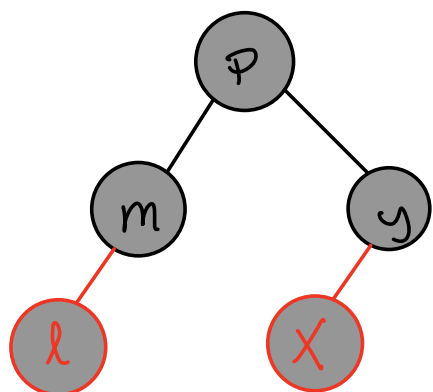


Red Black Trees:

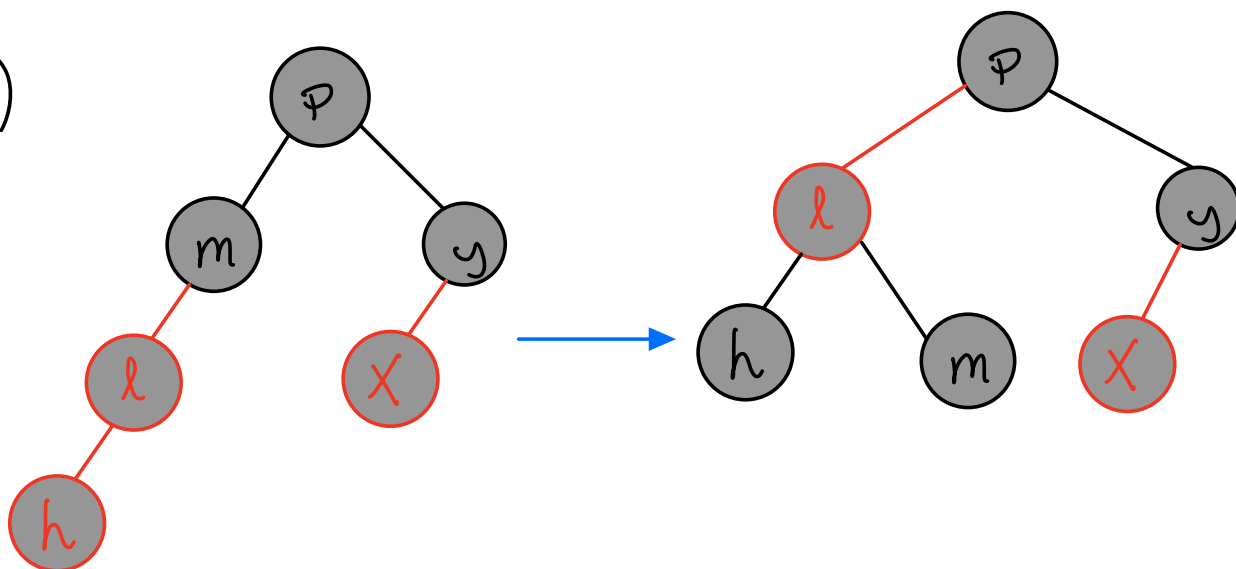
3) Draw the Red-Black Trees that result when you insert the keys Y L P M X H C R A E S T B C A in that order into an initially empty tree. Show all intermediate and final trees after each insertion.



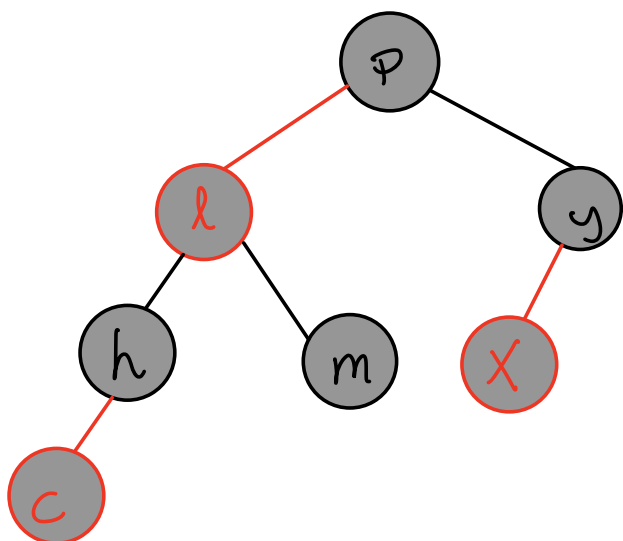
5)



