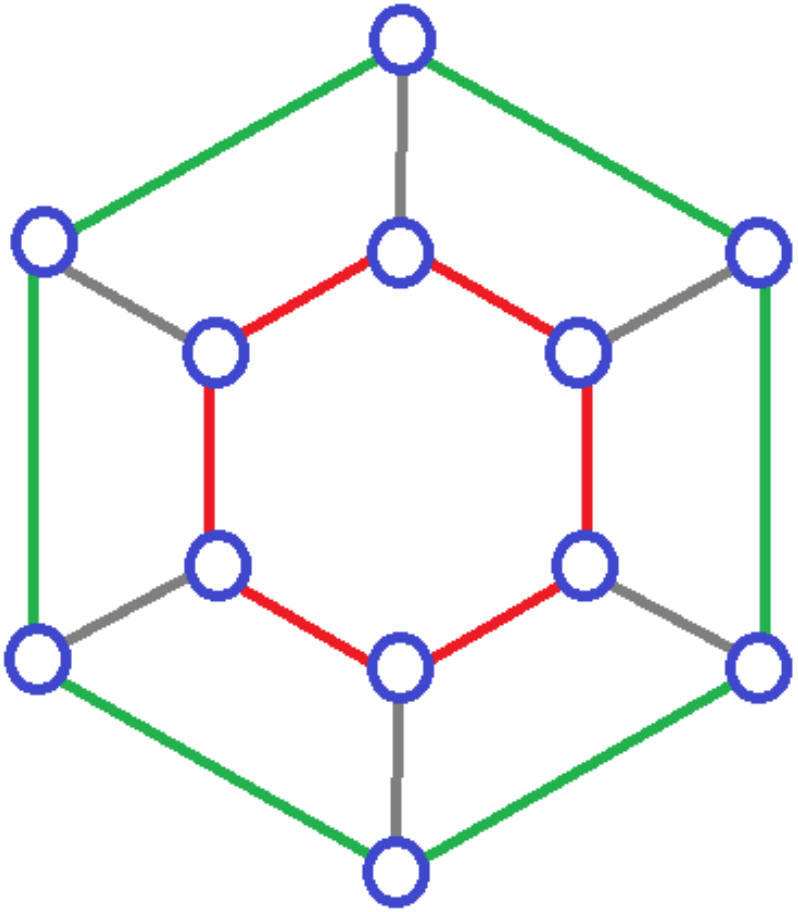
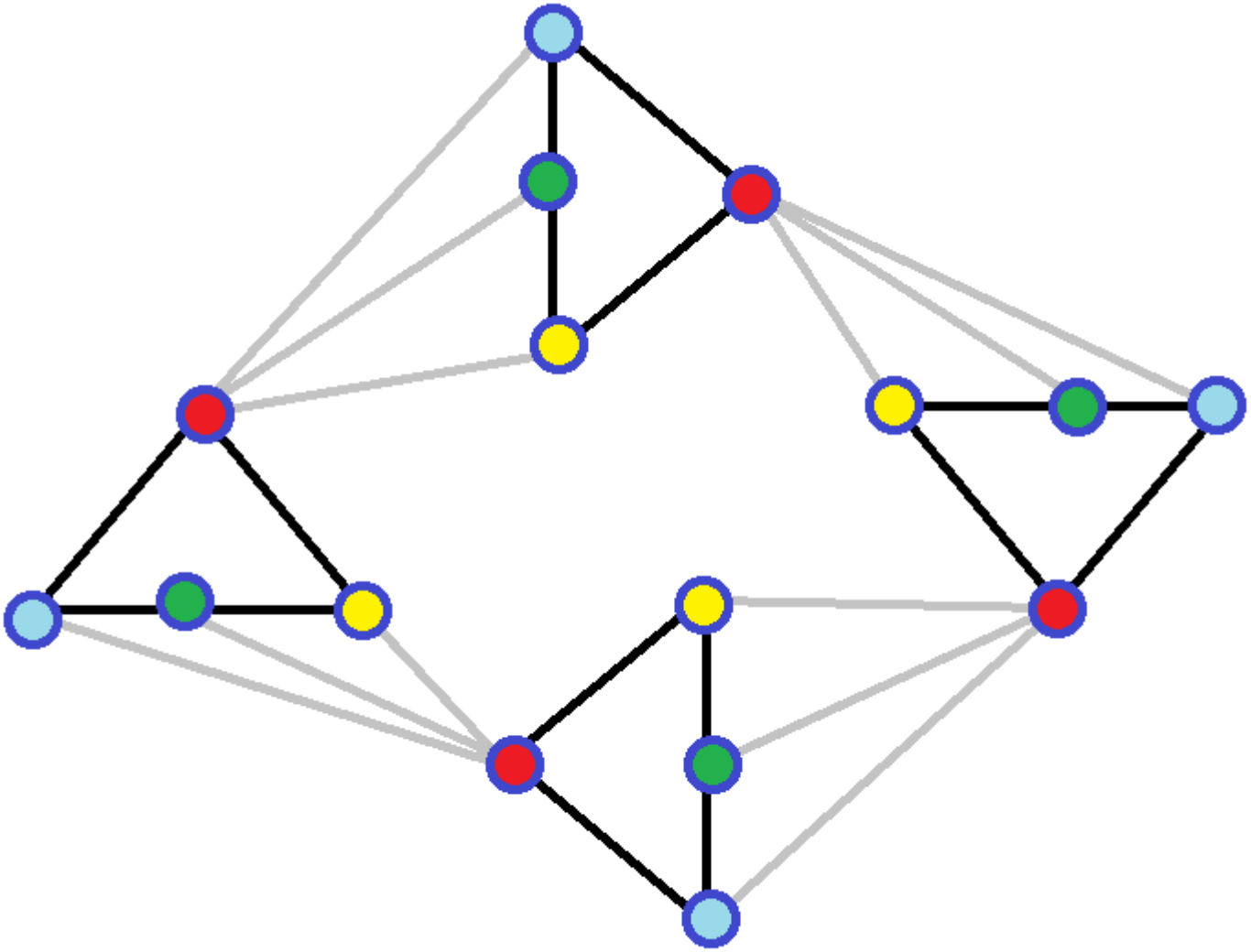
How many automorphisms does a 6-prism have?



