Lecture-22
SL

classmate
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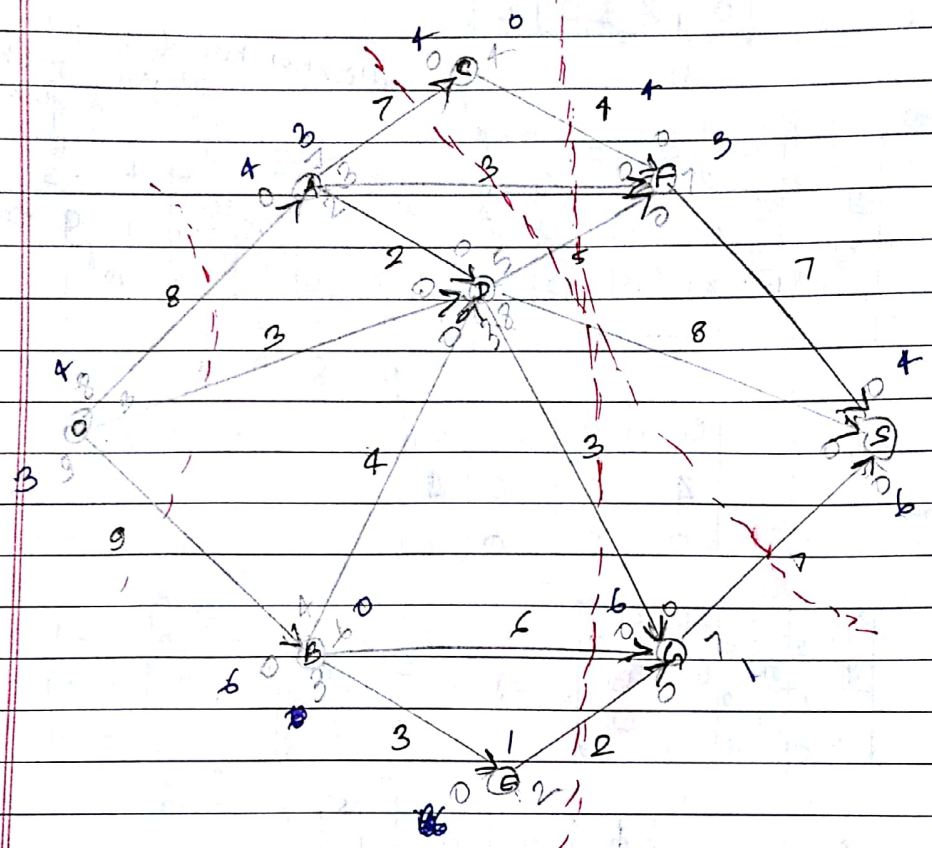
Page

Maximal flow problem
Ford Fulkerson method



Based on the concept of augmenting path

Find max flow possible at unit time.
Find the flow path from source to sink & the amount that is passed from this path

General maximal flow problem can be described as -

1. Directed and connected network, all flows through this network that originate at one node called the source and terminate at other node called the sink. An intermediate node is called transshipment node. There should be just one source & one sink.
2. Maximum amount of flow is given by the capacity of the link.

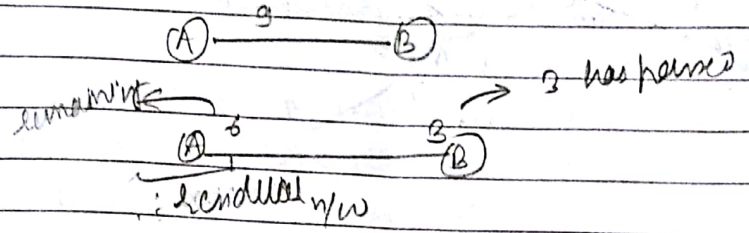
It is desired to maximize the total flow from the source to sink. This maximum flow happens to be

the amt. of flow leaving the source is the amount of flow entering the sink.

⇒ There are two important concepts:

i) Residual network

ii) Augmenting path



Residual n/w gives the remaining link capacity.

~~Residual network~~ Augmenting path

It is a directed path from source to the sink in a residual n/w that every link on this path has a strictly positive residual capacity in the positive direction of the link.