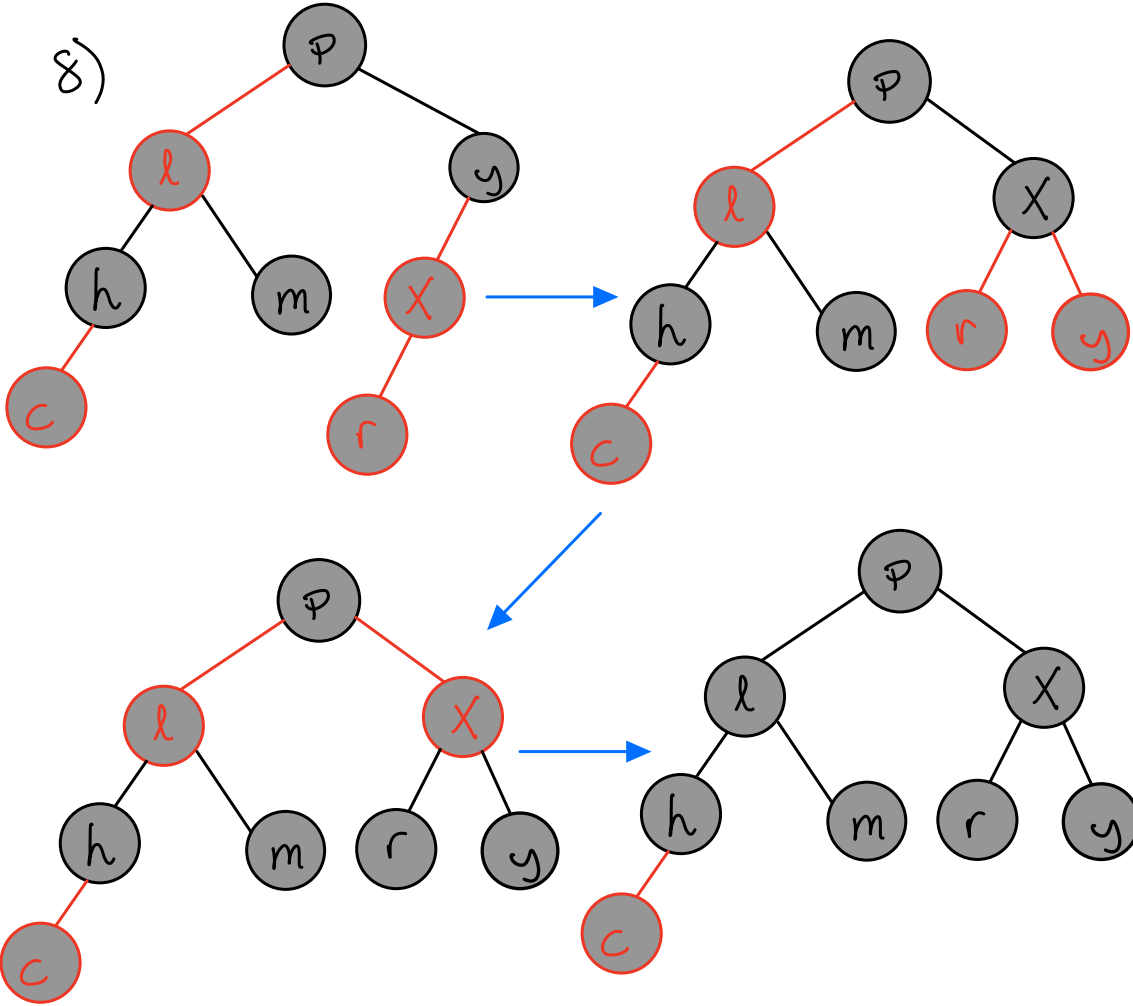
6)



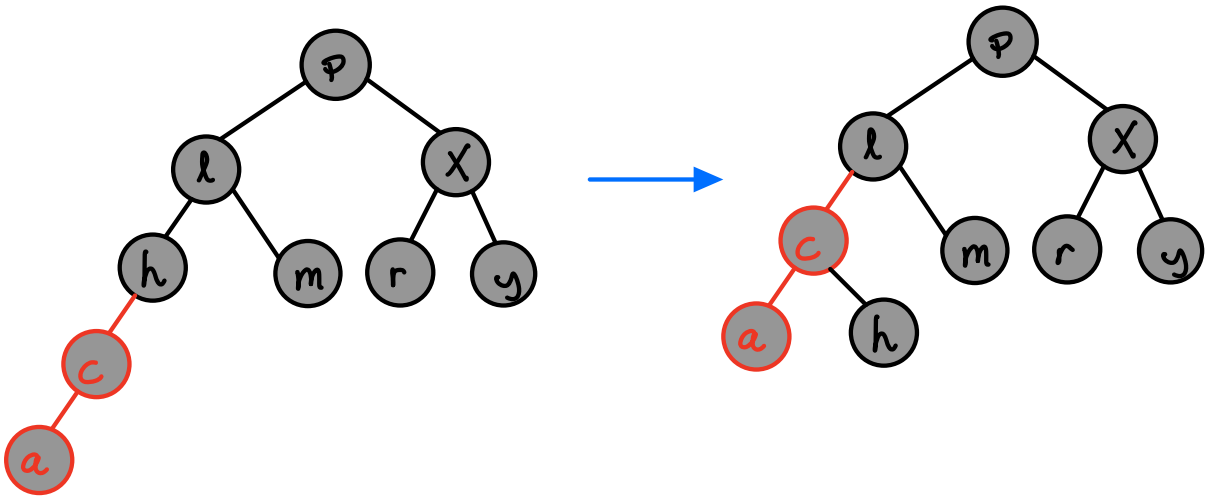
7)



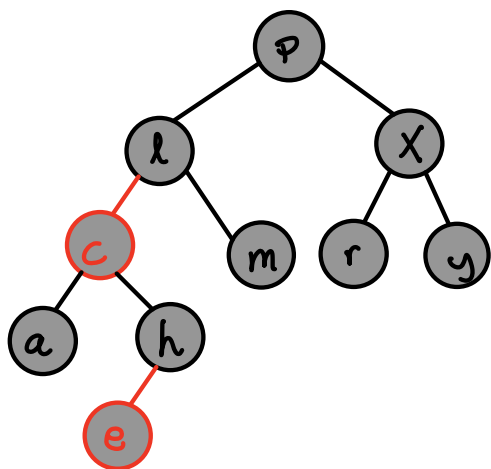
8)