How many automorphisms does this rotation system have?



Polyhedron	Group Order- no flips	Chiral	Group Order-flips
C_{60}	60	no	120
Nanotube			
Tetrahedron			
White Star			
Blue Star			
White Blob			
Blue Blob			
Football			
M&M			
C_{24}			
Egg			
7ball			
8ball			
pillow			
bumpy			
rhombi			

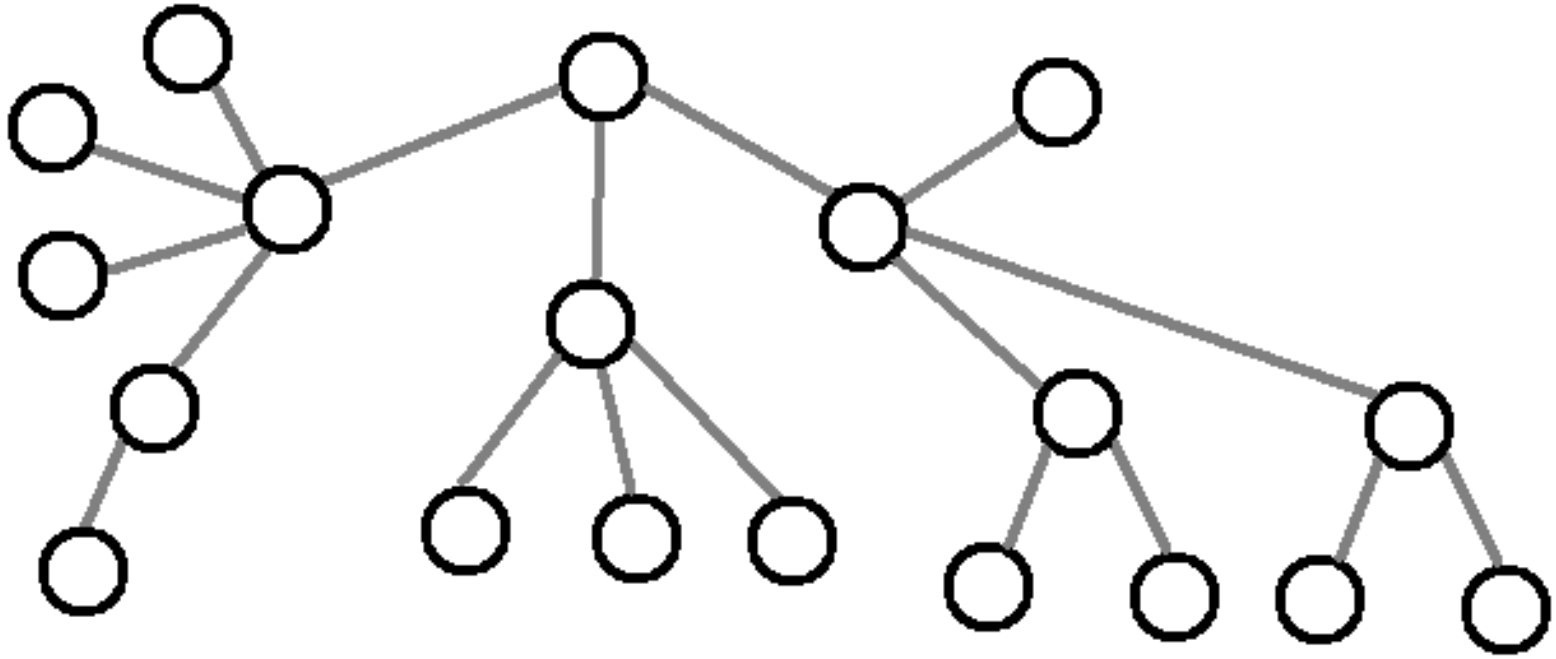
Graph Isomorphism

The graph isomorphism problem has no known polynomial time algorithm which works for an arbitrary graph.

Canonical form: If two graphs are isomorphic, their canonical forms must be the same, otherwise, they must be different.

For trees and planar graphs, a canonical form can be computed in polynomial time.

