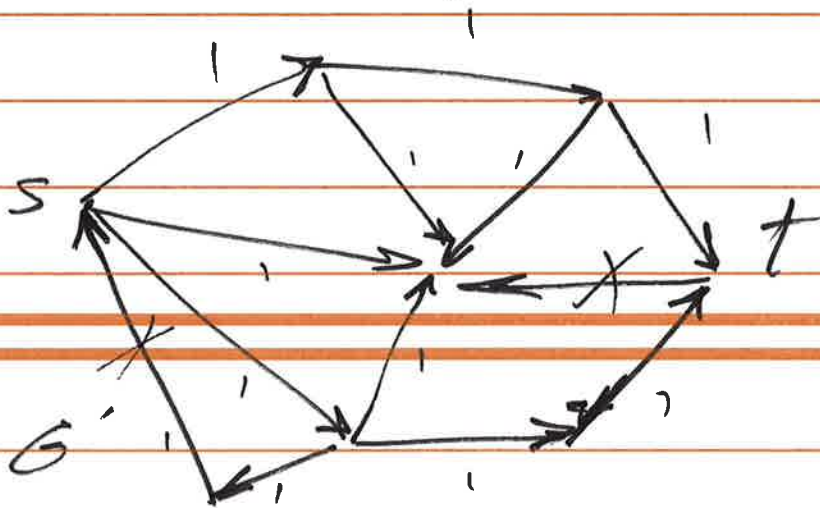


Network Flow

edge Disjoint paths

Def. A set of paths is edge-disjoint if their edge sets are disjoint.

Prob. Given a directed graph  $G$  w/  $s, t \in V$ , find max. no. of edge-disjoint  $s$ - $t$  paths in  $G$ .



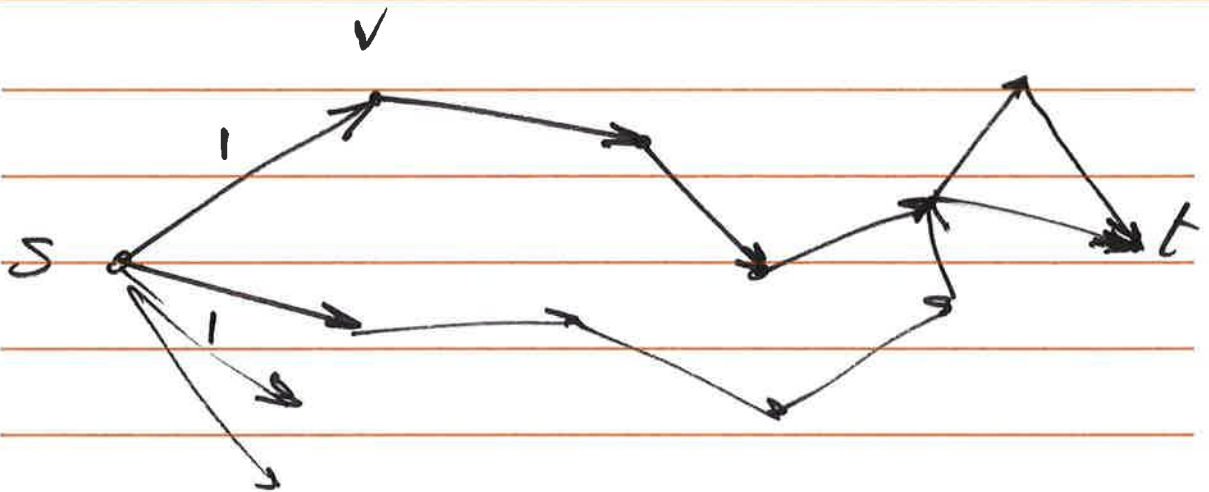
Solution:

Run Max. Flow on  $G'$   
 $v(f)$  will be the ~~no.~~ Max no. of edge disjoint paths from  $s$  to  $t$