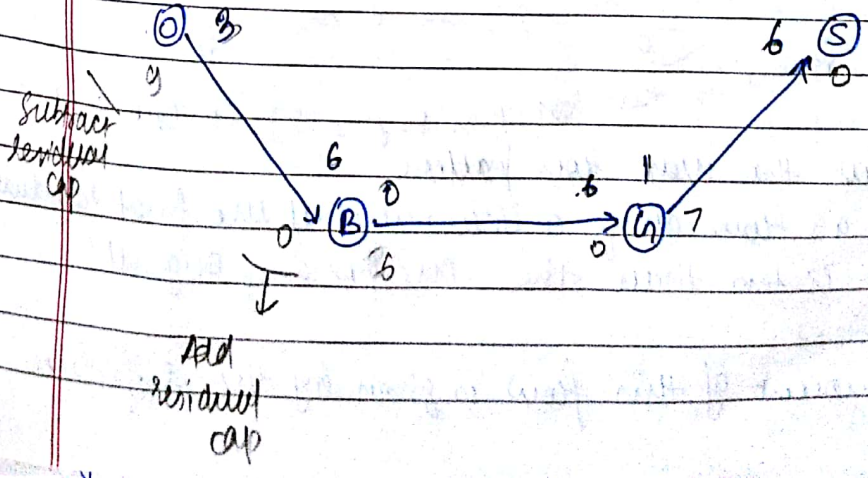
The minimum of these residual capacities on the path is called the residual capacity of the augmenting path.

1. Write the flow values (0 & values) at each of a link. 0 on arrow side
2. Identify an augmenting path

OBGS is one such augmenting path

{9, 6, 7}

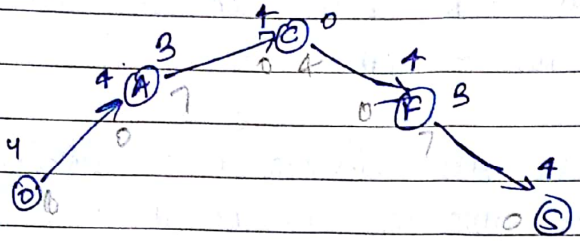
↳ min → ∴ residual capacity



Another augmenting path

OACFS

{8, 7, 4, 7}

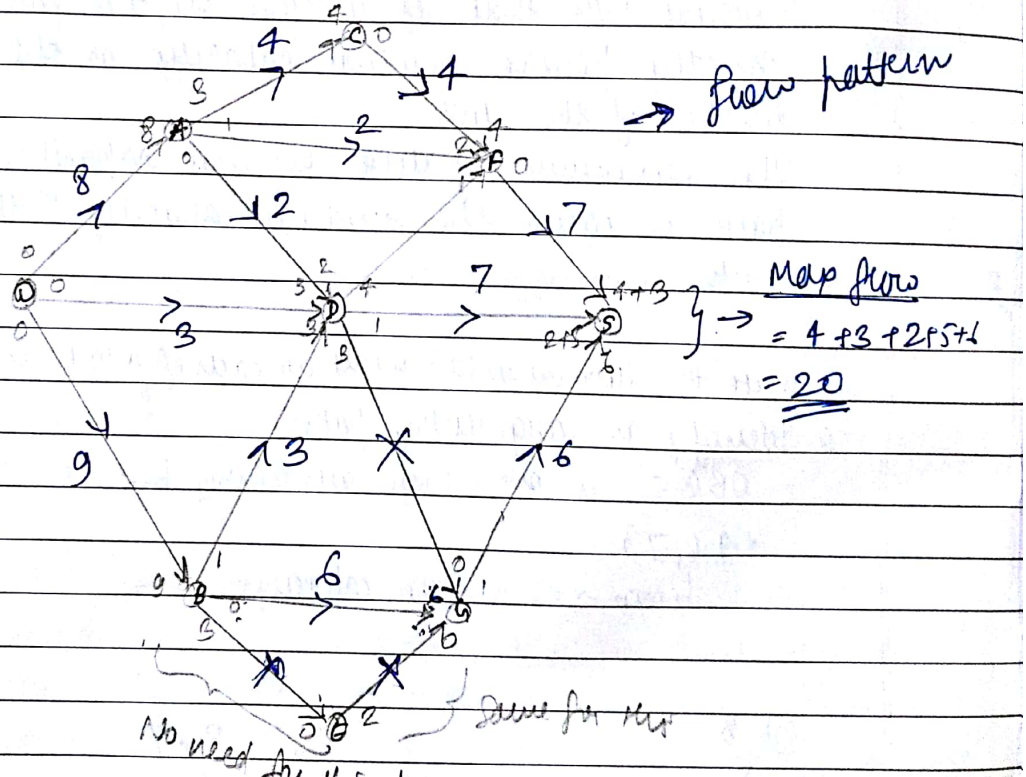


OBDFS {3, 4, 5, 3}

OADS {4, 2, 8}

ODS {3, 6}

OAFDS



To find out the max flow pattern

- There is a flow along a line only if the final residual capacity is less than the corresponding original capacity.
- The amount of this flow is given by the difference

is this (original vs ~~edit~~ Residual capacity)

min cut=

Maximal flow ~~mean~~ ~~fatta~~ method

This method helps us to recognize the attainment of maximum flow, thus saving us from searching of additional augmenting path.

A cut defines a set of directed link which when deleted from the network will cause a complete discontinue of flow b/w the source & sink.

We have to select a no. of cut in the original flow that totally discontinues ~~cuts to the original~~ flow from source to sink.