The ( ) Canonical Form for a Tree



Label each vertex with the string ( ).
While more than two vertices remain do

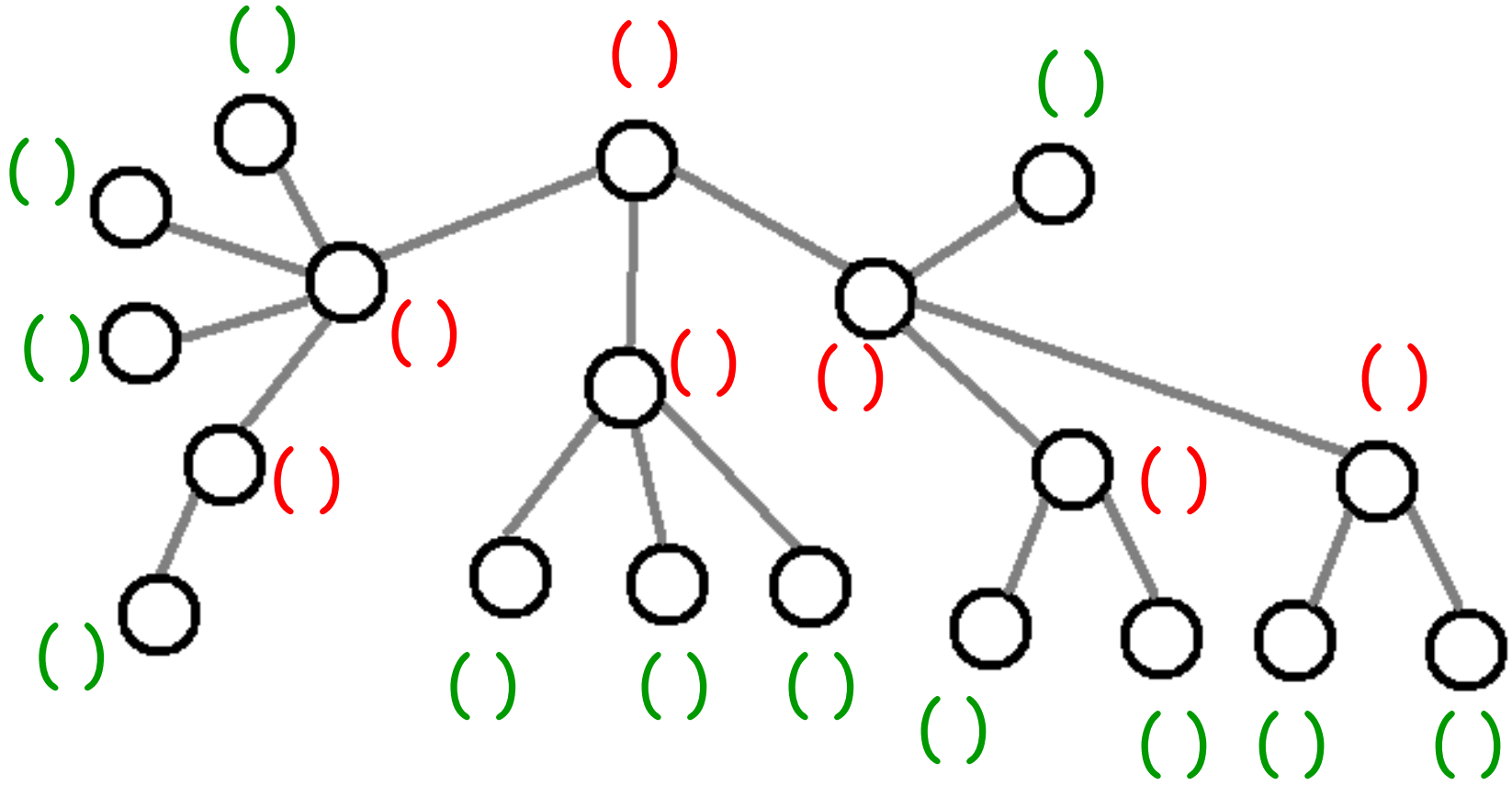
Locate all the leaves.

Remove each leaf placing its label within the (and) of the parent so that within the ( ) of the parent, the strings representing the children are sorted.

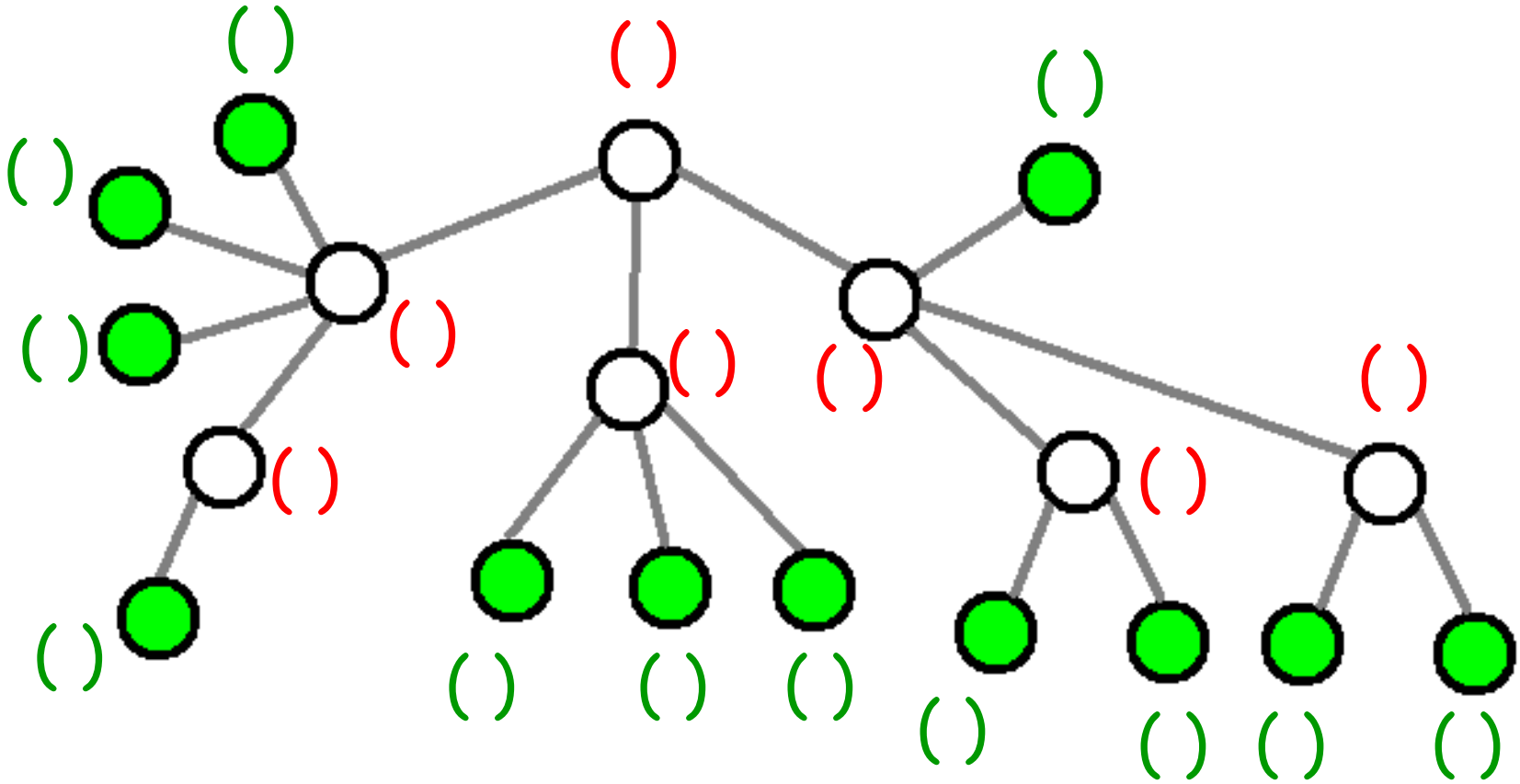
End while

If there is one vertex left, the canonical form of the tree is the label of this vertex.

