8.11.2020

Must exam এ আসবে

Maximum Flow

Question: 1. Flow network এর characteristics

Ans: Slide point গুলো + 1 টা fig

2. Graph/flow network কিরো with capacity এবং initial flow থাকতেও পারে / নাও পারে

Q. Maxm Flow explain করার

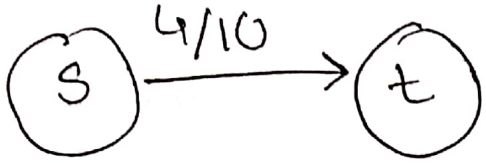
Ans: Slide এর line + fig (ছোট্ট করেও বলা যায়)

মূল প্রবলেম: flow maximize করা

* Flow network এর 2টা node এর মাঝের line কে link বলে.

Residual Network:

(~~Graph~~ flow network এর একটি property)



$V = \{ s, t \}$

$E = \{ (s,t) \}$

Residual network denoted by $G_R = (V, E_R)$

flow network ~~vertex~~ vertex set এবং Residual network এর edge set একই না

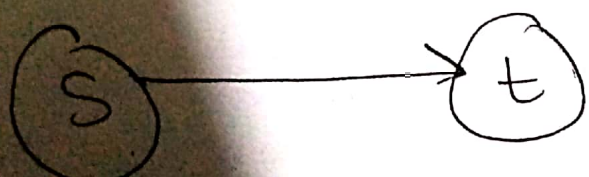
$E_R = \{ \{s,t\} \times \{s,t\} \}$

$E_R = \{ (s,s), (s,t), (t,s), (t,t) \}$

Self loop থাকবে না

$= \{ (s,t), (t,s) \}$

Now



$V = \{s,t\}$

$E_R = \{ (s,t), (t,s) \}$

$C_R(s,t) = 10 - 4 = 6$

$C_R(t,s) = f(v,u)$

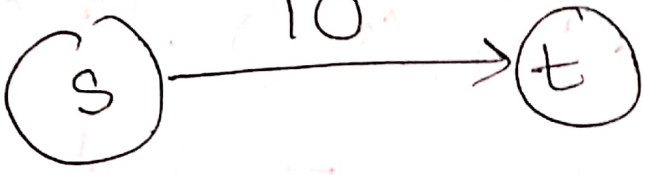
$= 4$

2nd Part class

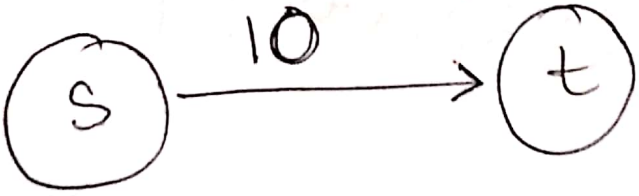
edge 0 আসলে নিবো না

Residual network এ only capacity থাকবে flow থাকবে না।

case 2: G_R



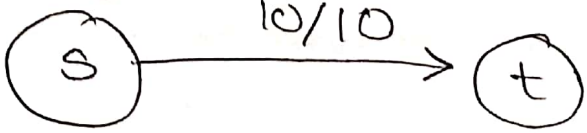
G_R:



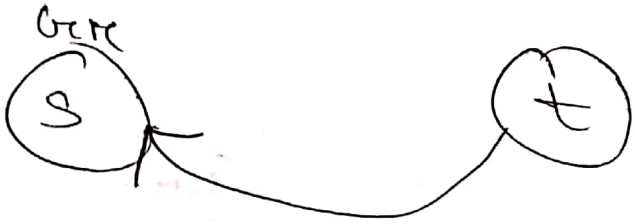
shortcut:

case 3:

G_f:



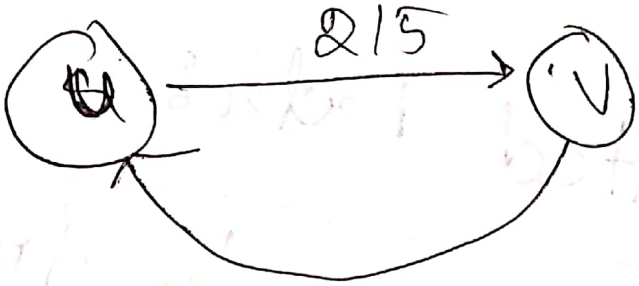
$G_{f'}$



10

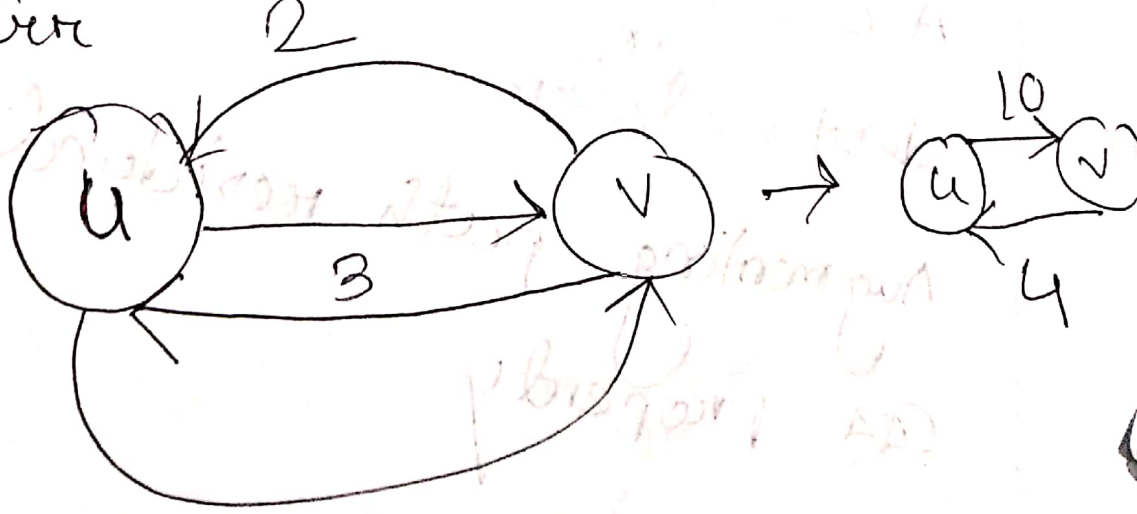
case 4:

G_f



719

$G_{f'}$



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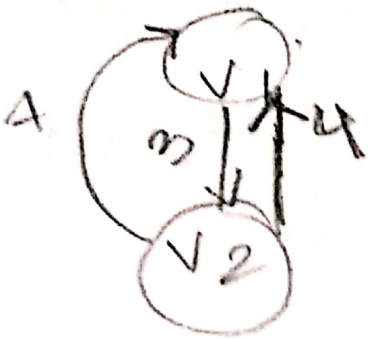


G_f:

$|E|$

G_{fr}:

$|E_{fr}| \leq 2|E|$

Augmented Path:

A continious path from src to destinal in G_{fr}

Augmenting path residual network

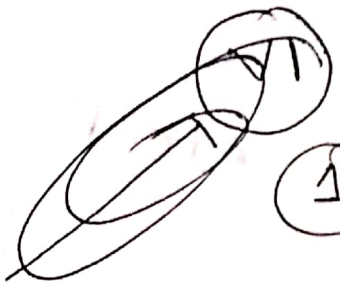
G_A property

15.11.2020

Residual Capacity:

Minimum Residual capacity of an augmenting path P

Ford - Fulkerson Algorithm

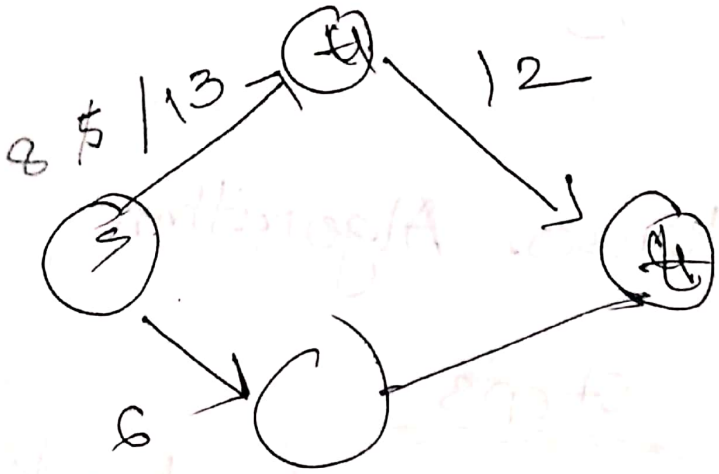


Steps

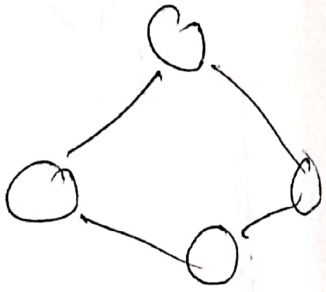
1. Draw Residual network of main network
2. Residual Flow network এর augmenting path খুজতে হবে
3. Augmenting path এর residual capacity খুজে বের করে
4. Now on ~~Augmenting path~~ Flow network increase flow by residual capacity.

Exam Answer procedure

Flow Network এরকম থাকবে



Step 1: Residual network এরকম



Aug path: $s \to u \to t$

Residual capacity: ——

then চিত্রের মত change করব

Step 2: Again ~~to~~ residual network

Aug path: $s \to u \to t$

Residual capacity:

এভাবে চলতে থাকবে ——

Maxflow অনেক বড় হলে Ford Fulkerson Algo fail করতে পারে

Time Complexity:

$O(maxflow * E)$