TD 4

Graph theory
Level: L 2 2024-2025

Exercise l

A server S is t connected to the machine T by a network with the nodes s A, B, C, D, where the capacity s of the connections between the nodes is in Mbps. The user of machine T downloads a very large file from server S.
We want to find the routing that maximizes the throughput.

	A	B	C	D	T
S	2	6	1		
A		3		7	
B				3	5
C		2		6	
D	3				4

Exercise 2

The NAFTAL Company of Tlemcen has two main LPG tanks which are supplied directly from the Arzew station. These tanks supply nine main stations located in different regions of the wilaya, namely Tlemcen, Remchi, Nedrouma, Maghnia, Bab El-Assa, Sabdou stations, Marsa Ben M' hidi, Ouled Mimoun and Arisha. Note that the quantity required by some stations can be satisfied by the two tanks.

The Tlemcen reservoir can discharge 370 thousand liters per week, while the Sabdo reservoir can discharge 250 thousand liters per week.

The average quantities required (in thousands of liters) per week for the nine stations are shown in the following table:

	Tlemcen	Remchi	Nedrouma	Maghnia	Bab El-Assa	Marsa Ben M'hidi	Ouled Mimoun	Arisha	Sabdou
Needs	77	105	70	105	56	49	56	35	42

The following table shows the transport capacities (in thousands of litres) of each tank to each station according to the quantities required:

	Tlemcen	Remchi	Nedrouma	Maghnia	Bab El-Assa	Marsa Ben M'hidi	Ouled Mimoun	Arisha	Sabdou
Tlemcen reservoir	54	54	54	54	27	27	27	--	--
Sabdou reservoir	--	--	--	54	27	27	27	27	27

1. Give the modelling of the problem to be solved.
2. Determine the maximum amount of fuel obtained from the two tanks of the Naftal company.

Exercise 3

The construction of a warehouse is divided into ten tasks whose characteristics are given in the table below. Find the critical path.

Tasks	A	B	C	D	E	F	G	H	I	I
Precedents	-	-	A	A,B	A	C	D,F	E	G	H,I
Duration (days)	4	2	l	l	2	2	2	l0	4	l