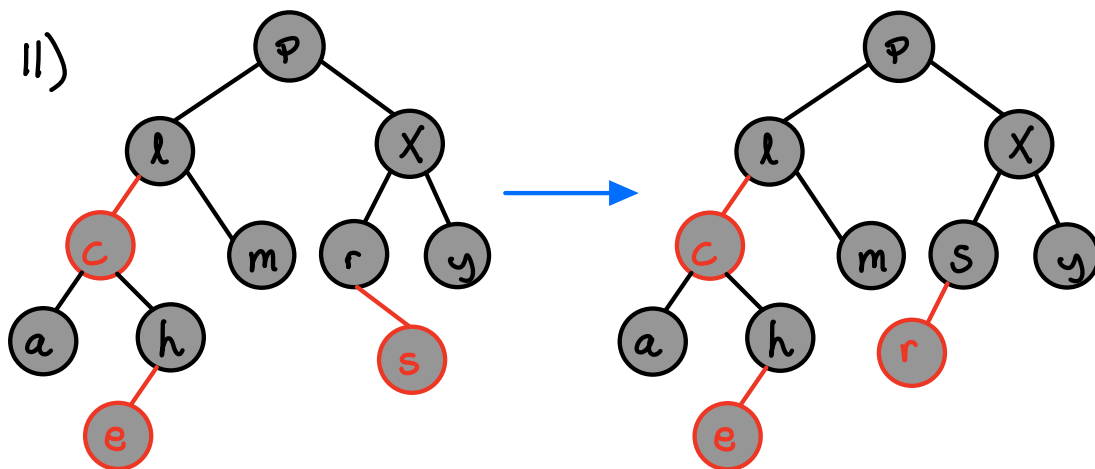
9)



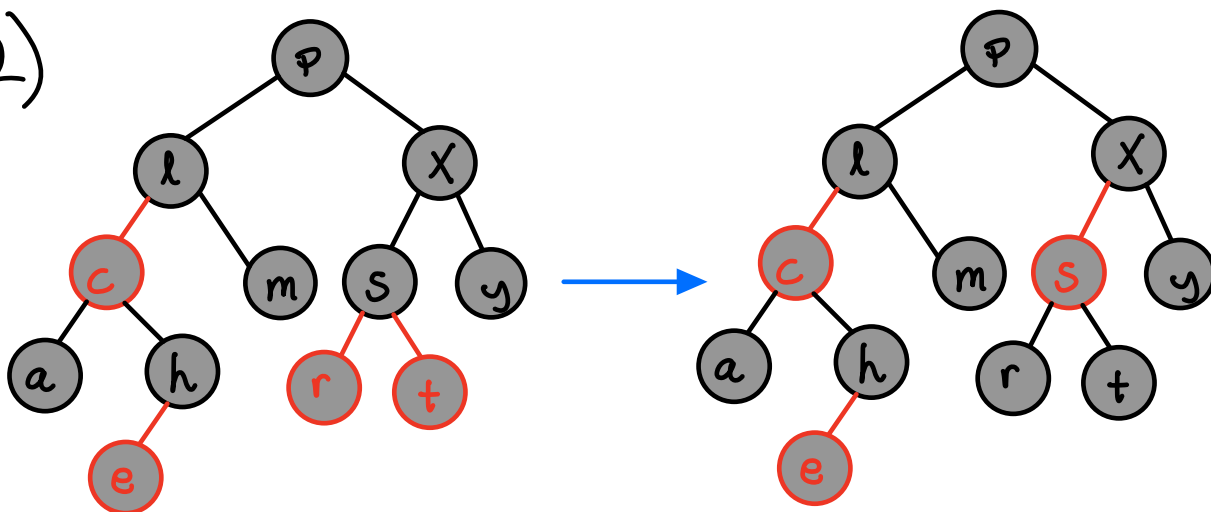
10)

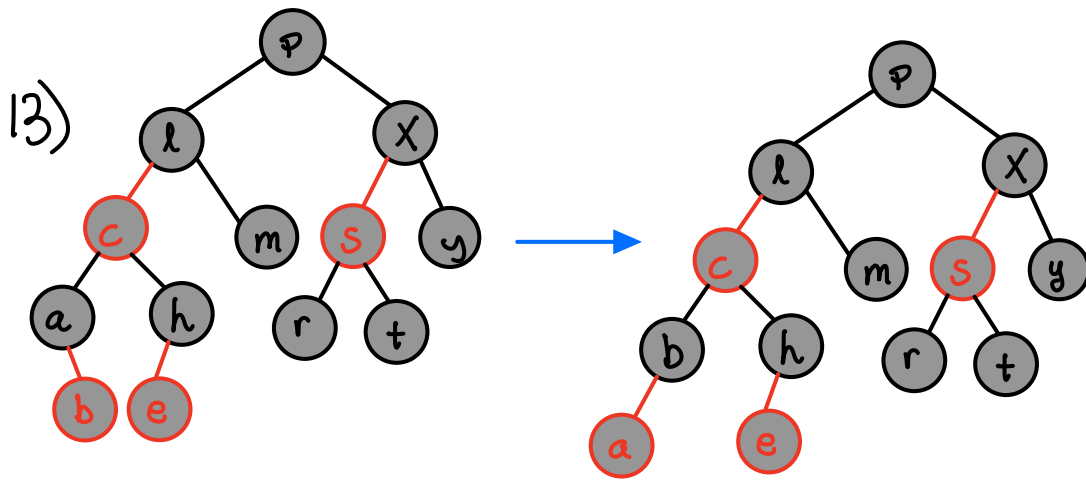


11)