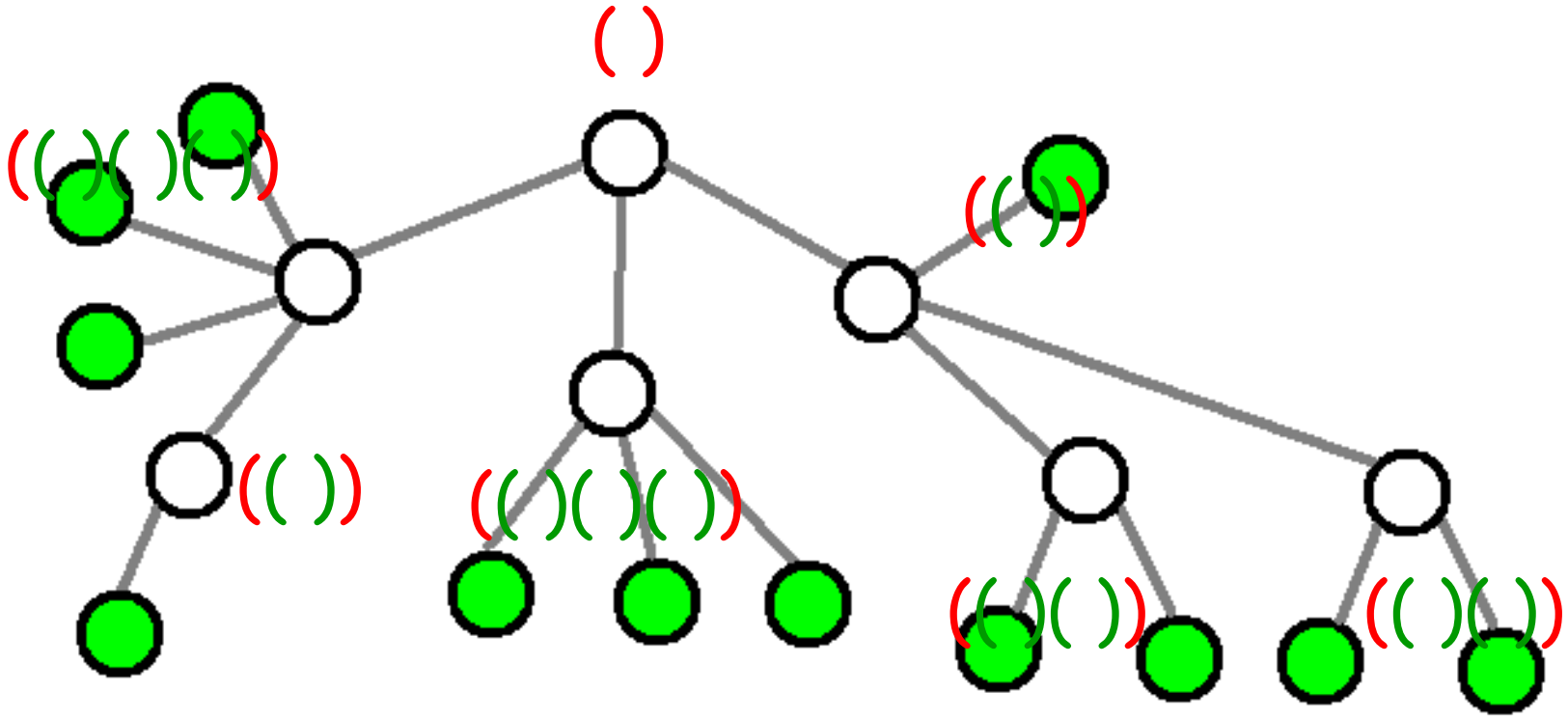
If there are two vertices u and v left, the canonical form of T is label(u) concatenated with label(v) where label(u) ≤ label(v).



