Refs: Graph Slide P.40

7. If (u,v) is a cross edge

$\Rightarrow$ u, v are in different tree

$\Rightarrow$ When we are on u, looking at (u,v), v is either gray of black

v is black $\Rightarrow$ (u,v) is undirected edge so v should have visited u with it

$\Rightarrow$ conflict

v is gray $\Rightarrow$ u,v is in the same tree

$\Rightarrow$ conflict

$\Rightarrow$ (u,v) must not be a cross edge