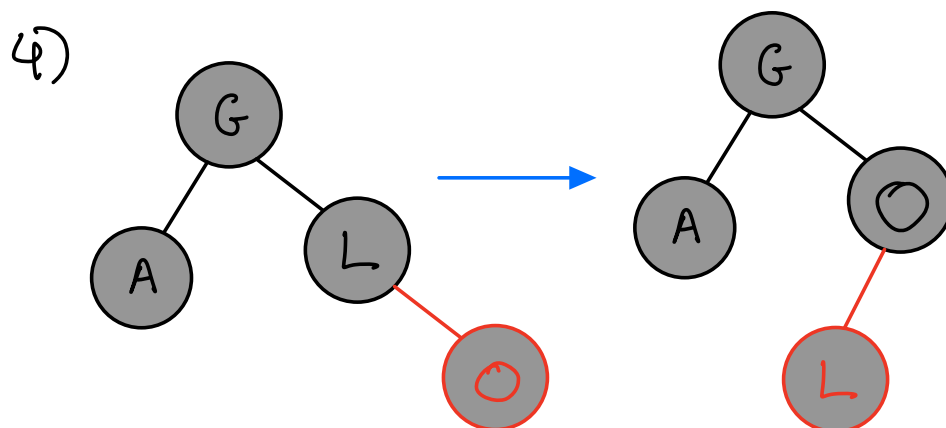
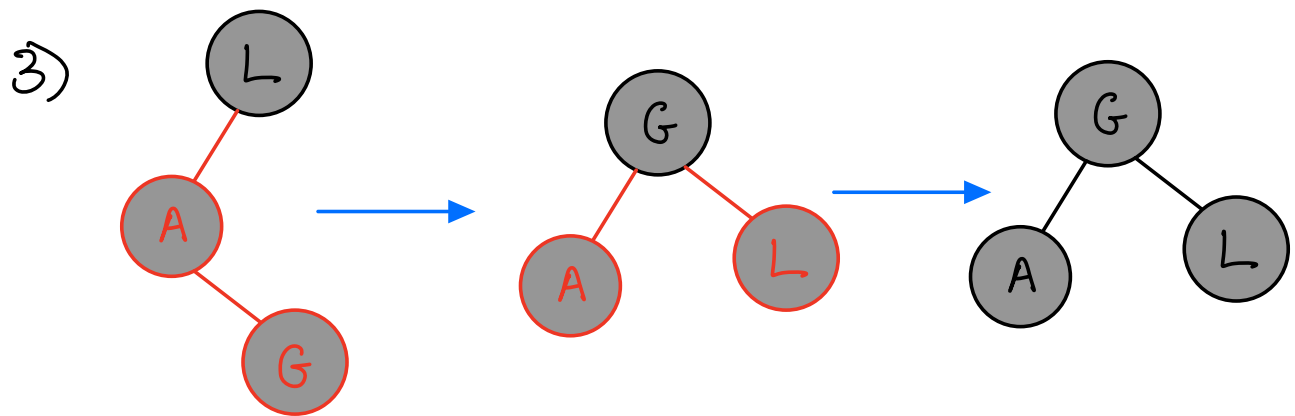
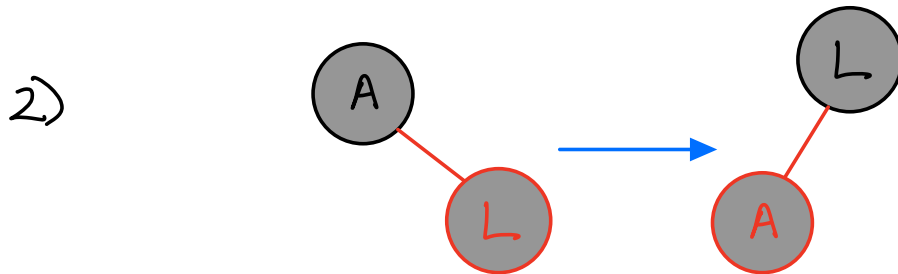
12)



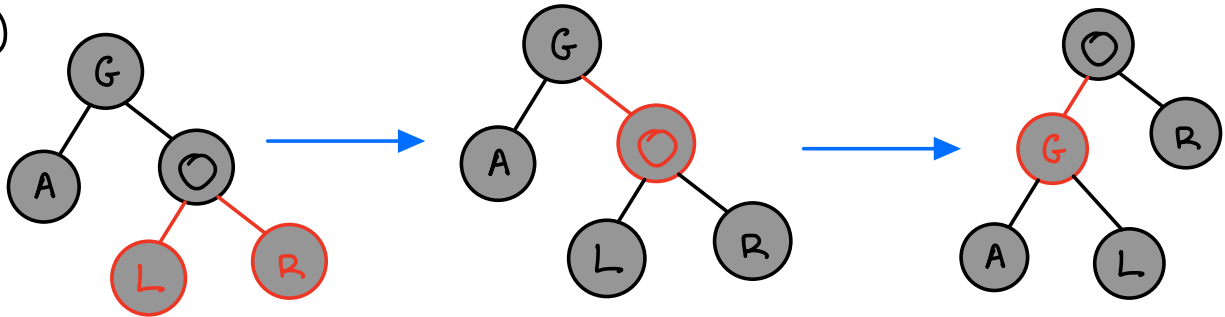


14) C is already inserted
15) A is already inserted

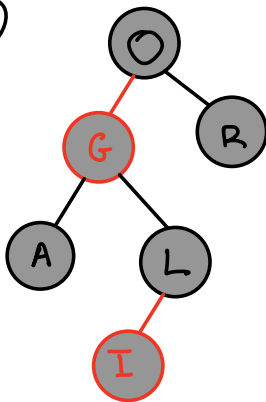
4) Draw the Red-Black trees that result when you insert the keys A L G O R I T H M S X Y Z in that order into an initially empty tree. Show all intermediate and final trees after each insertion.