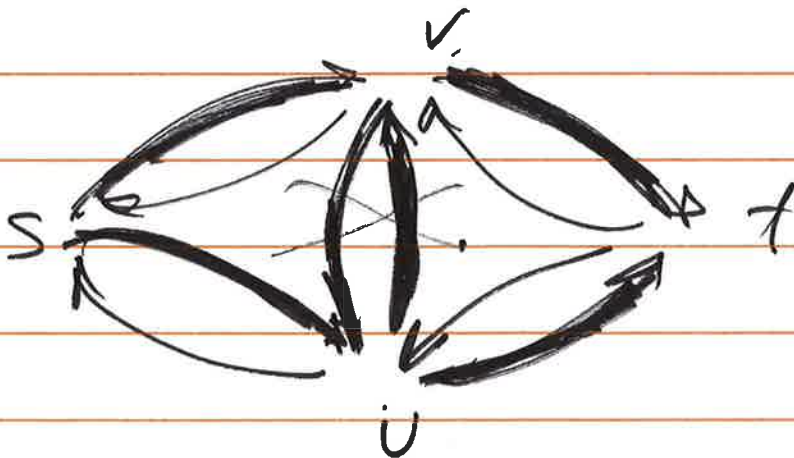
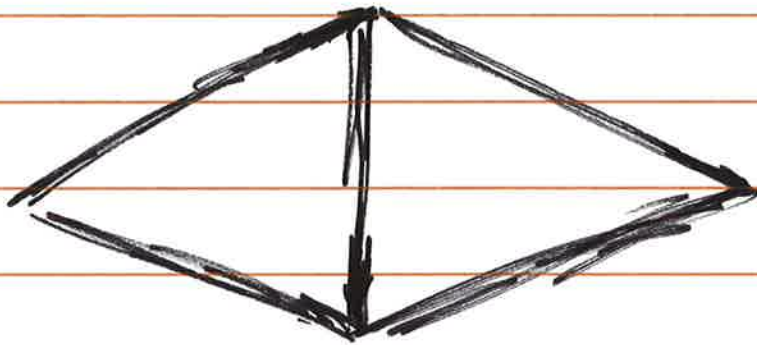
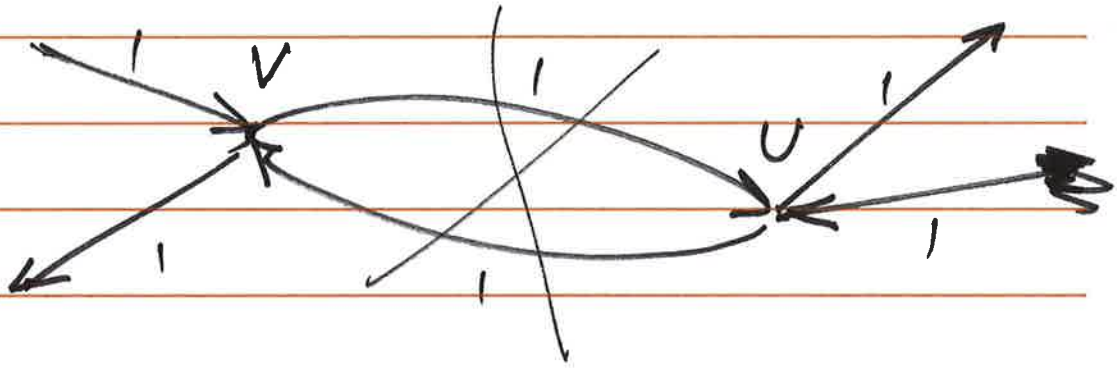
&  $f$  will identify edges on these paths.

A) If we have  $k$  edge-disjoint  $s$ - $t$  paths in  $G$ , we can find a flow of value  $k$  in  $G$ .

B) If we have a flow of value  $k$  in  $G$ , we can find  $k$  edge-disjoint  $s$ - $t$  paths in  $G$ .



How to modify the solution  
for an undirected graph?



Complexity of our solution

if Ford-Fulkerson is used  
to find Max-flow :

$$O(\underline{C_m})$$



$$O(nm)$$