

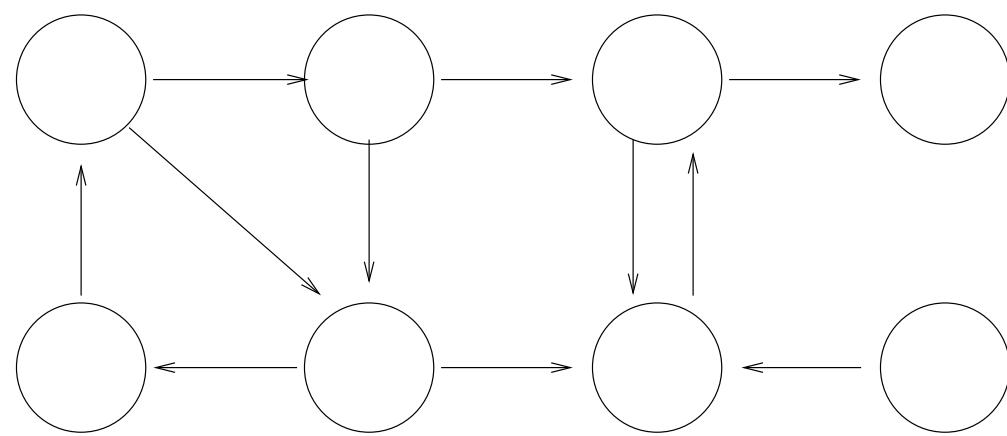
Strongly Connected Components

Definition A strongly connected component of a directed graph G is a maximal set of vertices $C \subseteq V$ such that for every pair of vertices u and v , there is a directed path from u to v and a directed path from v to u .

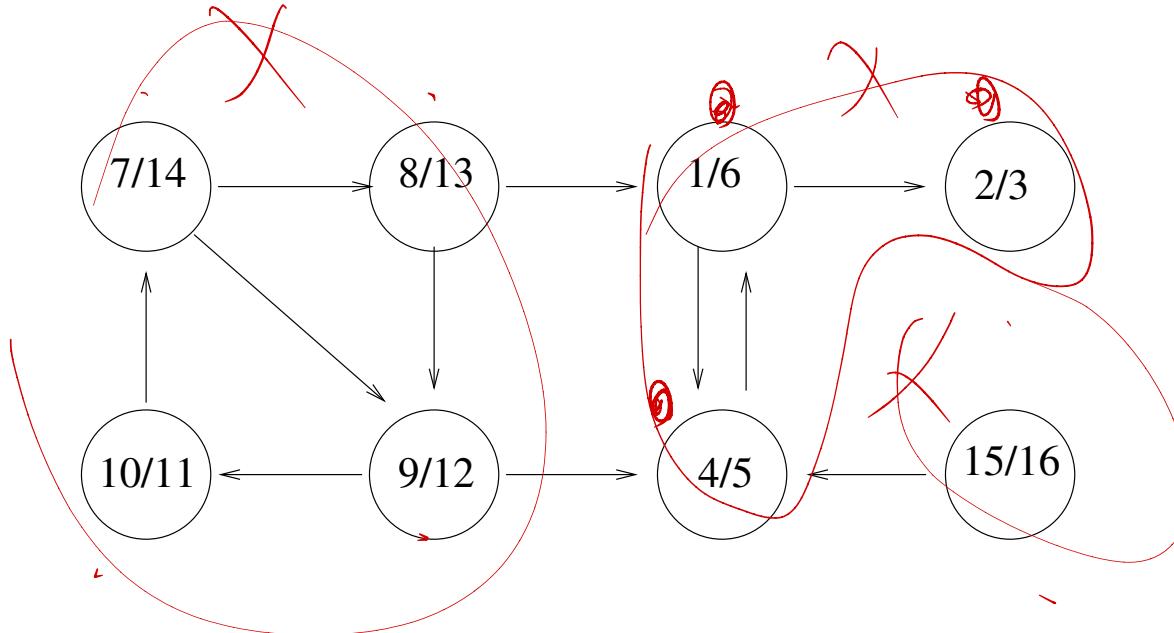
Strongly-Connected-Components(G)

