HW7 out - due Tue after break

Last HW before MT2

following Tue Apr 4ish

Max Flow Min cut

Team	Won–Lost	Left	NYY	BAL	BOS	TOR	DET
New York Yankees	75–59	28		3	8	7	3
Baltimore Orioles	71–63	28	3		2	7	4
Boston Red Sox	69–66	27	8	2		0	0
Toronto Blue Jays	63–72	27	7	7	0		0
Detroit Tigers	49–86	27	3	4	0	0	

Can team n win first place?

Input: $W[1..n]$ - wins so far

$G[1..n, 1..n]$ - games left

$R[n] =$

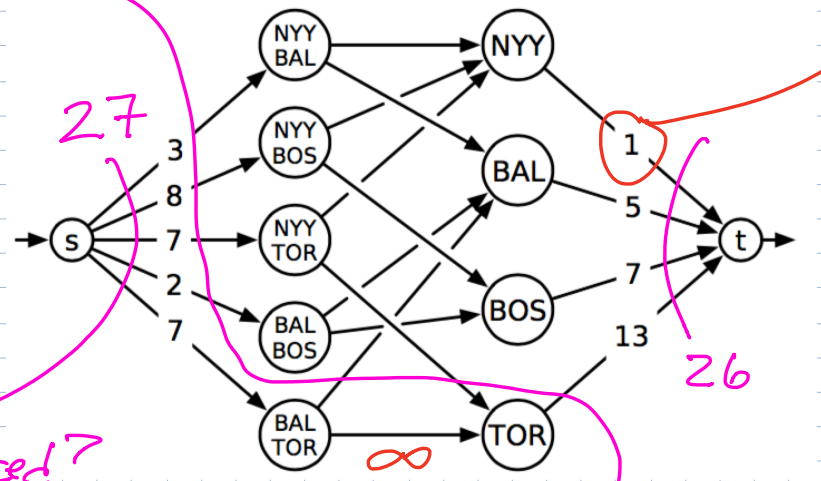
Assume team n wins all $\sum_{i<n} G[i,n]$ games

$$R[i] = \sum_{i \neq j} G[i,j]$$ — remaining games for team i

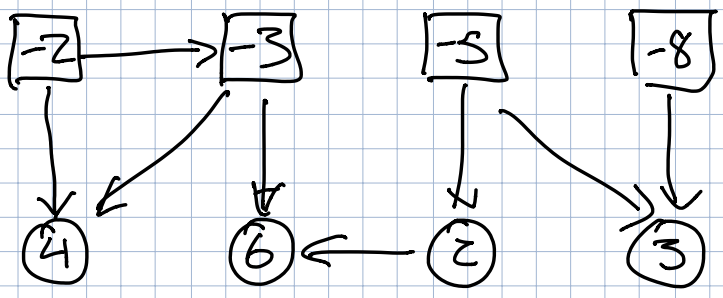
Is it possible for every team $i \leq n$ to end with at most $W[n] + R[n]$ wins?

... wins at most $W[n] + T[n] - W[i]$ more games?

Assign a winning team to each game



$\#\text{vertices} \le O(n^2)$
$\#\text{edges} \le O(n^2)$
$\Rightarrow O(VE) = O(n^4)$ time



(before ⟶ after)

