

6	9	13	7
12	10	5	
3	1	4	14
15	8	11	2

Mathematics for Computer Science  
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# Tree coloring



Albert R Meyer, April 8, 2013

tree-color.1

6	9	13	7
12	10	5	
3	1	4	14
15	8	11	2

## unique paths

A tree is a graph with **unique paths** between every pair of vertices.



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tree-color.2

6	9	13	7
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3	1	4	14
15	8	11	2

## Chromatic Number

chromatic number,  $\chi(G)$

lemma:

$$\chi(\text{tree}) = 2$$

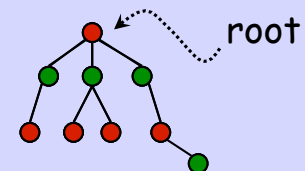


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tree-color.3

6	9	13	7
12	10	5	
3	1	4	14
15	8	11	2

## Trees are 2-colorable



Pick any vertex as "root."  
if (unique) path from root is  
even length: ●  
odd length: ●



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tree-color.4