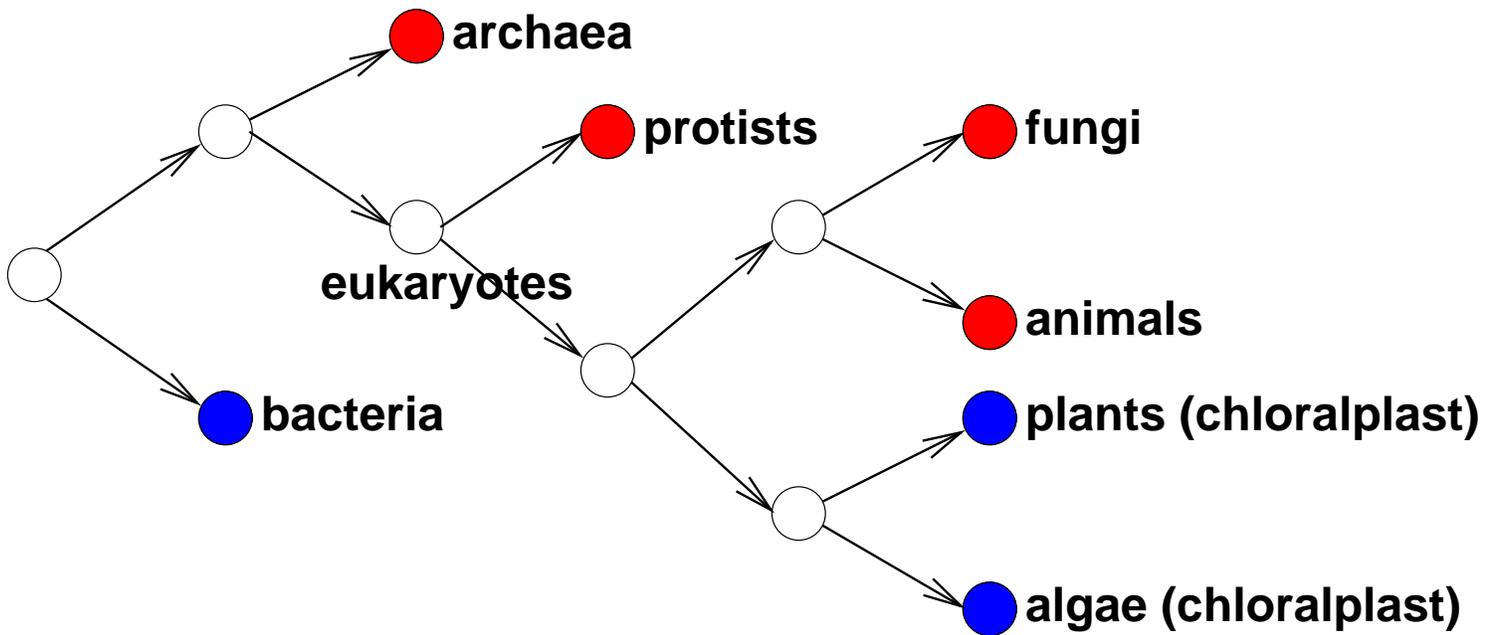
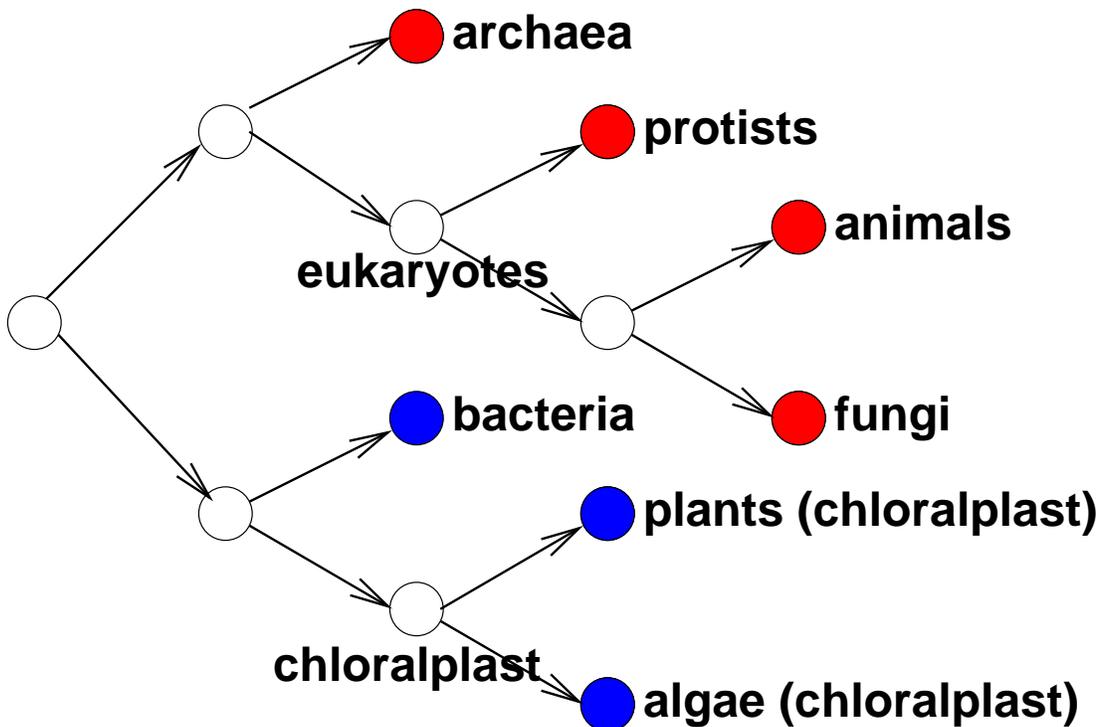


Covariation due to the mismatch of gene tree and species tree



sequence evolution on species tree.
 sequence pair 1 (blue) appears in bacteria, plants and algae.
 sequence pair 2 (red) appears in archaea, non-green eukaryote.
 transition between 1 and 2 occurs twice.



sequence evolution on gene tree.
 sequence pair 1 (blue) appears in bacteria and chloralplast.
 sequence pair 2 (red) appears in eukaryotes and archaea.
 transition between 1 and 2 occurs once.