

strongly connected components (SCC)

G = directed graph

a SCC in G is a maximal set of vertices which are mutually reachable

1. no vertex can belong to more than one SCC.

2. every vertex belongs to an SCC

1. for (each vertex v) $color[v] = white$,

1. $h = n$;

2. for (each vertex v)
if ($color[v] == white$) DFS(v) →

3. let G_{rev} be the reversed G . ☆

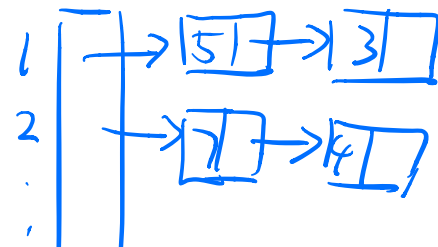
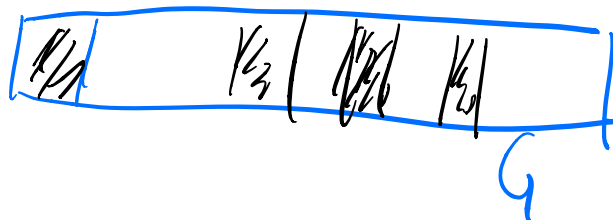
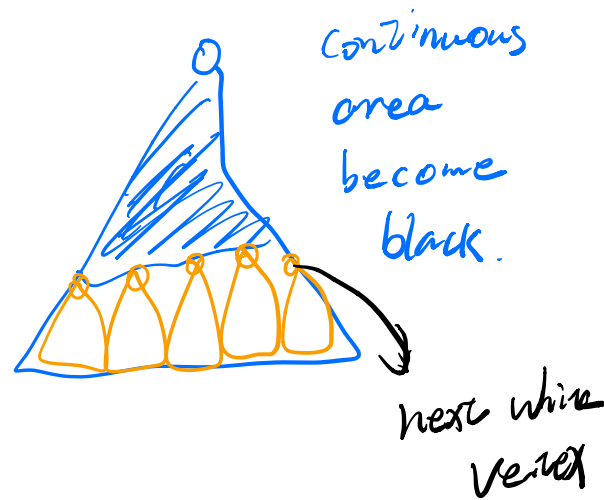
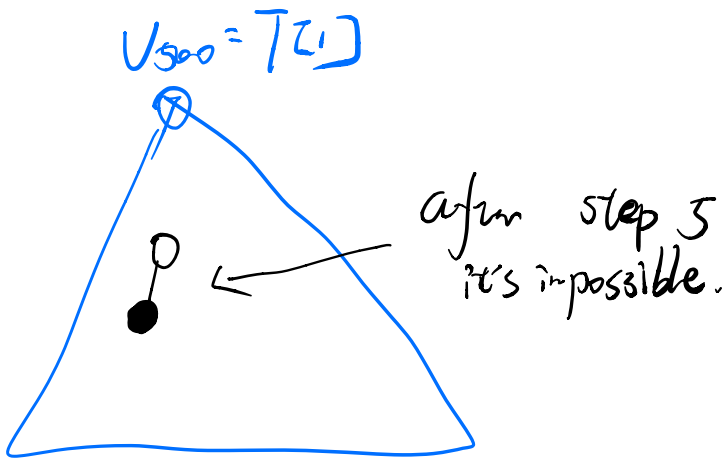
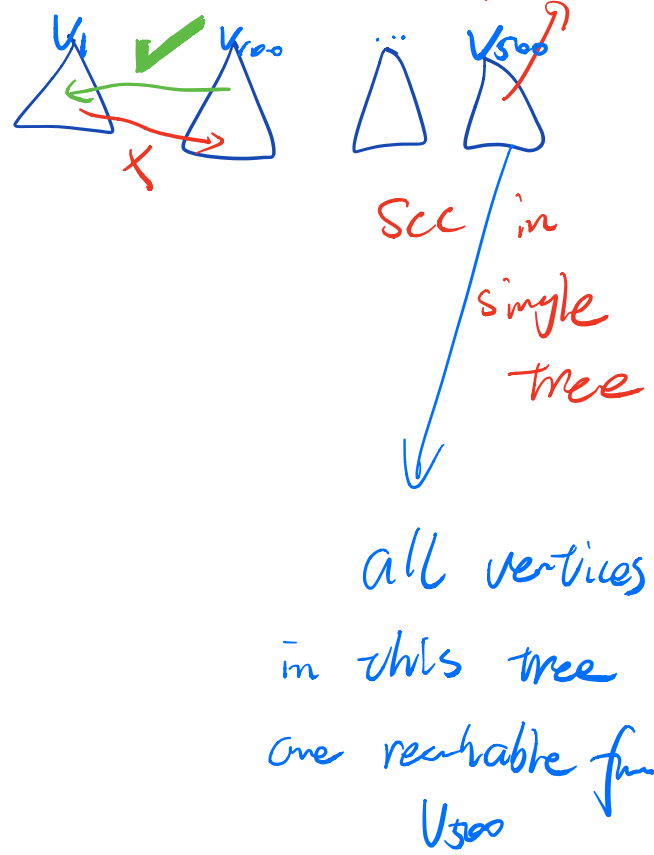
4. for (each vertex v) $color[v] = white$.

all V from SCC
in this time

4' $scc\# = 0$
~~5. $DFS_k(T[1])$ on G_k~~

5. for $i=1; i \leq n; i++$
 if (color[T[i]] == white)
 $DFS_k(T[i])$
 $scc\#++$

6. output(scc[1..n])



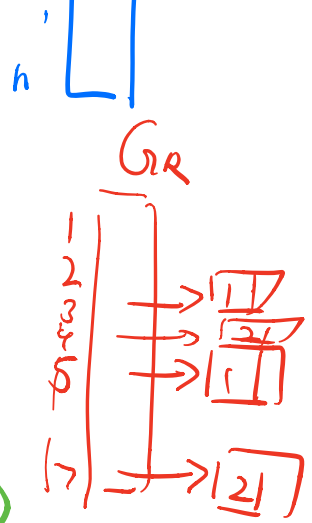
DFS(v)

1. $color[v] = gray$;

2. for (each edge $[v, w]$)

if ($color[w] == white$) DFS(w)

3. $color[v] = black$; $T[h-] = v$.



root of the last tree in sequence

Identify vertices



in this tree from which v_{500} is reachable (they are exactly the desired SCC)

$DFS_R(u)$

1. $color[u] = gray; \quad scc[u] = scc \#$

2. for (each edge $[u, w]$)

if ($color[w] == white$) $DFS_R(w);$

$color[u] = black$