

# assignment Problem

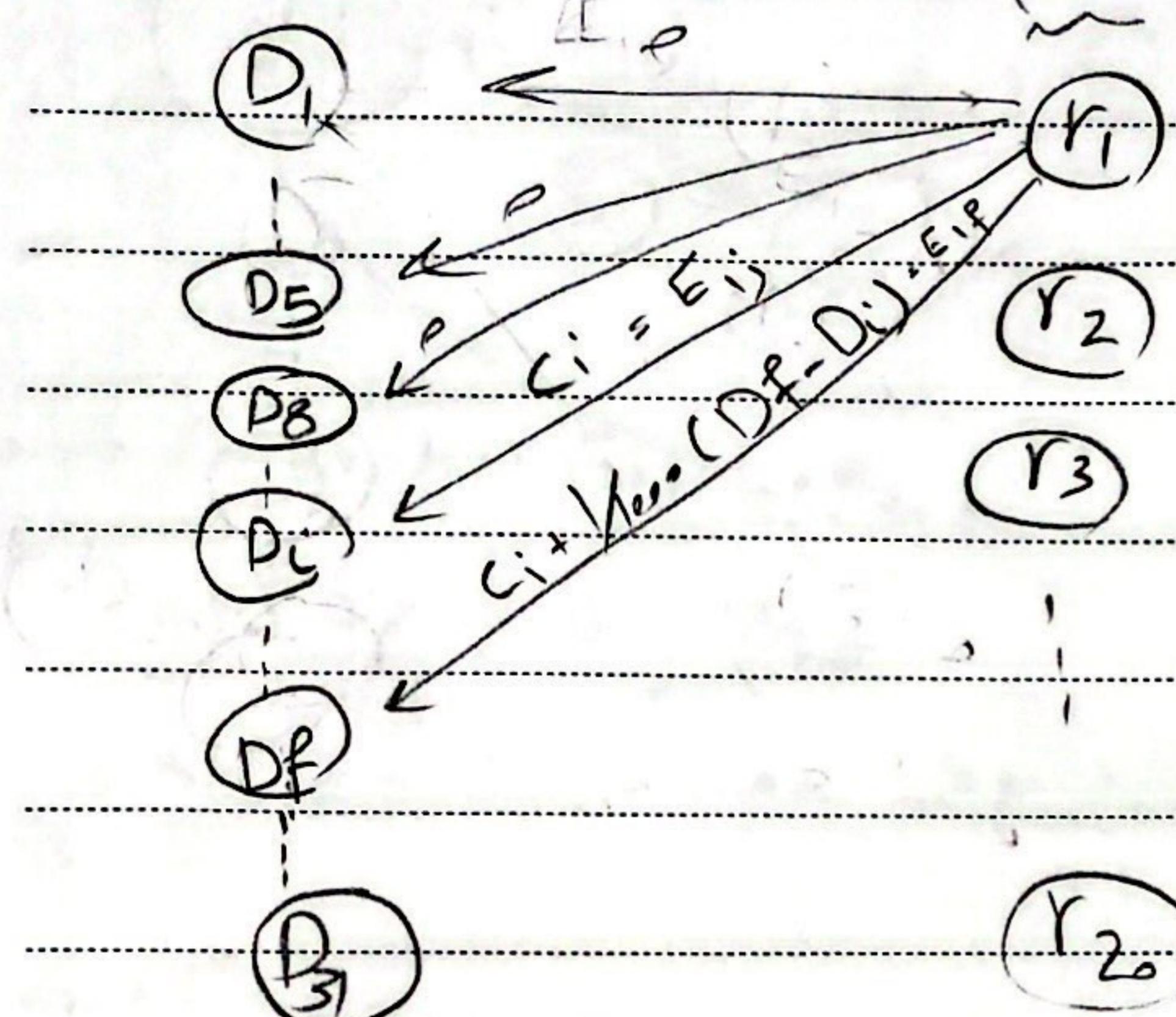
:eta **DP** age: \_\_\_\_\_

(3)

$D_1 \rightarrow$  Monday  $f_{1,1} \leq b$  is 2  
 $D_5 \rightarrow$  Friday  $f_{5,1} \leq b$

