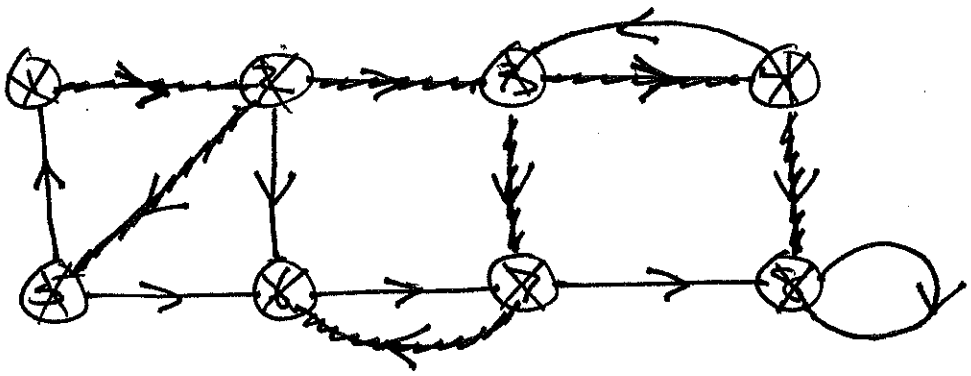
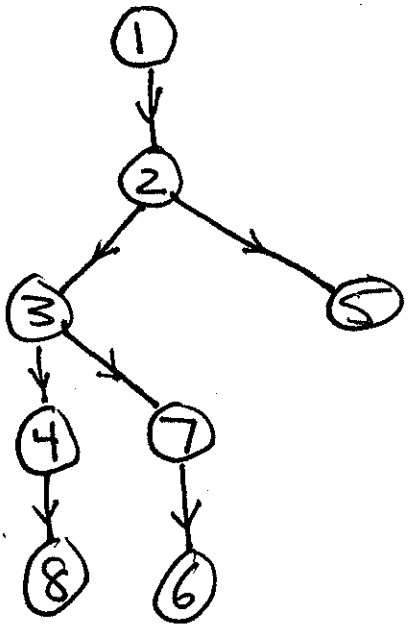
CSE 101-02 4-25-23

Ex.

G



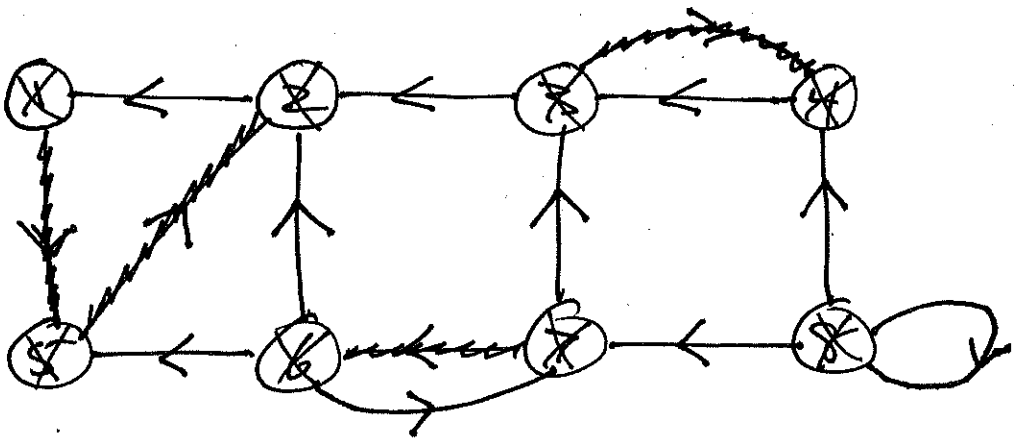
Forest



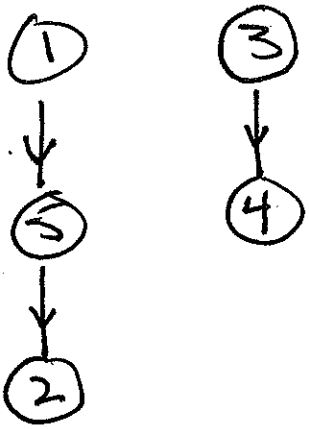
Stack

1 ↙
2 ↙
5 ↙
3 ↙
7 ↙
6 ↙
4 ↙
8

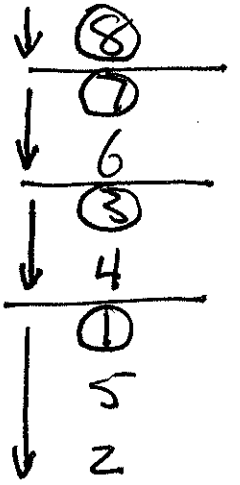
G^T



Forest



stack



C_1 : {1, 5, 2}

C_2 : {3, 4}

C_3 : {7, 6}

C_4 : {8}

Note: G and G^T have same SCCs.

