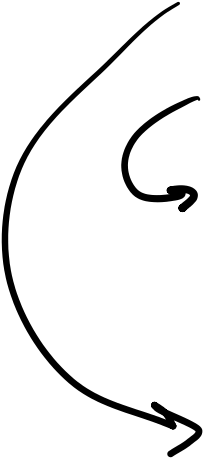


① A "tree" is defined as:

* Connected

* acyclic



we know a maximally acyclic graph must be acyclic

A maximally acyclic graph can not be disconnected, as a new edge connecting two components is a cut edge, which can not be part of a cycle

=> Hence, it must also be connected \square

② $\tau(G) = \tau(G - e) + \tau(G \cdot e)$

$\tau(\text{graph with red edge}) = \tau(\text{graph without red edge}) + \tau(\text{graph with red loop})$



$$\begin{array}{c}
 \downarrow \\
 5 + \tau(\text{graph}) + \tau(\text{graph}) \\
 \downarrow \quad \swarrow \quad \swarrow \\
 5 + 3 + 3 = 11
 \end{array}$$