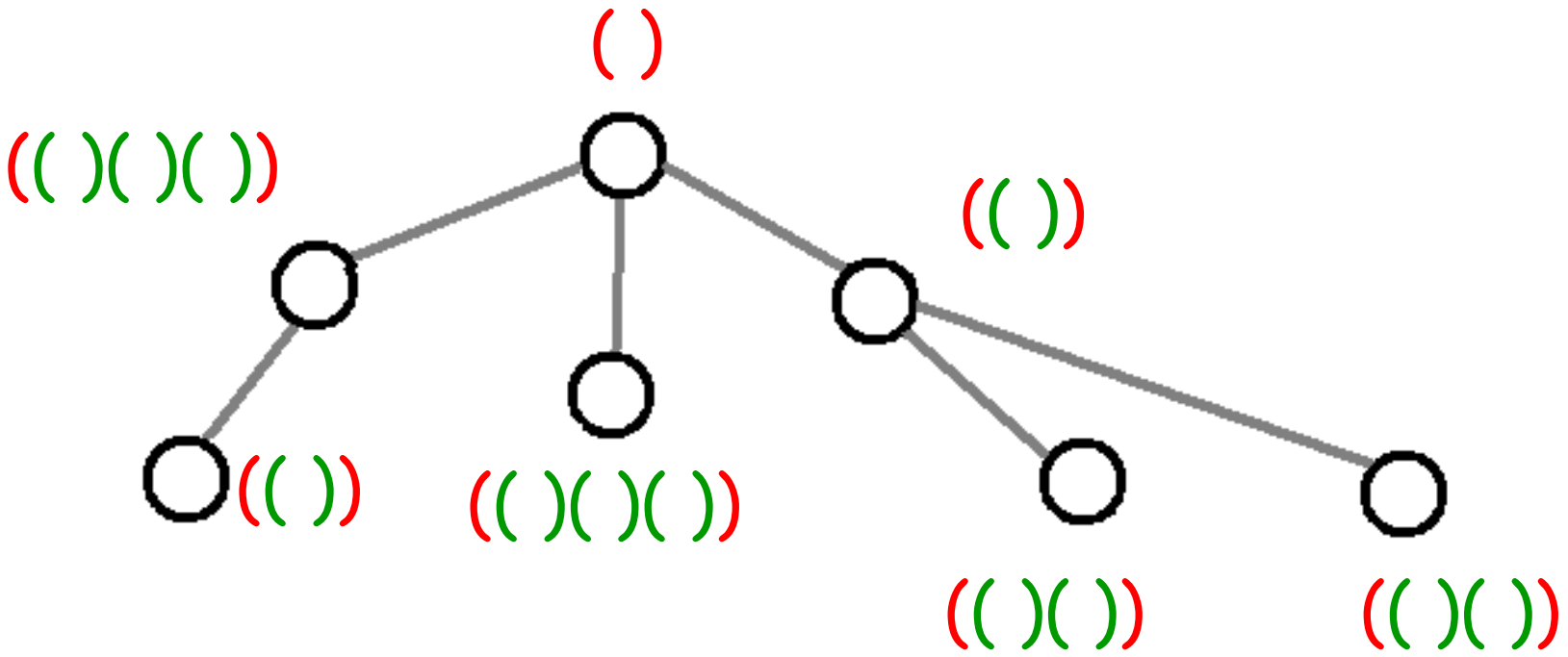
Label each vertex with ( ) .

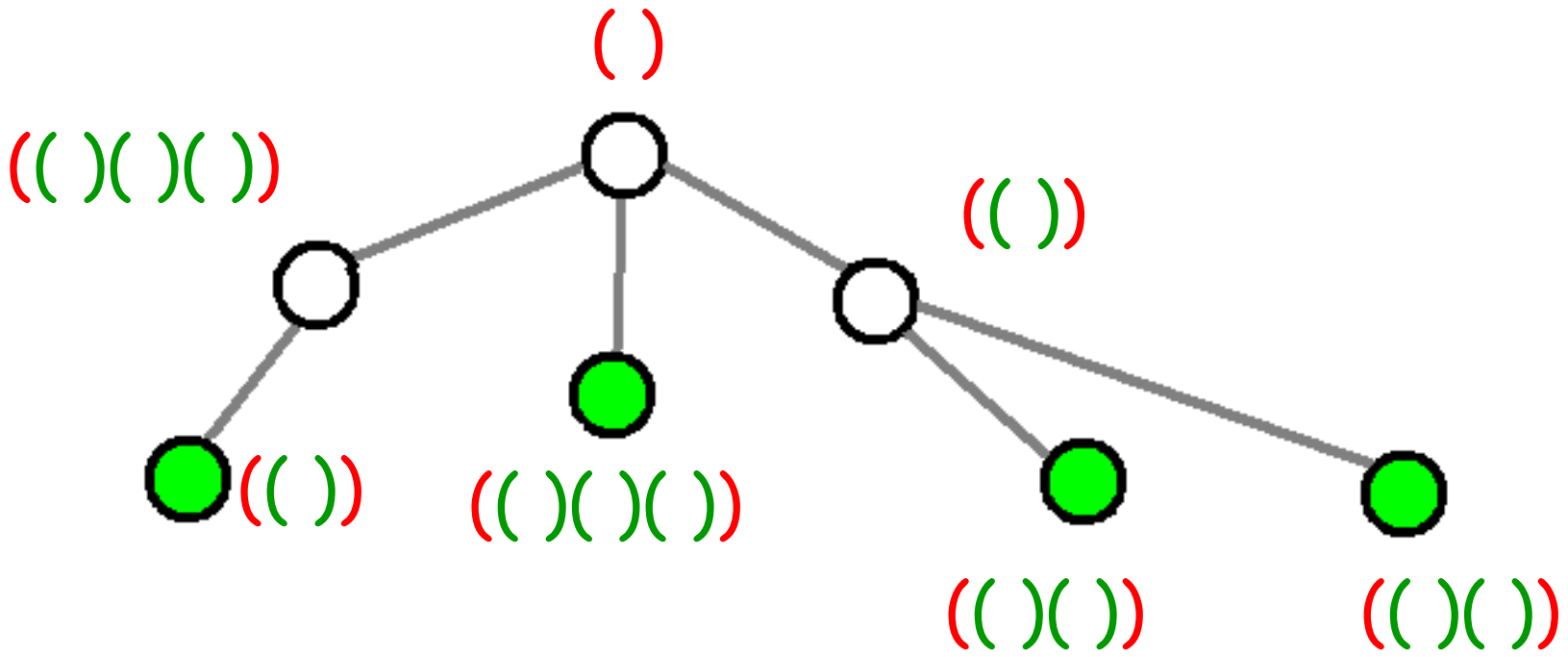


Identify the leaves.