Def

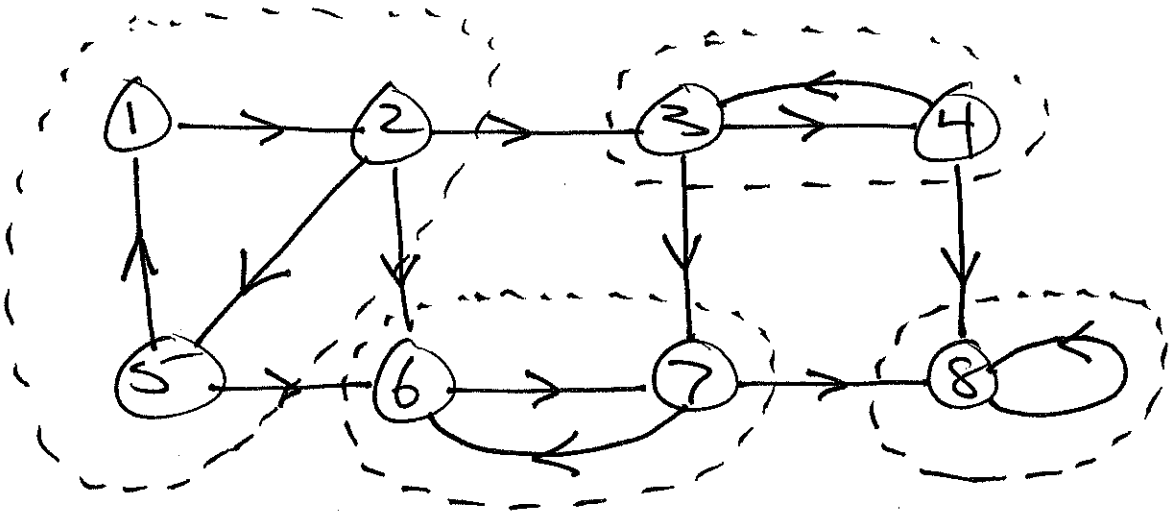
The component graph of G (also called condensation graph) is the digraph G^{SCC} with

$$V(G^{SCC}) = \{\text{strong components of } G\}$$

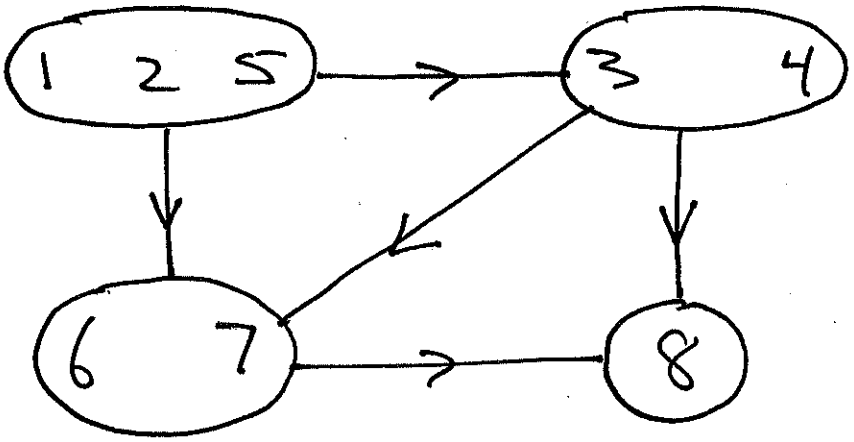
$$E(G^{SCC}) = \{(C_i, C_j) \mid \text{there exists } x \in C_i \text{ and } y \in C_j \text{ with } (x,y) \in E(G)\}$$

Ex.