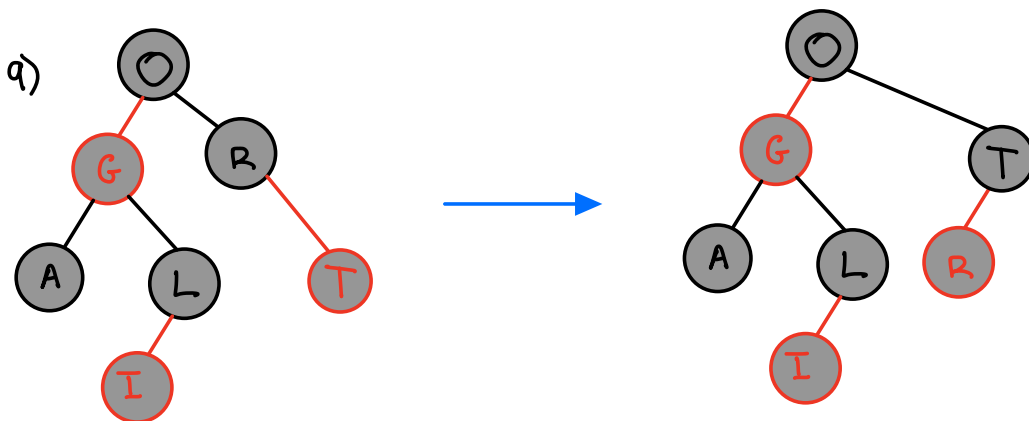
5)



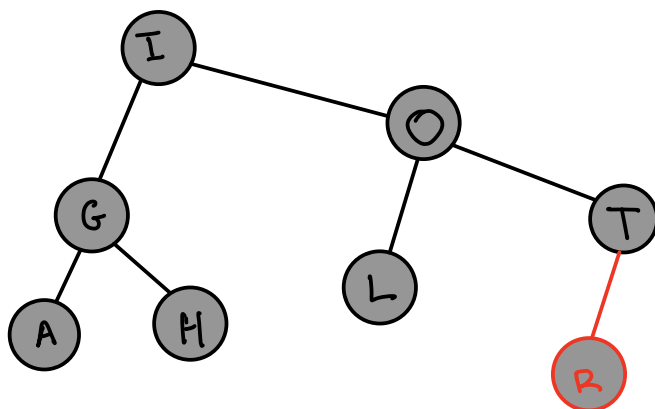
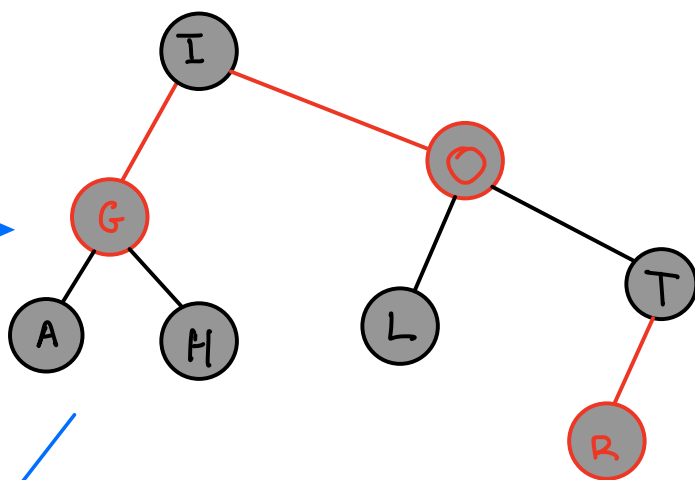
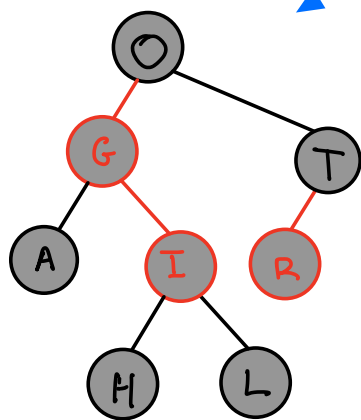
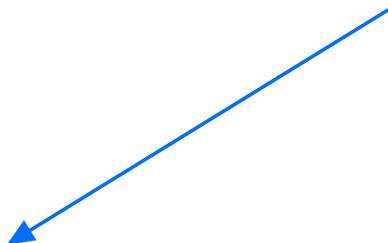
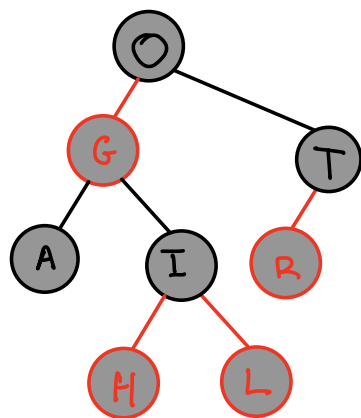
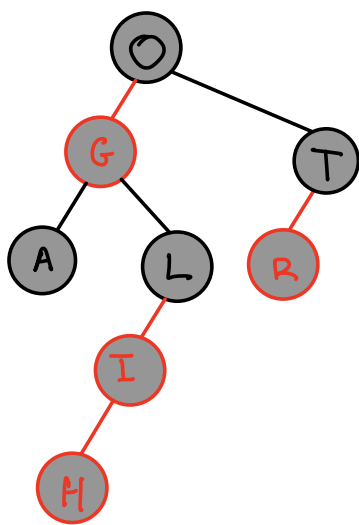
6)



