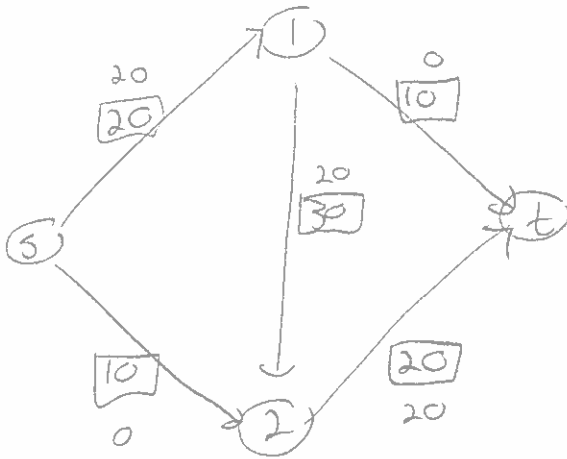


April 9

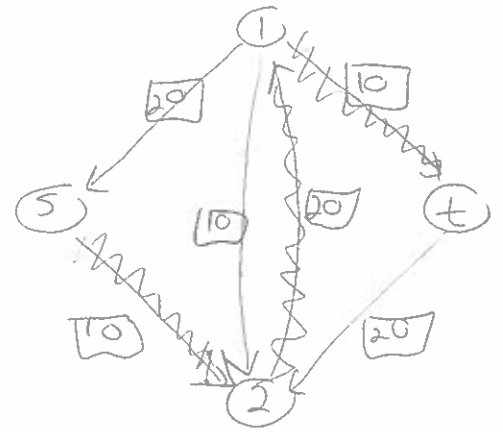
(1)

Augmenting Path Example

Before



G

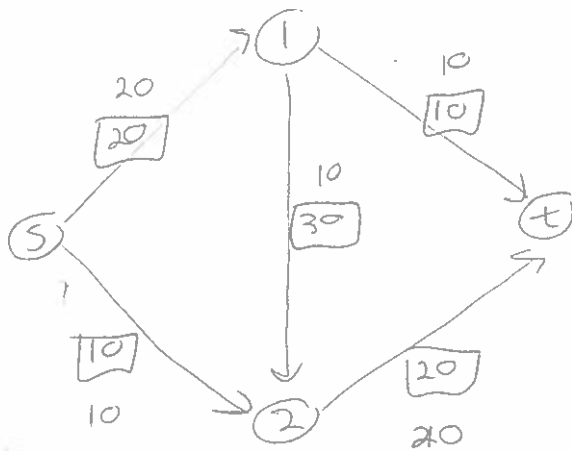


G_f

Exercise: find an augmenting path

$P = s \rightarrow 1 \rightarrow 2 \rightarrow t$

After



Augmenting path

backward

$P =$



forward

April 9

Augmenting Path Proof

(2)

Claim: let $f' = \text{Augment}(f, P)$. Then f' is a flow in G .

Proof sketch: need to verify capacity and conservation

(i) Capacity (refer to example)

Forward edge

$$f'(e) = f(e) + b \leq f(e) + \underbrace{(f(e) - c_e)}_{\text{residual capacity of } e} = c_e$$

$$f'(e) \geq f(e) \geq 0$$

min. residual capacity

residual capacity of e

Reverse edge

$$f'(e) = f(e) - b \geq f(e) - f(e) = 0$$

$$f'(e) \leq f(e) \leq c_e$$

(2) Conservation (refer to example).

HW Exercise!

F.g

