- SUBIECTUL II -

Gruia Gabriel

1) $d_4 = [\infty, \infty, \infty, \infty, 0, \infty]$

	0	1	2	3	4	5
S1:				3		
S2:					V	
S3:	20	6	7			12
S4:				V		
S5:	12		9			
S6:		V				
S7:	13					
S8:			V			
S9:			16	16		
S10:	V					

$\Rightarrow d_{4,0} = 10$

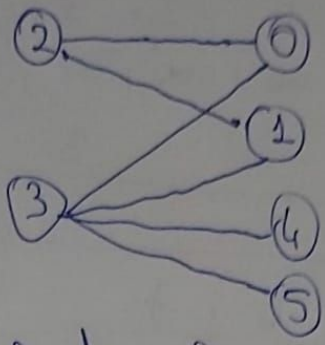
4) gr 0 = 3 ~~+1 edge~~
gr 1 = 3
gr 2 = 3 ~~+1 edge~~
gr 3 = 5
gr 4 = 1
gr 5 = 1

adăgăm 2 muchii:
→ 4 - 1 ⇒ { gr 4 = 2, gr 1 = 4
→ 5 - 0 ⇒ { gr 5 = 2, gr 0 = 4
⇒

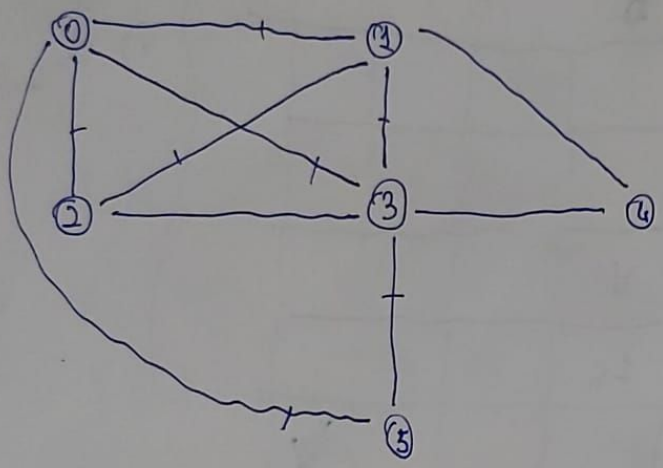
⇒ graful admite lanț eulerian (are 2 noduri cu grad impar
(am adăugat muchii 4-1, 5-0 de la nodurile cu grad mic impar la nodurile cu următorul cel mai mic grad impar, adică din 2 în cazul gr%2 = 1 am dat gr%2=0

3) graful nu este bipartit
eliminăm 2 muchii : 0-1, 2-3 ⇒

⇒ graf bipartit:



4*) Un graf admite lanț eulerian ⇔ are 0 sau 2 noduri de grad impar (necesar și suficient)

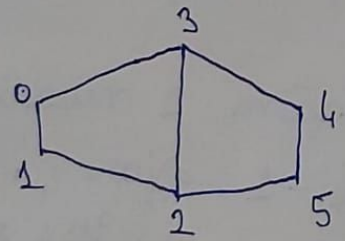


lanț eulerian:

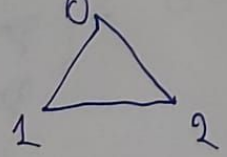
3-5-0-1-3-0-2-1-4-3-2

6)

a)

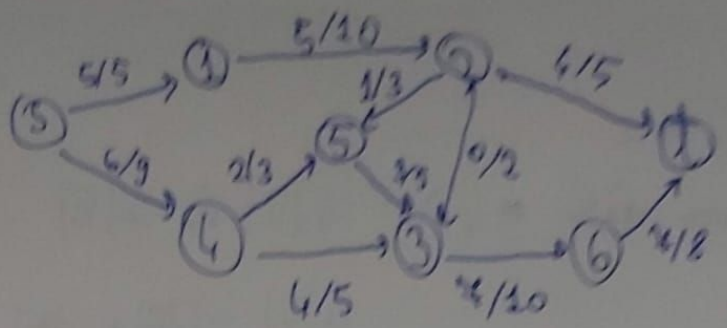


← cel puțin 2 fețe de gr 4



← nicio față de gr. 4

(5)



tăietura minimă: $\begin{cases} s-1 \\ 4-3 \\ 4-5 \end{cases}$

P_1 : 2-5 : 0/3
2-t : 5/5 (s-1-2-t lanț mărește)

P_2 : 4-5 : 3/3
4-3 : 5/5
s-4 : 8/9
3-6 : 8/10
6-t : 8/8 (s-4-3-6-t ↗)

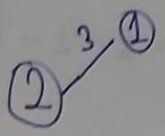
⇒ flux maxim = $f(s-1) + f(4-3) + f(4-5) = 13$

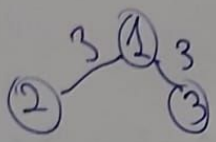
6) b) $|V| - |E| + |F| = 2$

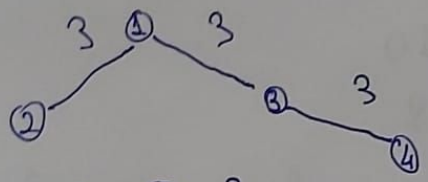
ge minim $\hat{v}$ef $= 4 \Rightarrow$ $4|V| \leq 2|E|$

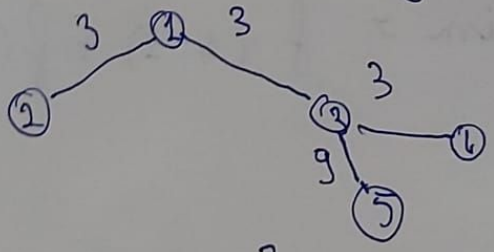
$4|V| - 4|E| + 4|F| = 8$

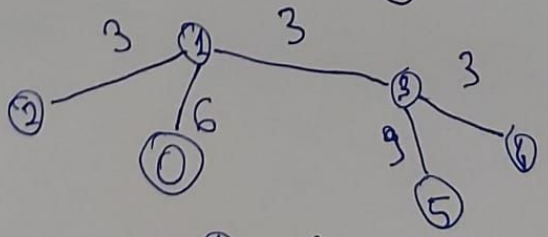
$\Rightarrow$ $4|F| \leq 8 + 2|E|$

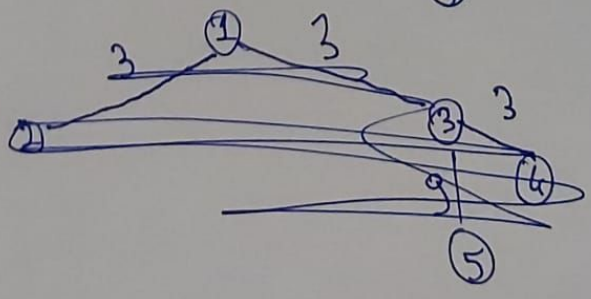
2) P_1: 

P_2: 

P_3: 

P_4: 

P_5: 

P_6: 

exp: la fiecare pas se alege muchia cea mai scurtă de la nodul curent fără să se creeze ciclu