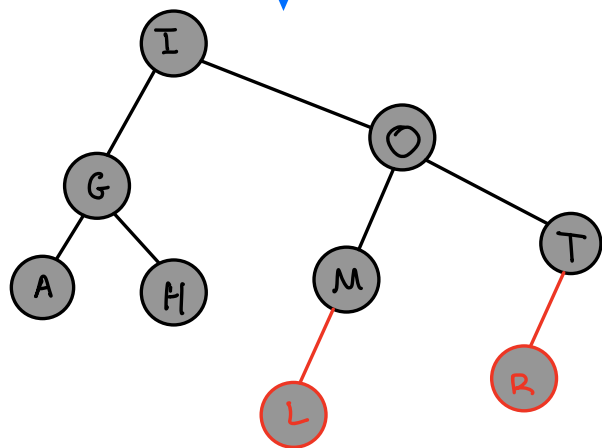
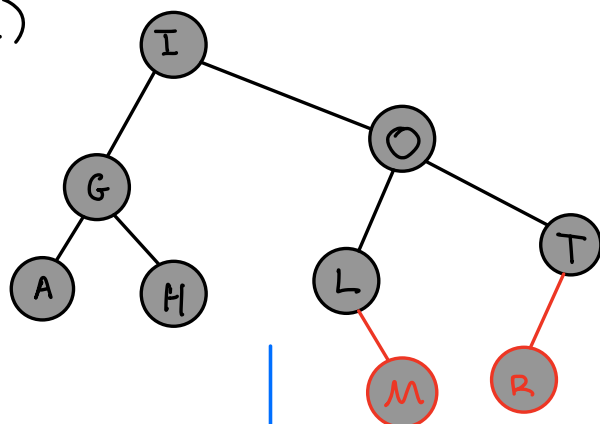
7) R already inserted
8) I already inserted



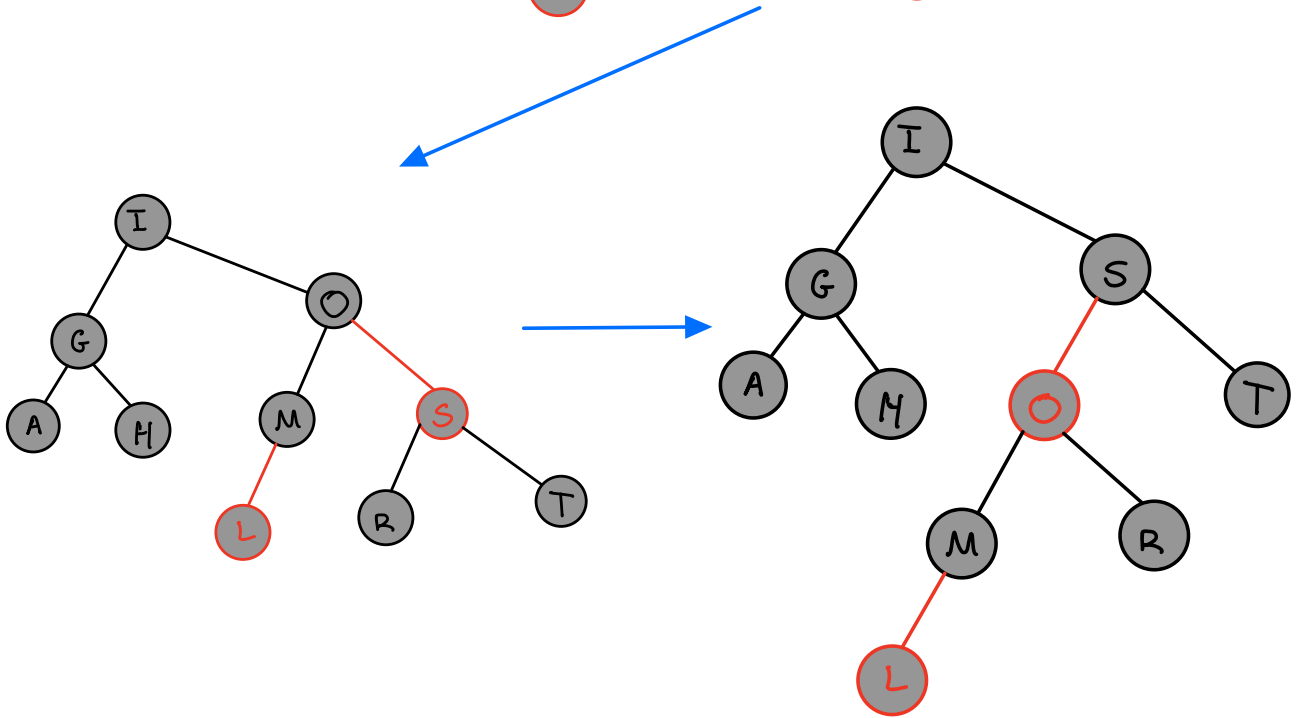
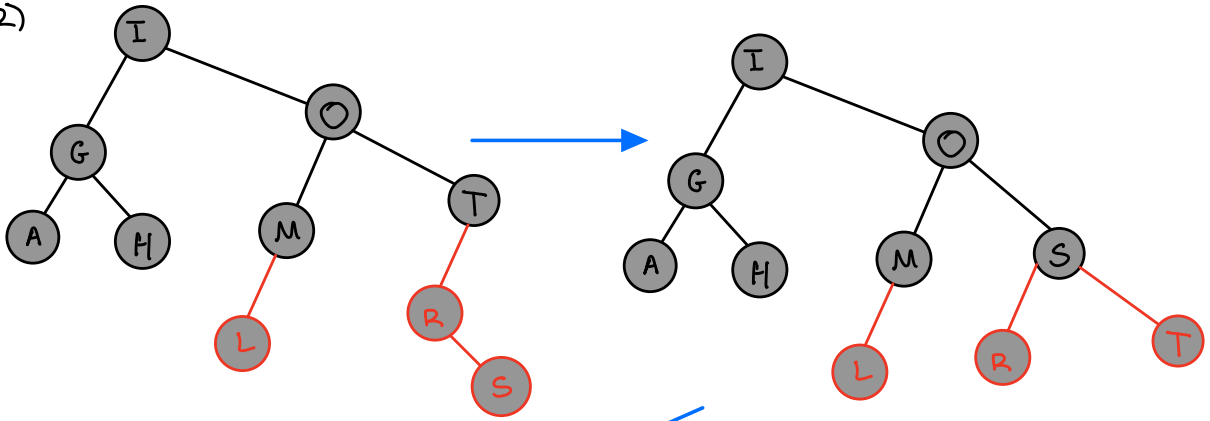
10)