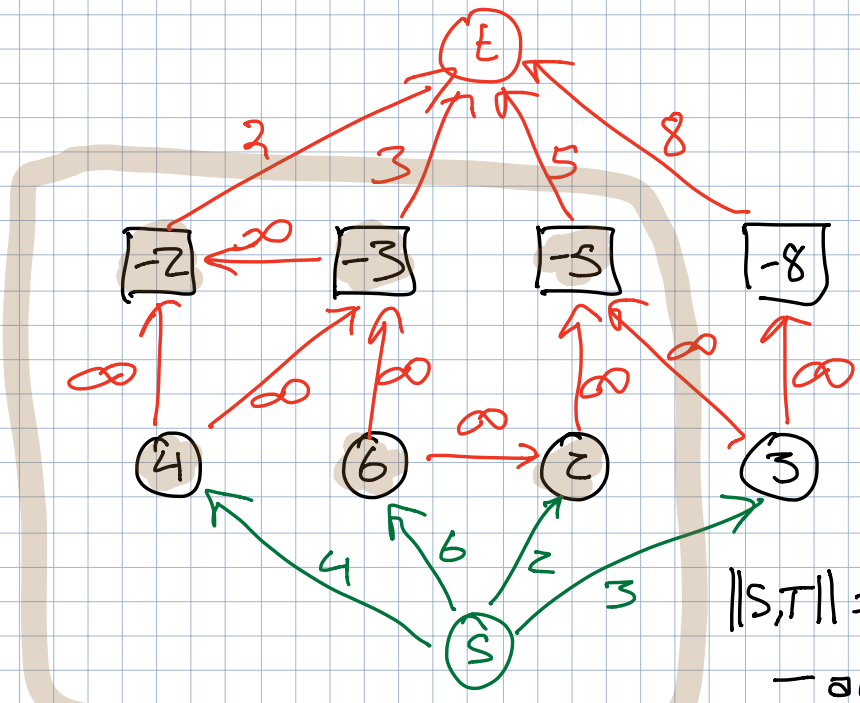
Given a dag $G=(V,E)$

Select a subset of vertices S

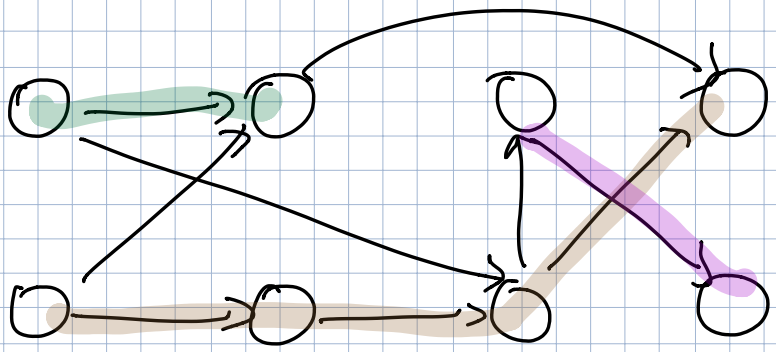
$v \in S \implies u \in S$ for all $u \to v$

max. total profit

Throw out $T = V \setminus S$



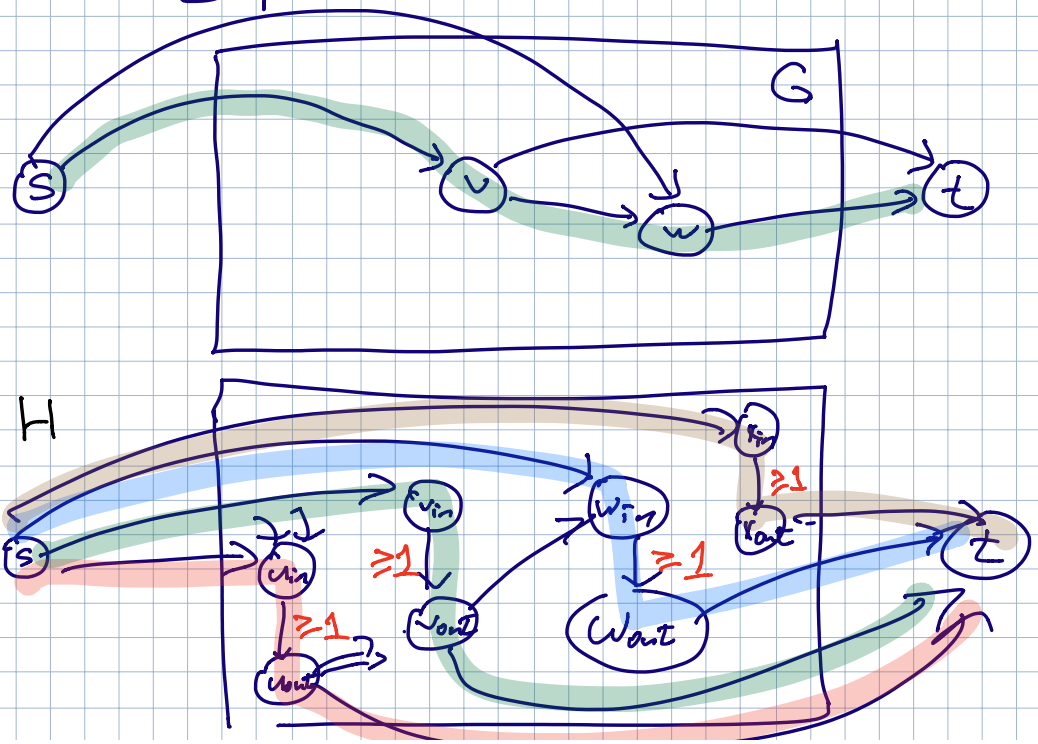
$\|S,T\| = \sum pos$ − actual profit



Given a dag G, find min # paths that cover all vertices

"Flow s.t flow into each vertex is ≥ 1"

Define new graph H

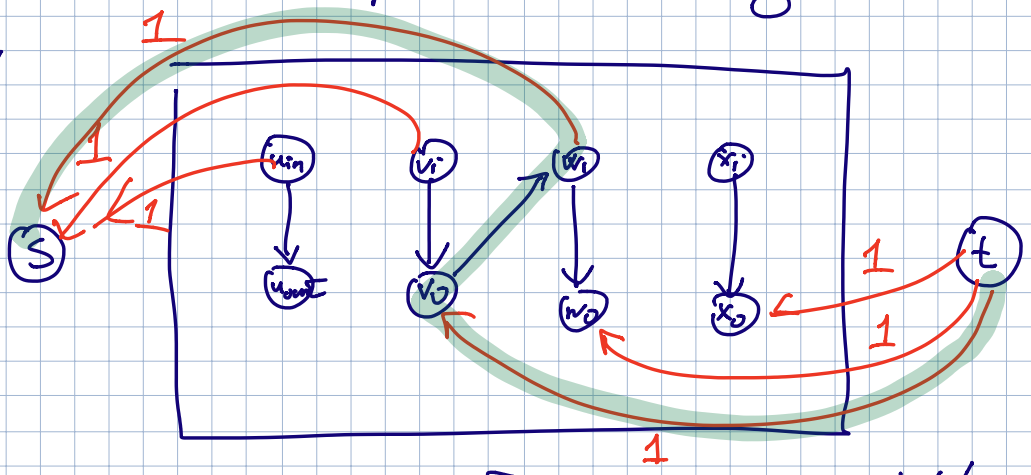


Find any Feasible Flow in H?

$s \to u_{in} \to u_{out} \to t$ For all u

$\Leftrightarrow$ V paths of length 2

H'



Compute max Flow From t to s in H'

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min # paths covering G

$= V -$ maxFlow (H')