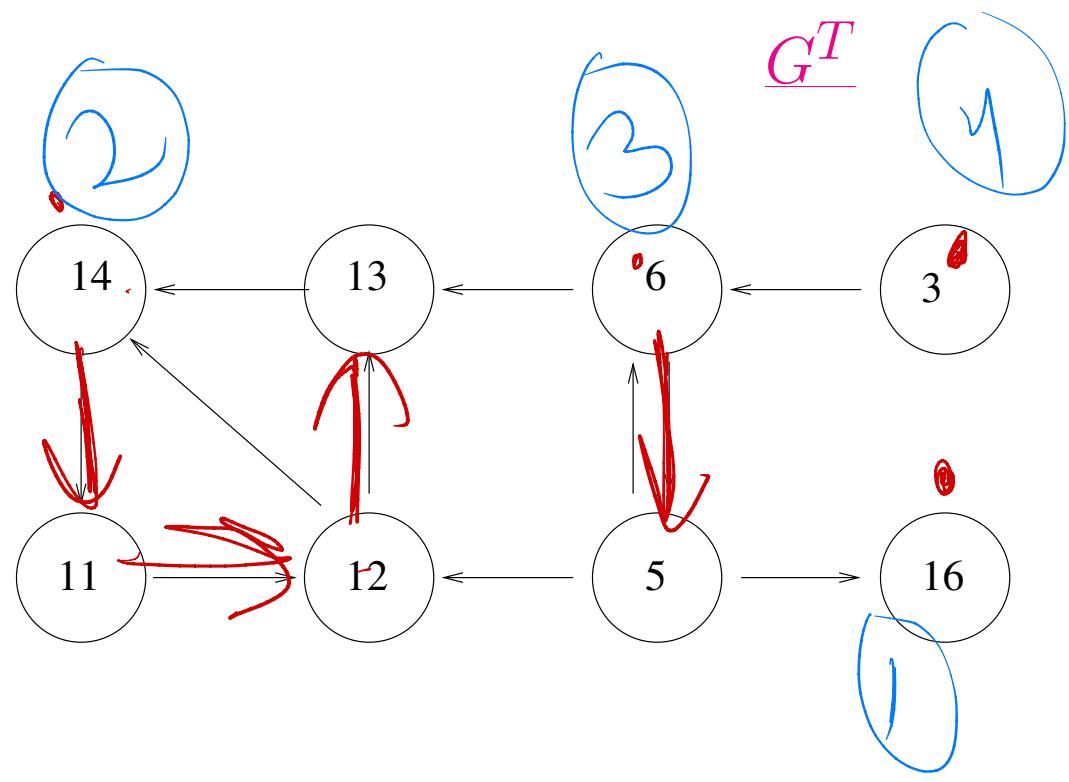
- 1 call DFS(G) to compute finishing times $f[u]$ for each vertex u
- 2 compute G^T
- 3 call DFS(G^T), but in the main loop of DFS, consider the vertices in order of decreasing $f[u]$ (as computed in line 1)
- 4 output the vertices of each tree in the depth-first forest formed in line 3 as a separate strongly connected component