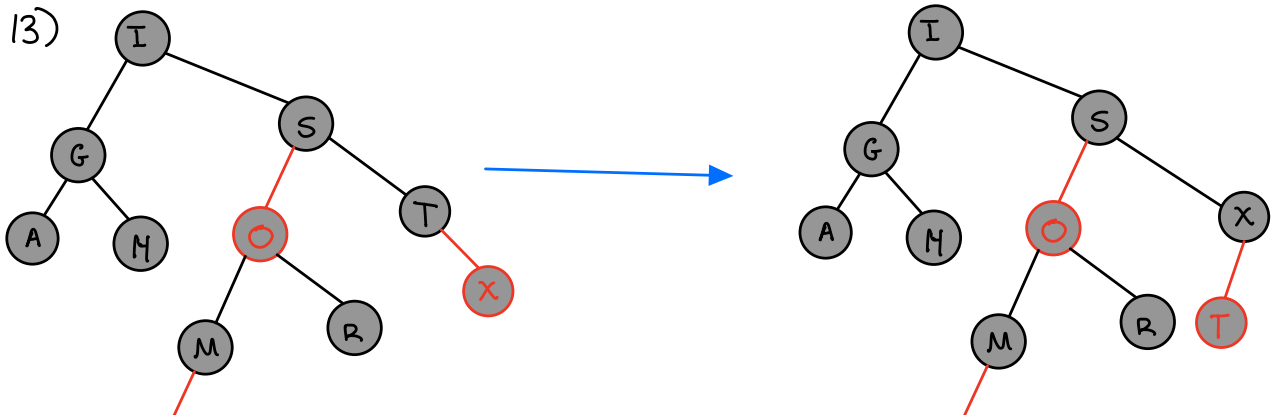
II)



12)



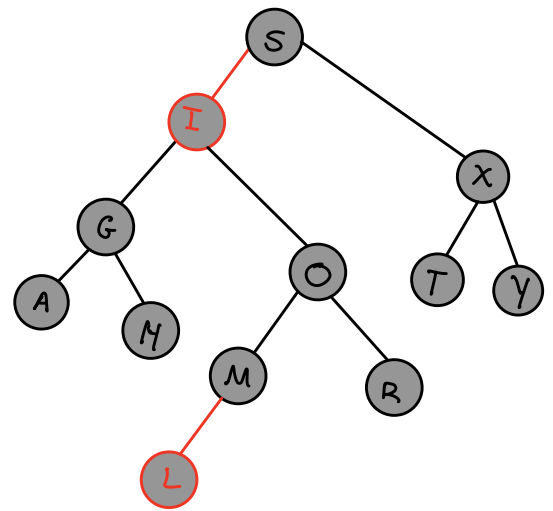
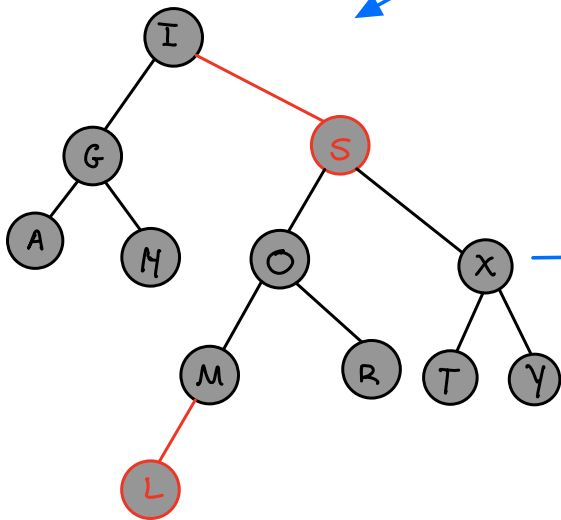
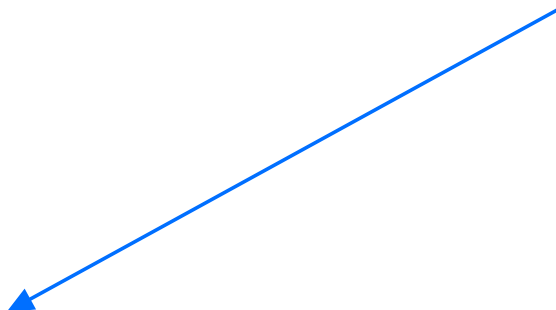
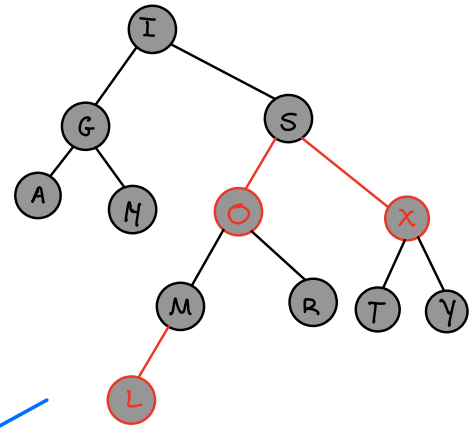
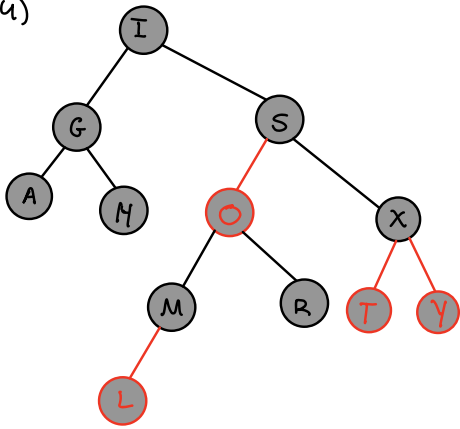
13)