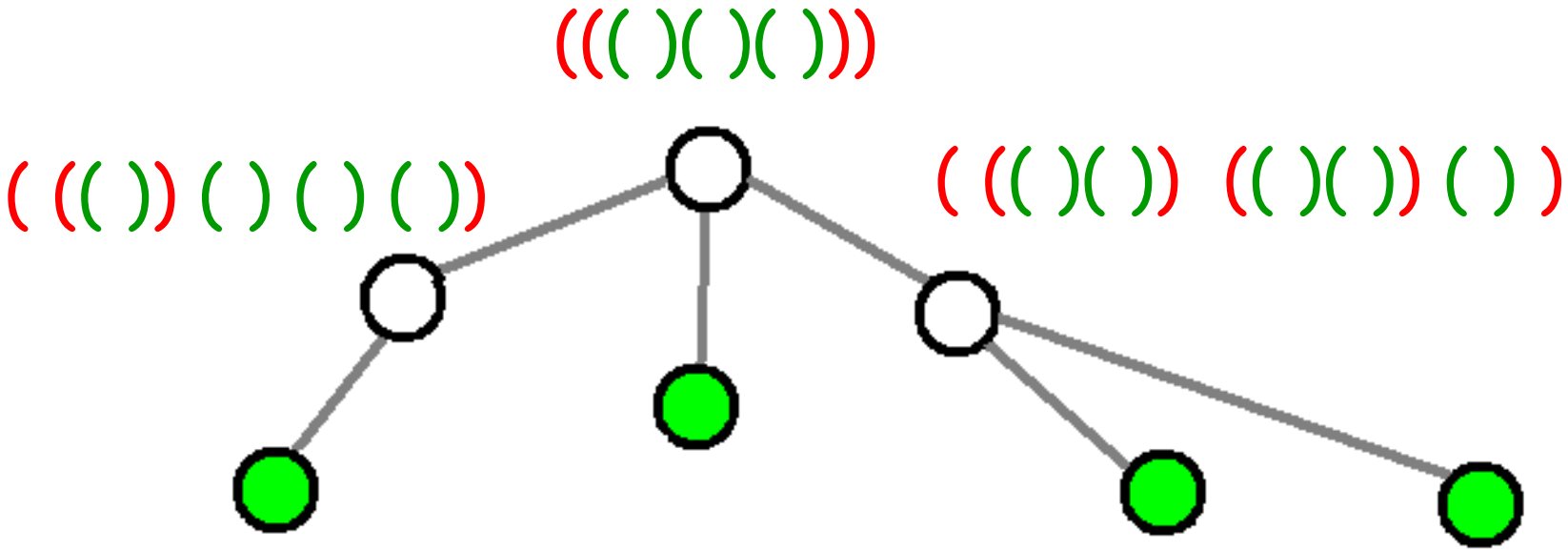


Put labels of leaves inside ( ) of their neighbours making sure strings are in sorted order.

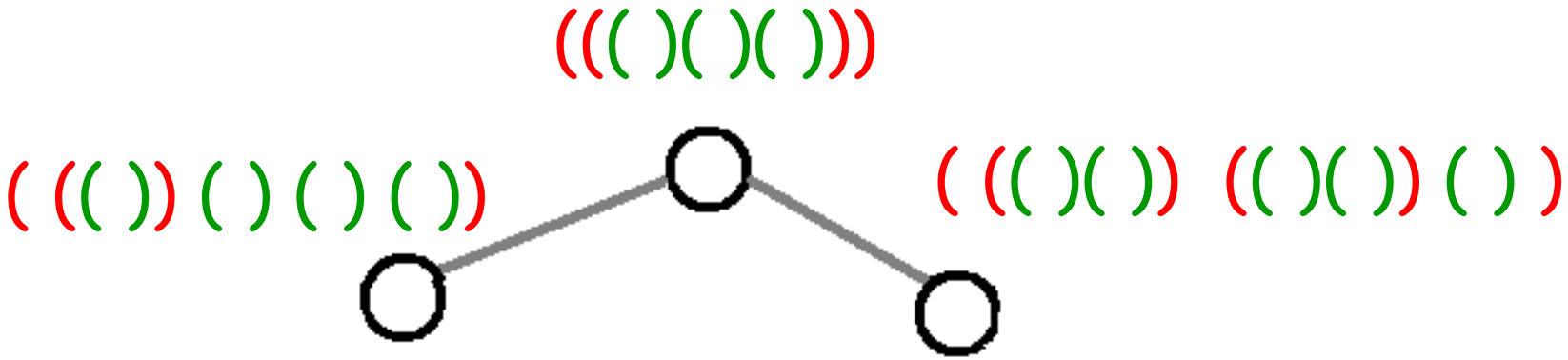


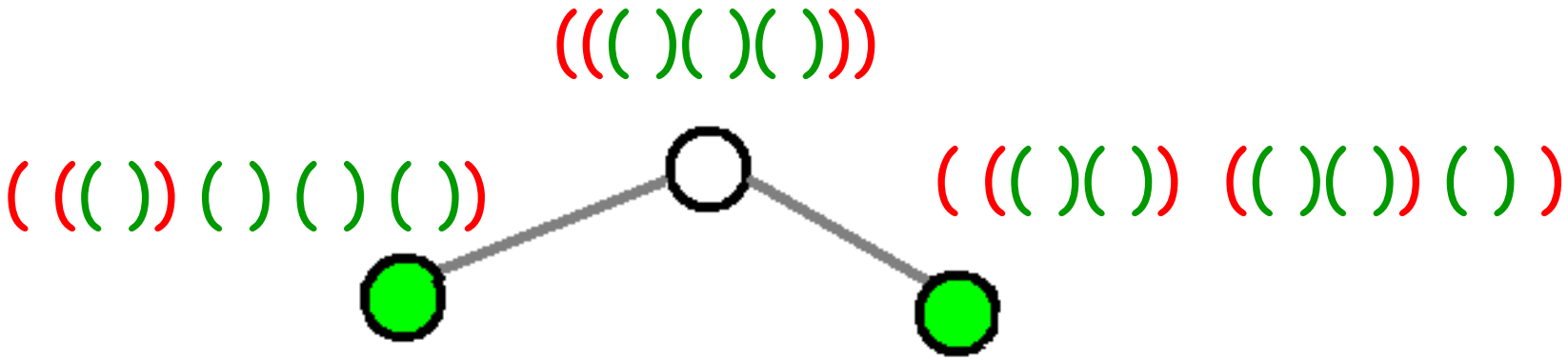


Identify the leaves.



Put labels of leaves inside ( ) of their neighbours making sure strings are in sorted order.