$j = 1, 2, \dots, 22$

$D_6, D_7 \rightarrow$  Saturday, Sunday  $f_{6,7} \leq b$



infeasible to assign  $D_6, D_7$  to  $b$

Dummy nodes  $r_1, r_2, r_3$  to represent

assignments to  $D_6, D_7$

$j = 1, 2, \dots, 22$

$j = \{1, 2, 3, \dots, 31\} - \{6, 7, 13, 14, 20, 21, 27, 28\}$

infeasible to assign  $D_6, D_7$  to  $b$

$$\text{Max } \sum_{i=1}^{22} \sum_{j=1}^{31} E_{ij} x_{ij}$$

$$s.t. \sum_{j=1}^{31} x_{ij} \leq 1 \quad (i=1, 2, \dots, 22)$$

$$\sum_{i=1}^{22} x_{ij} \leq 1 \quad (j=1, 2, 3, \dots, 26, 29, 30, 31)$$

$x_{ij}$

$E_{ij}$   
current day start

$$E_{ij} = C_i \left( 1 + \frac{1}{1000} \cdot (D_j - d_i) \right)$$

$$D_j x_{ij} \leq f_i$$

$$d_i x_{ij} \leq D_j$$

$$d_i f_i, E_{ij} \geq 0$$

$x_{ij}$

if  $E_{ij} > 0$  then  $x_{ij} = 1$

(2) Max P

S.t.

$$x_{ij} = \begin{cases} 0 & \text{if Person } i \text{ is assigned to position } j \rightarrow \text{week 6} \\ 1 & \text{not assigned} \end{cases}$$

20

$$\sum_j x_{ij} = 1$$

مفرد (صيغة)

$$\sum_i x_{ij} = 1$$

مفرد (صيغة)

$$x_{ij} + x_{kj} \leq 1 \quad \forall i, j, k, 1 \leq k \leq 5$$

$$c_{ij} > 0 \quad \forall i, j$$

$$E_{ij} = c_{ij} x_{ij} (1 - x_{ij}) (1 - x_{ij}^2) (1 - x_{ij}^3) (1 - x_{ij}^4) (1 - x_{ij}^5)$$

ممكن سُمّي بـ الـ 5!