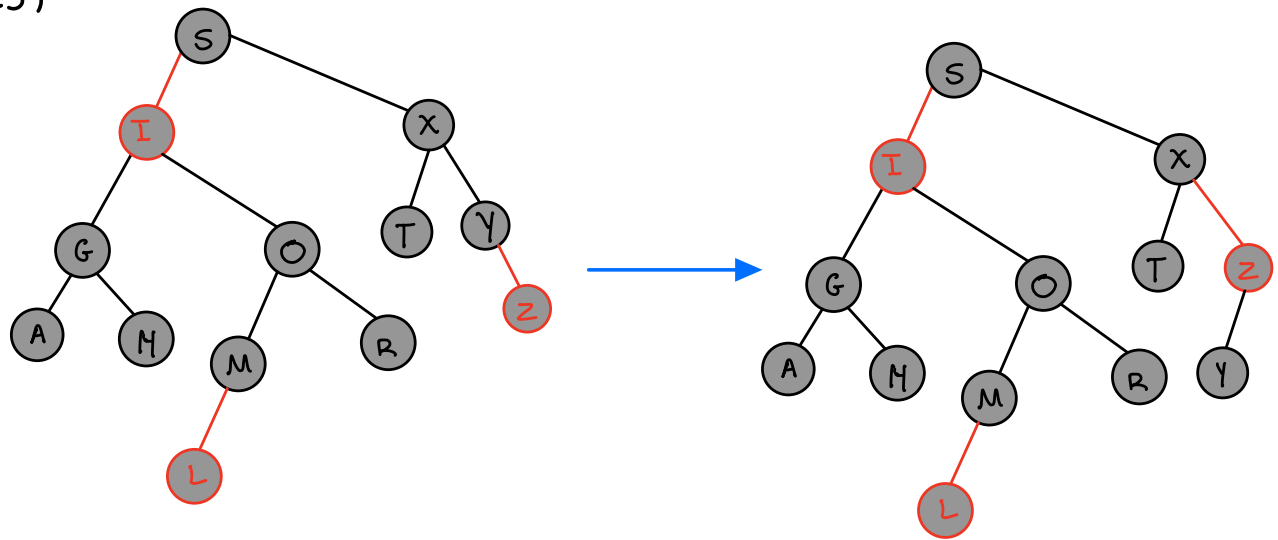
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L

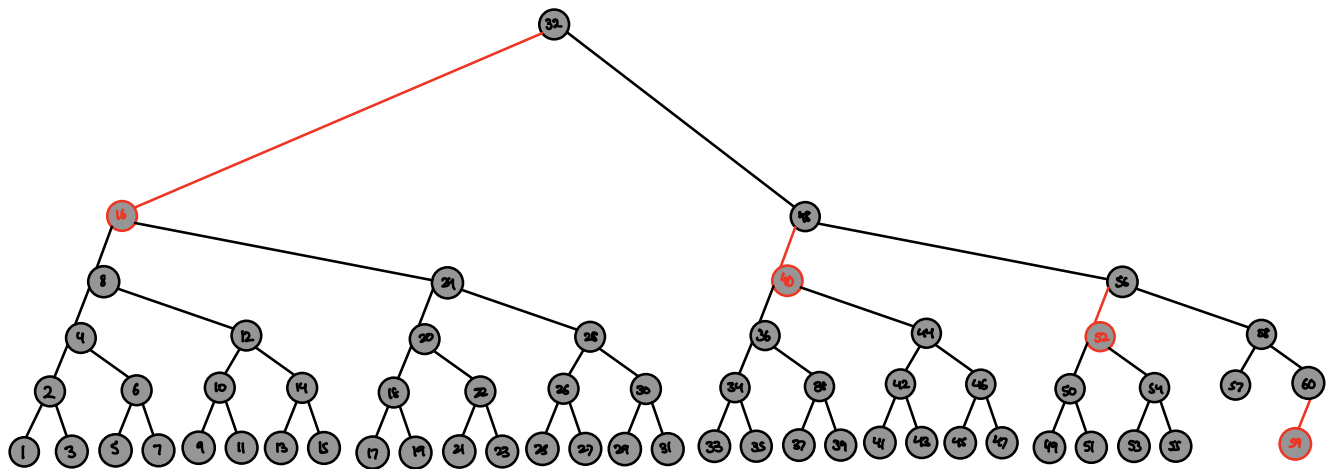
14)



15)



a) Draw the red-black tree that results when the numbers 1 through 60 are inserted in order.



b) Draw the red-black tree that results when the numbers 1 through 20 are deleted.