(((( )( )) (( )( )) ( ))
((( )) ( ) ( ) ( ))
(( )( )( )))

CANONICAL FORM FOR THIS TREE:

(((( )( )) (( )( )) ( )) ((( )) ( ) ( ) ( ))(( )( )( )))

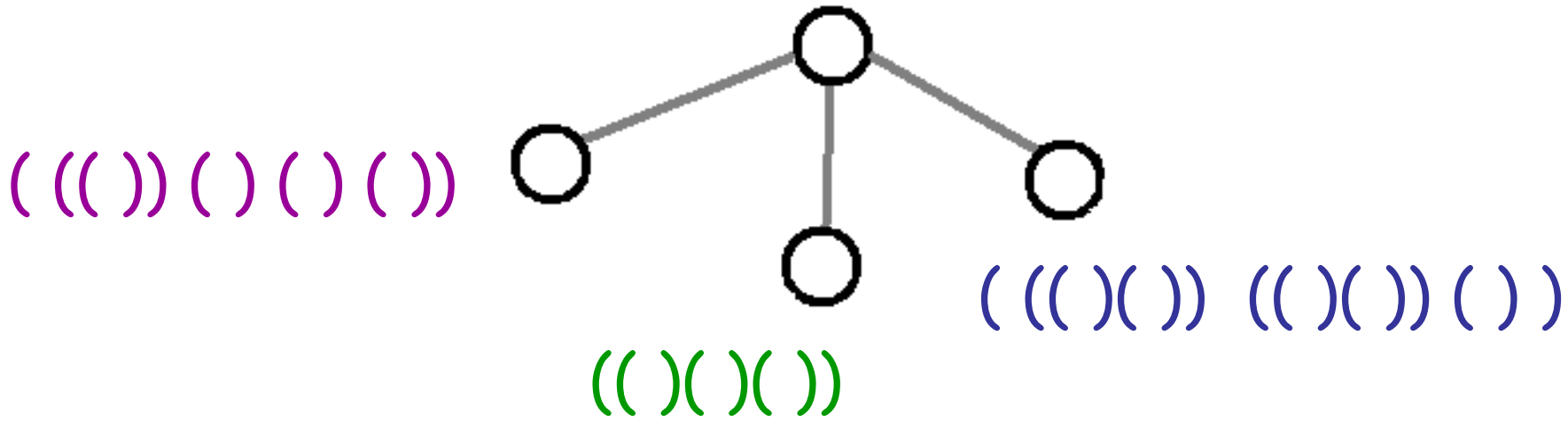
(((( )( )) (( )( )) ( ))

((( )) ( ) ( ) ( ))

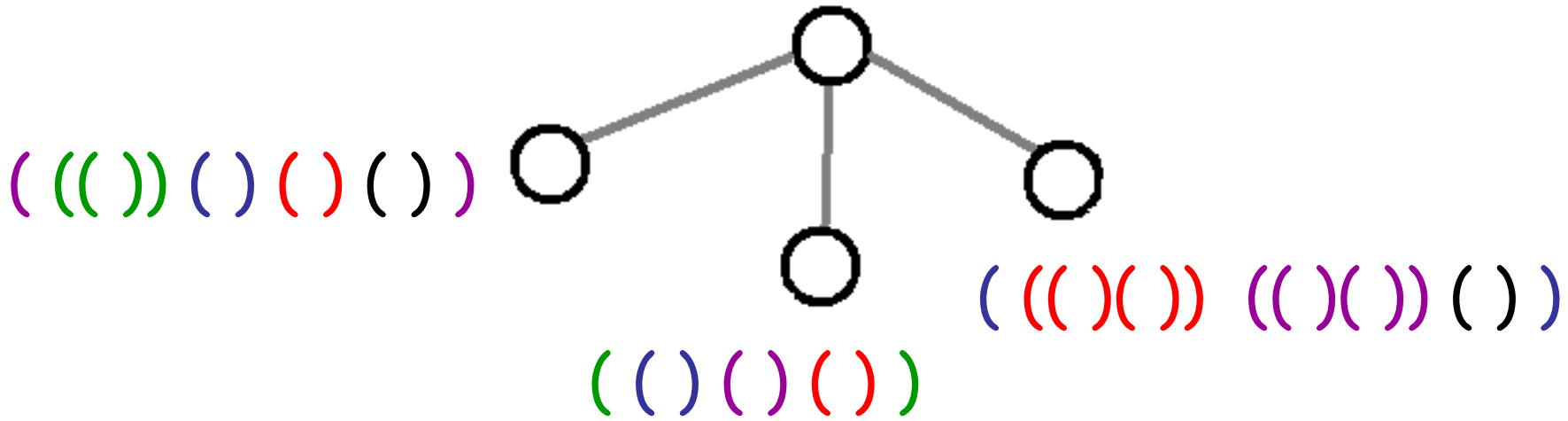
(( )( )( )))

To reconstruct the tree:

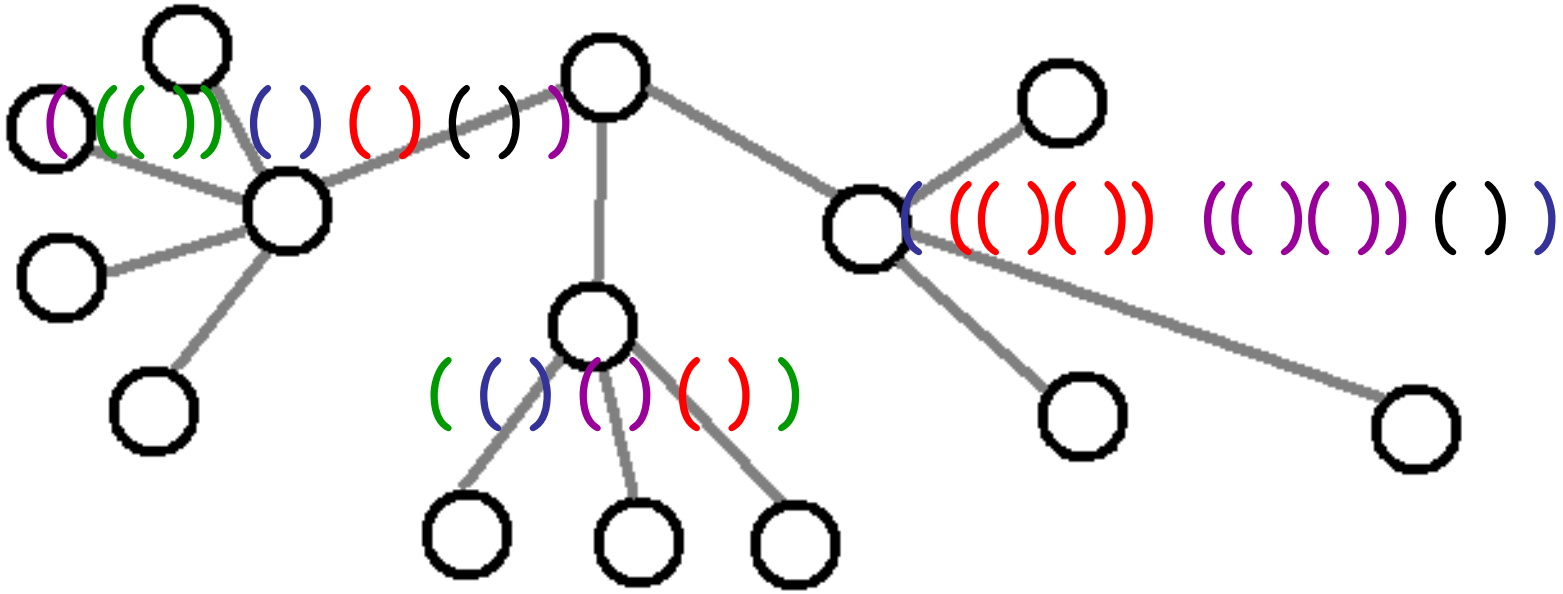
Factor what is in each ( ) into minimal well-parenthesized strings.



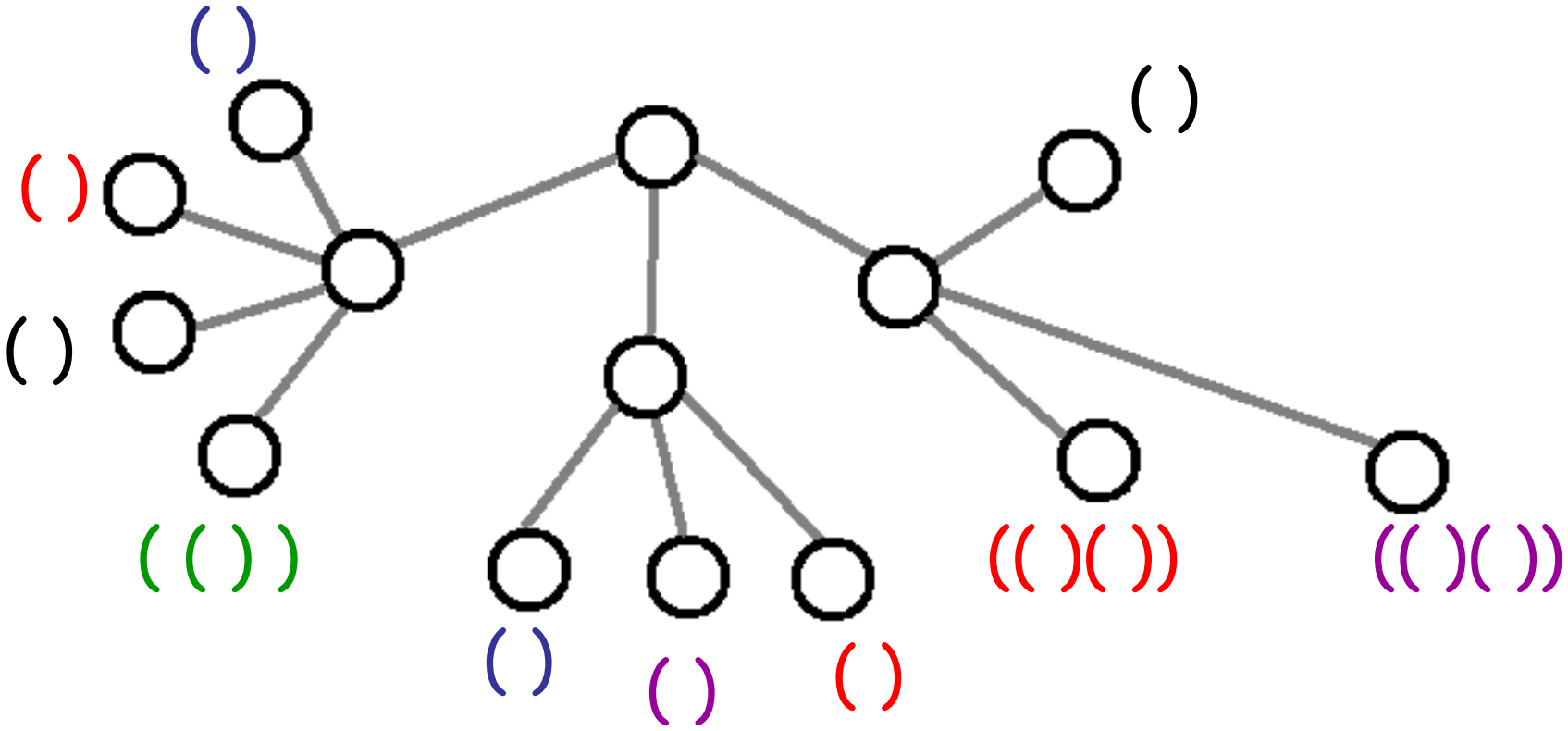
To reconstruct the tree: Add a leaf for each well-parenthesized string w with label w.



Factor what is in each ( ) into minimal well-parenthesized strings.



Add a leaf for each one.



With the labels on them.