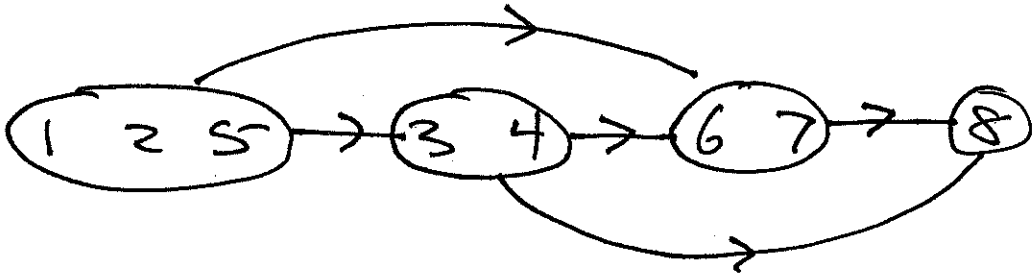
G



G^{SCC}



Topological sort of G^{SCC}

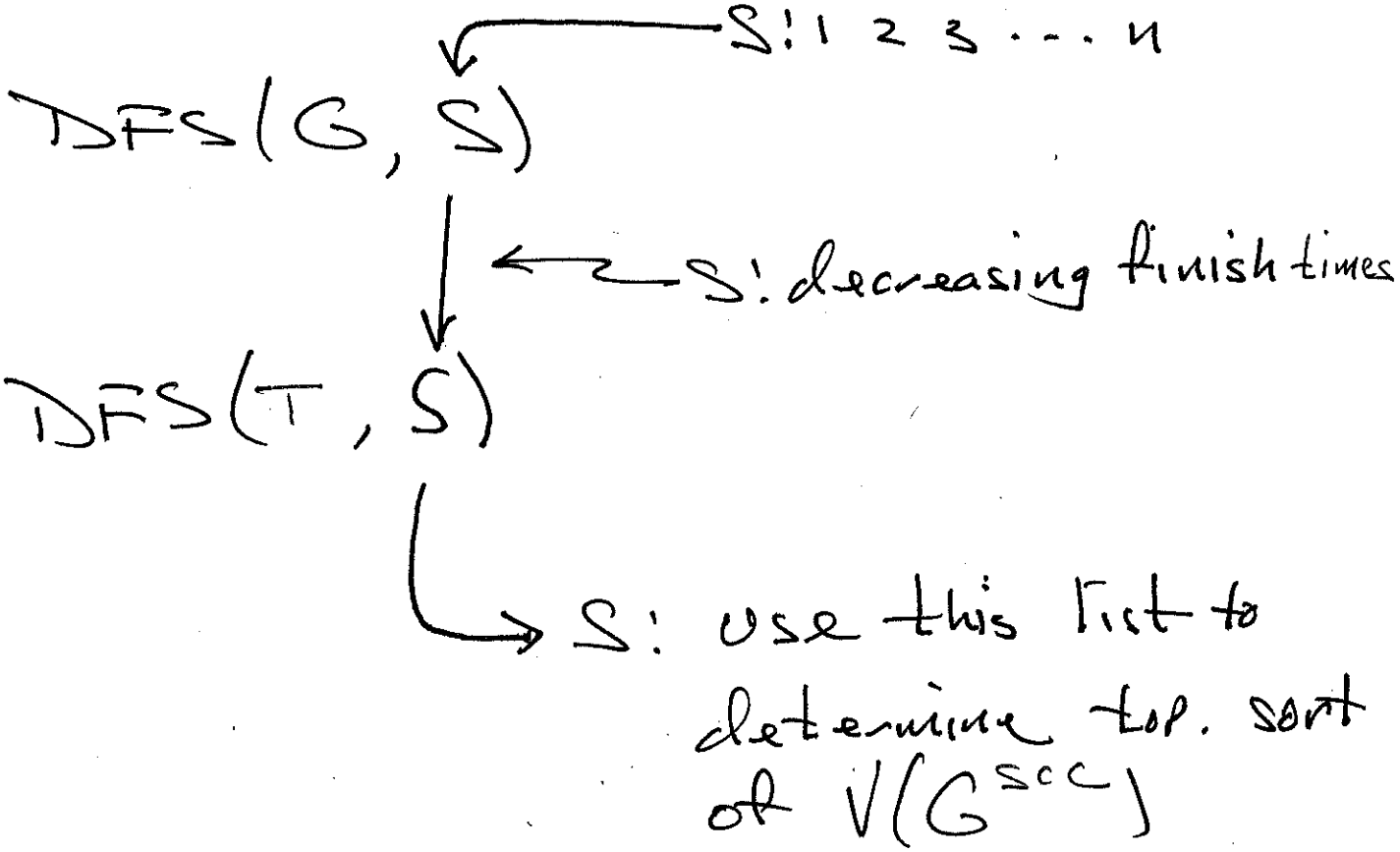


output file:

See IN4, OUT4 in Examples/Pa3

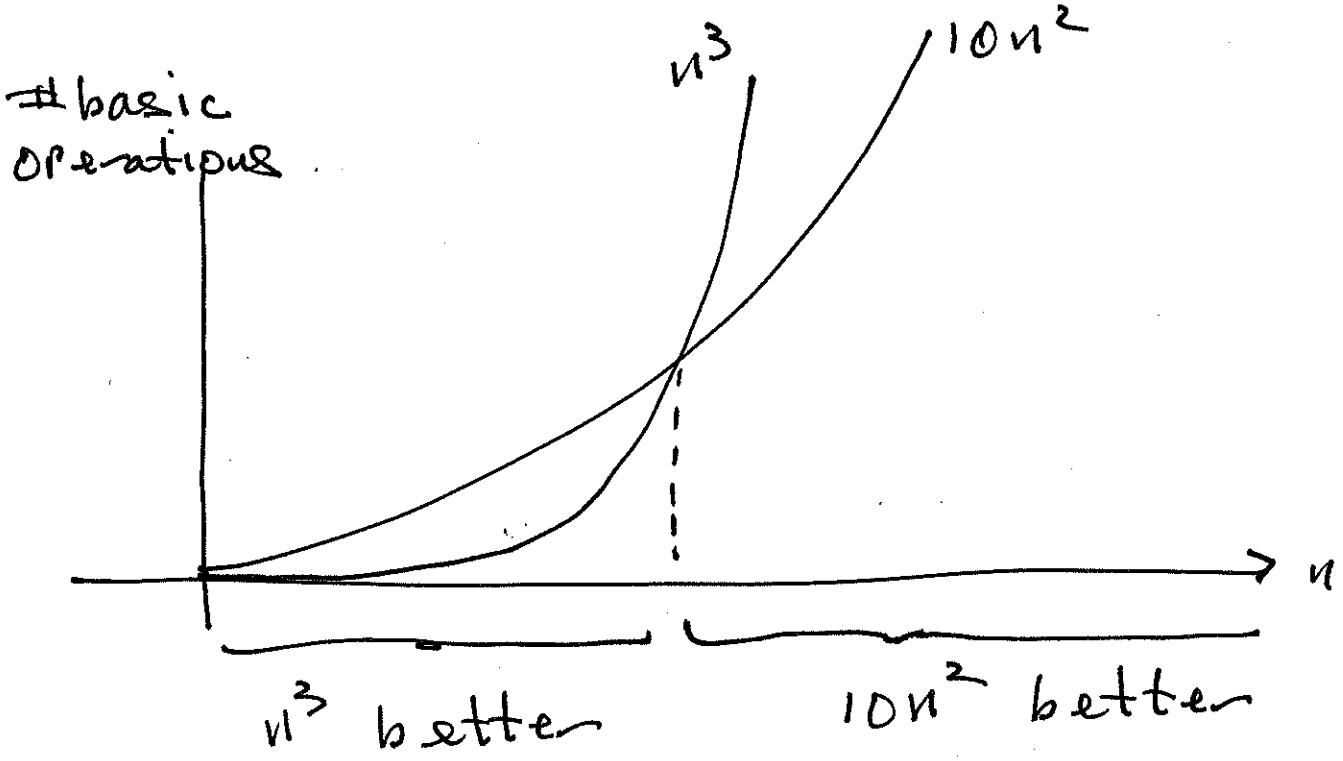
Prototype for DFS()

```
void DFS(Graph G, List S);
```



Algorithm Runtime (handout)

Compare: n^3 to $10n^2$



Defn

let $f(n), g(n)$ be fcns. (Positive)

we write $\boxed{f(n) = O(g(n))}$ to

mean: there exist $B > 0$, $n_0 > 0$

s.t.

$$\frac{f(n)}{g(n)} \leq B$$

for all $n \geq n_0$. We say $g(n)$

is an <u>asymptotic upper bound</u> for

$f(n)$.