Example

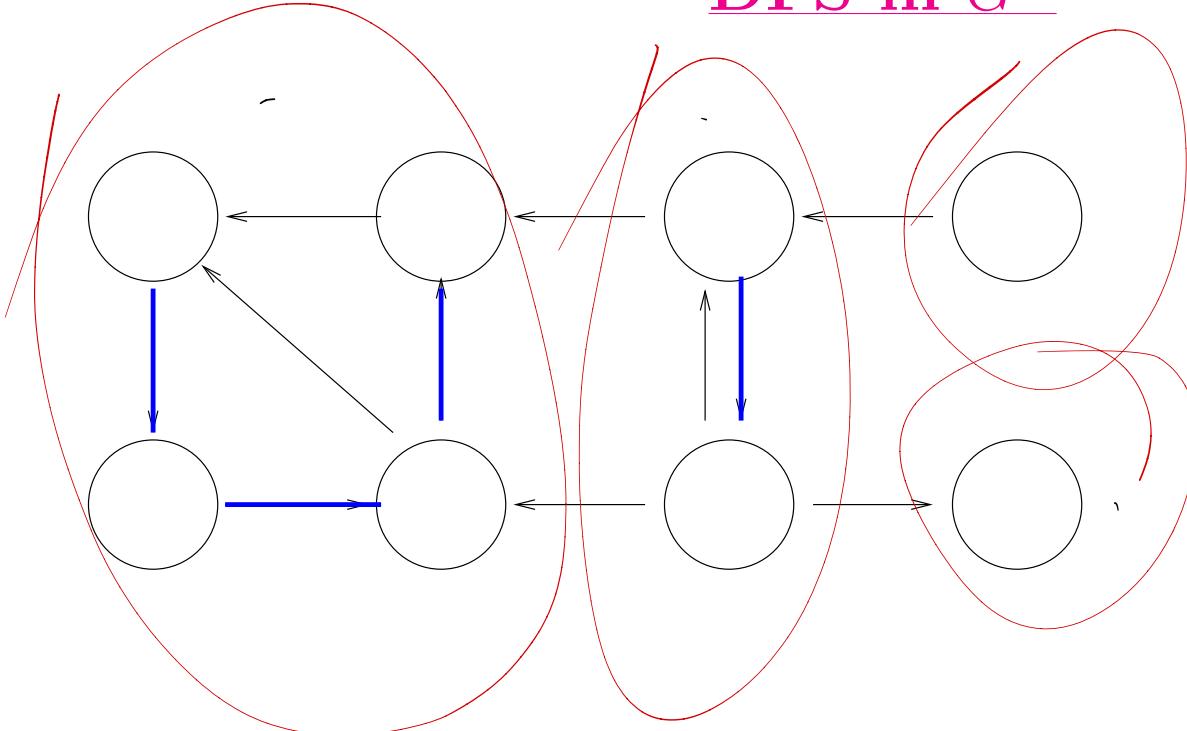


DFS

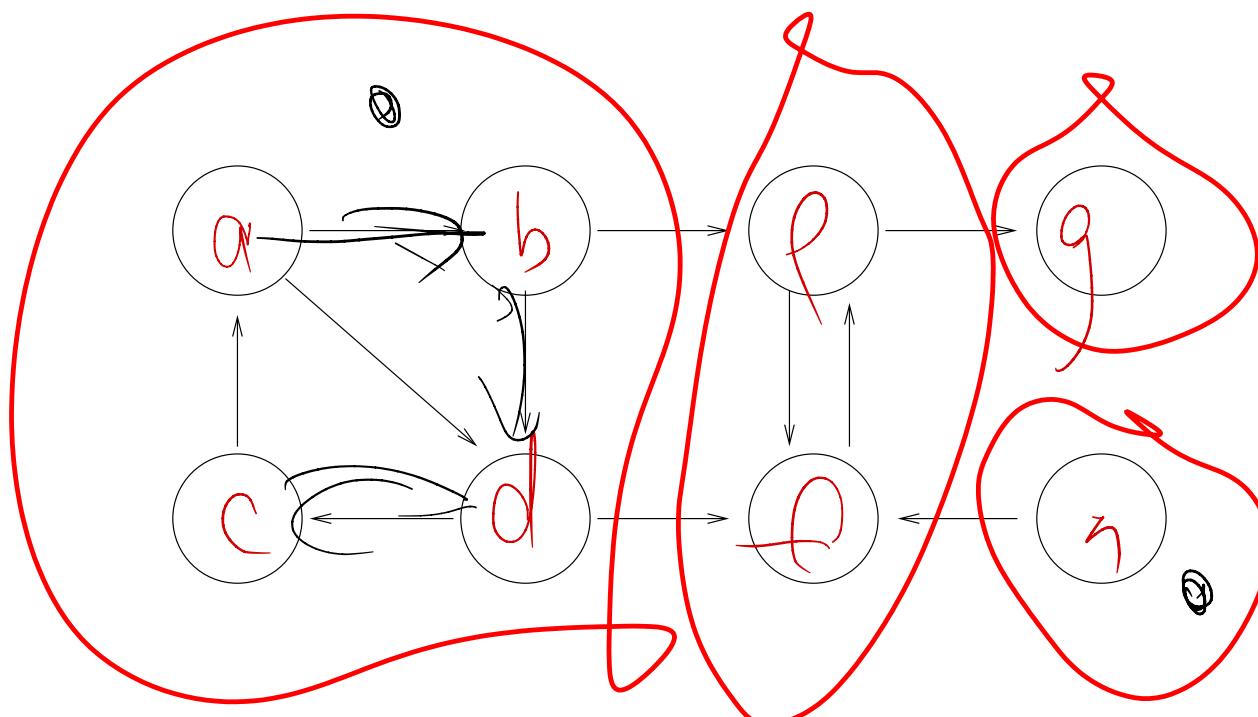




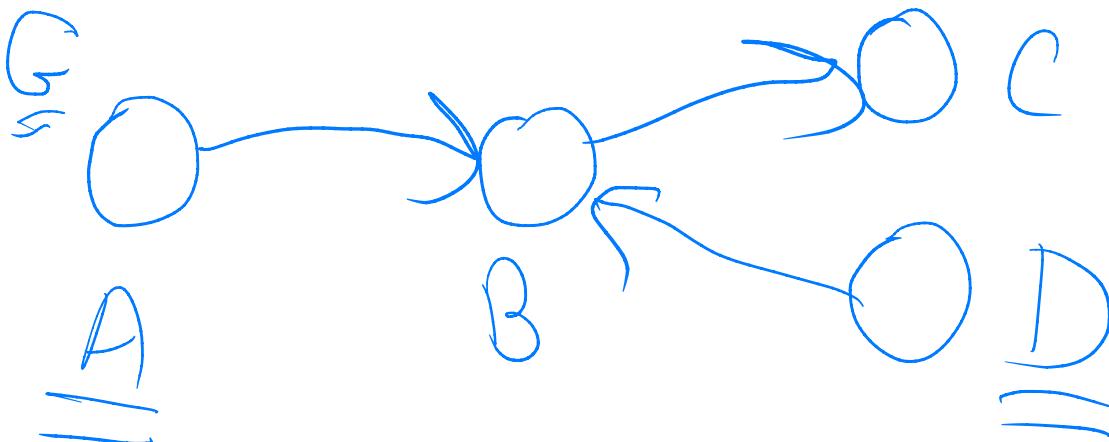
DFS in G^T



Solution



largest f must be
in a component
w/ no incoming edges



G^T

largest f is
in a component
w/ no outgoing edges