Algorithms and Problem-Solving Lab (15B17CI471)

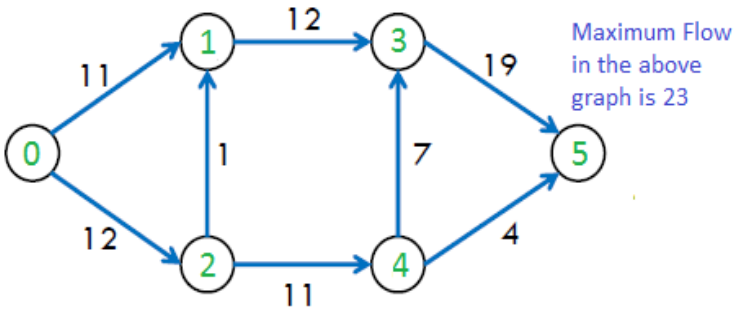
EVEN 2022

Week -9 (4 Apr – 9 Apr 2022)

Q1. Given a graph which represents a flow network where every edge has a capacity. Also given two vertices *source* 's' and *sink* 't' in the graph, write a program to find the maximum possible flow from s to t using Ford Fulkerson algorithm with following constraints:

a) Flow on an edge doesn't exceed the given capacity of the edge.

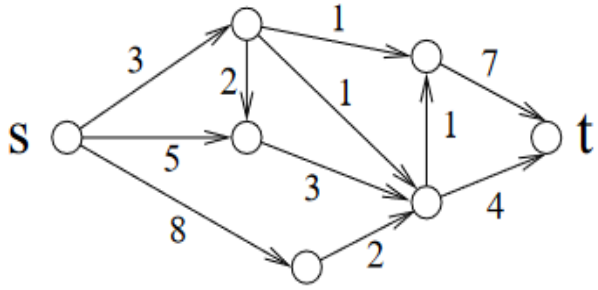
b) Incoming flow is equal to outgoing flow for every vertex except s and t.



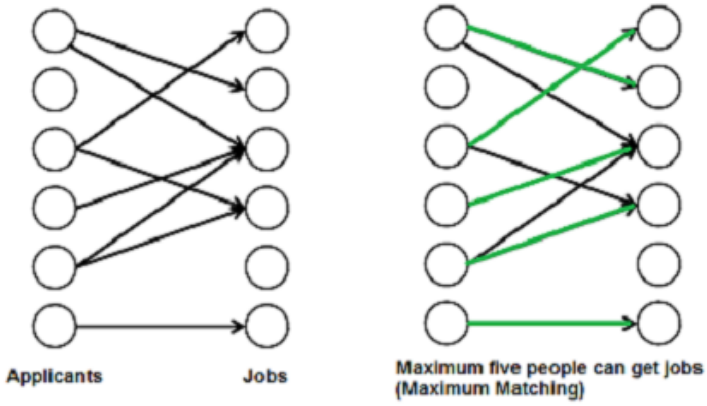
Q2. Given a graph which represents a flow network where every edge has a capacity. Also given two vertices *source* 's' and *sink* 't' in the graph, write a program to find the maximum possible flow from s to t using Edmond's Karp algorithm with following constraints:

a) Flow on an edge doesn't exceed the given capacity of the edge.

b) Incoming flow is equal to outgoing flow for every vertex except s and t.



Q3. There are M job applicants and N jobs. Each applicant has a subset of jobs that he/she is interested in. Each job opening can only accept one applicant and a job applicant can be appointed for only one job. Implement an efficient algorithm to find an assignment of jobs to applicants in such that as many applicants as possible get jobs.



Q4. Given a directed graph (representing a network) and two vertices in it, source 's' and destination 't'. Suppose you want to send some large files from s to t but never have two files use the same network link (to avoid congestion on the links). Implement an algorithm to find out the maximum number of files that can be sent from s to t.

For example, for the given network, maximum two files can be sent via paths shown in blue and red.