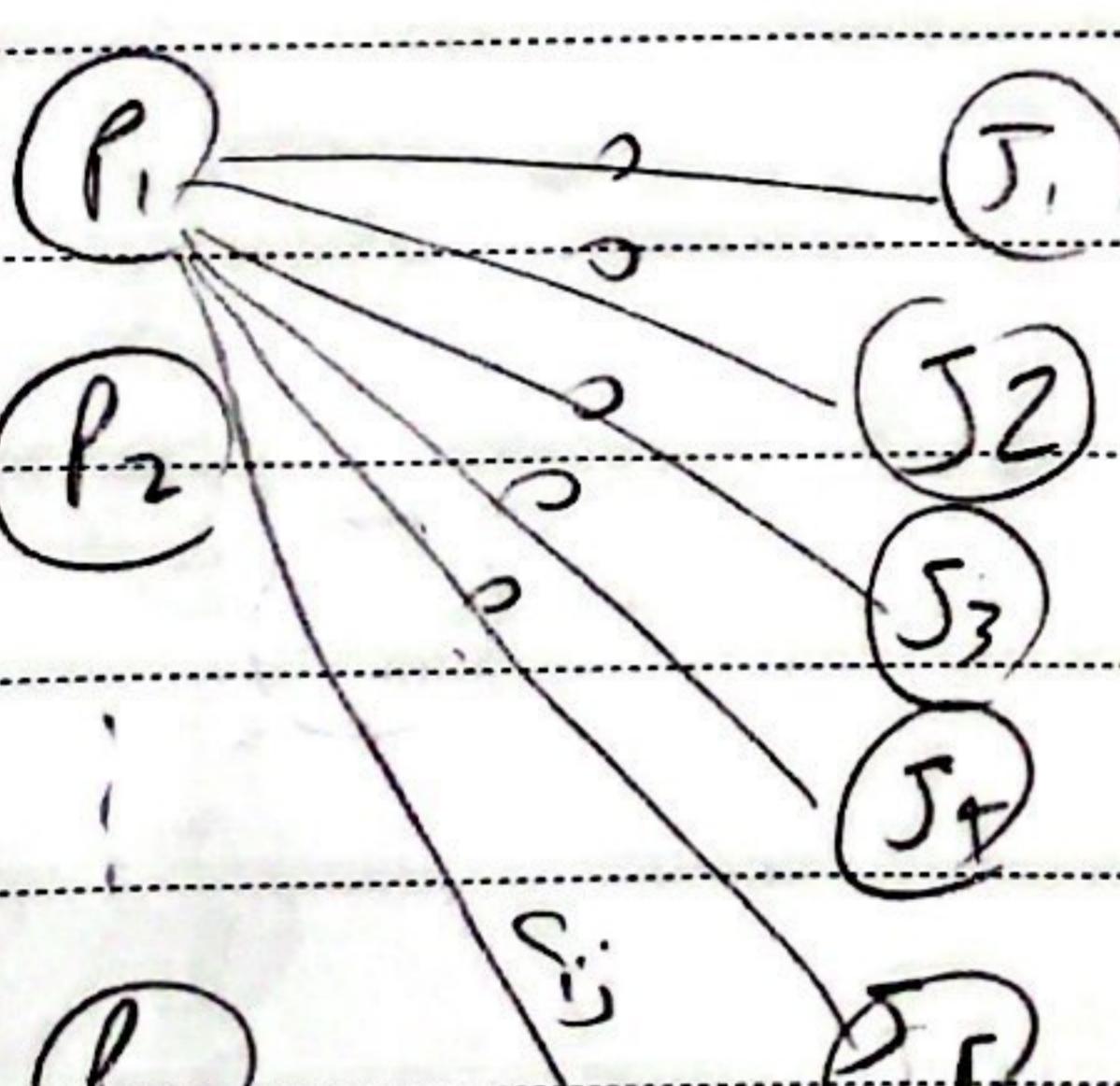
PRE<sub>ij</sub>

جودة المراجحة

(Cost)

E<sub>ij</sub> ← الـ 5

ـ 5



مقدار المراجحة

رانداو داده شده با مراجحة

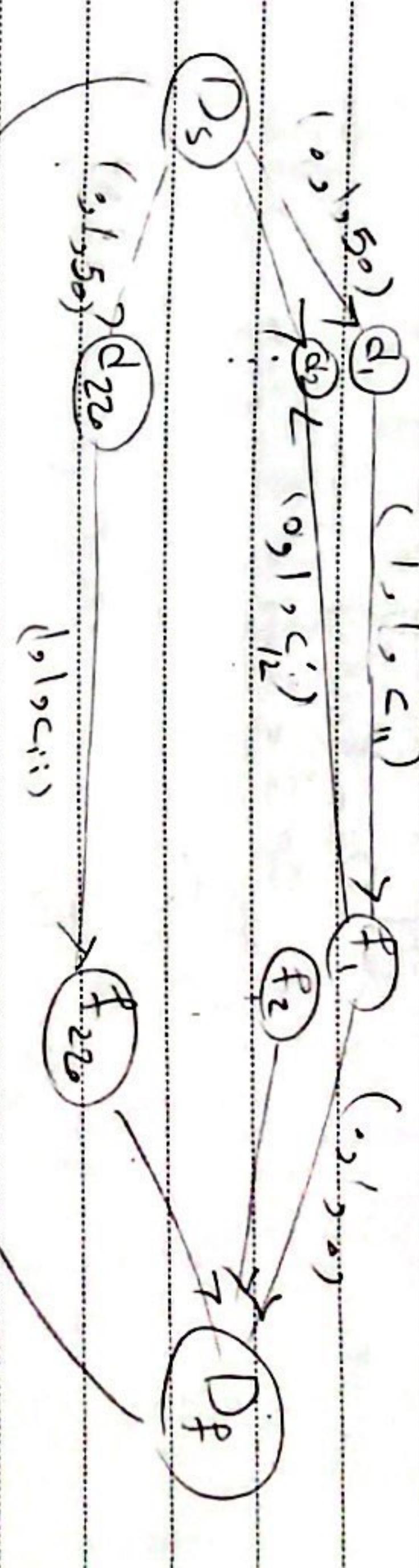
تکمیلی از اینجا کم خواهد بود

QP  
age:

$(t_s, t_p, cost)$  — :eta

QP  
age:

Q



$T = 10$   $\text{ca}$

$$(D_s) \xrightarrow{(t_s, 0, 0)} (f_{220}) \xleftarrow{(t_p, 0, 0)} (D_p)$$

میں سے وہ سفر  $t_s$  کا شرطی تھا کہ  $t_s < t_p$

$$f_i(t) = t^3 + (T - t)^{1.0}$$

جسکے مکالمہ سے پیدا ہوا تھا

لے کر  $t_s < t_p$  کا شرطی تھا

$BFS \rightarrow AC, BA, CD, CE$ 

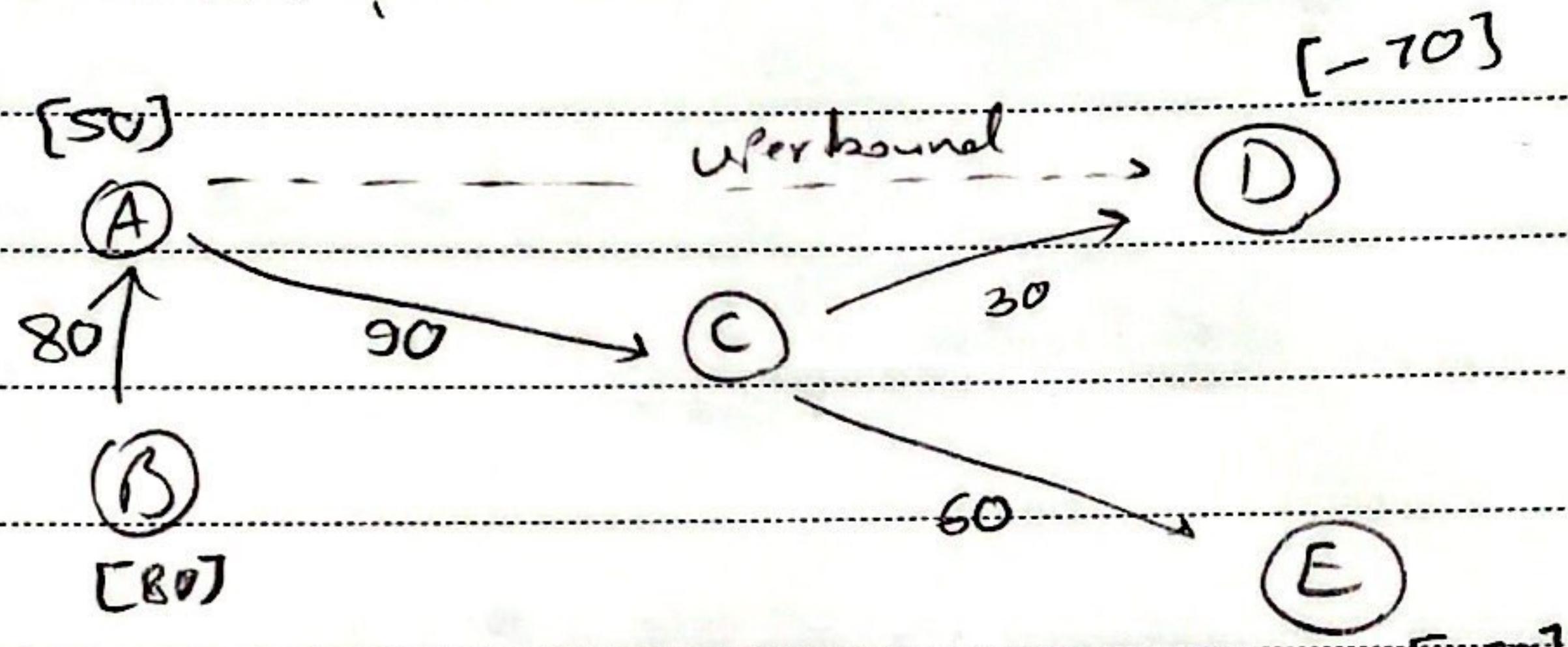
(MCFP)

④

$$\left\{ \begin{array}{l} \bar{c}_{ij} \leq c_{ij} - w_i + w_j \geq l_{ij} \\ \bar{e}_{ij} = c_{ij} - w_i + w_j \leq u_{ij} \end{array} \right.$$

$$\bar{c}_{ij} = c_{ij} - w_i + w_j = l_{ij} < u_{ij} < k_{ij}$$

init Solution:

 $T = \{AC, BA, CD, CE\}$ 

Us {AD}

جواب

 $w_C = 0$ 

$$\bar{c}_{AC} = c_{AC} - w_A + w_C \Rightarrow 4 - w_A + 0 = 0 \Rightarrow w_A = 4$$

$$\bar{c}_{BA} = c_{BA} - w_B + w_A \Rightarrow 1 - w_B + 4 = 0 \Rightarrow w_B = 5$$

$$\bar{c}_{CD} = c_{CD} - w_C + w_D \Rightarrow 3 - 0 + w_D = 0 \Rightarrow w_D = -3$$

$$\bar{c}_{CE} = c_{CE} - w_C + w_E \Rightarrow 5 - 0 + w_E = 0 \Rightarrow w_E = -5$$

$$\bar{c}_{AD} = c_{AD} - w_A + w_D \Rightarrow 6 - 4 + (-3) = -1 \quad \checkmark$$

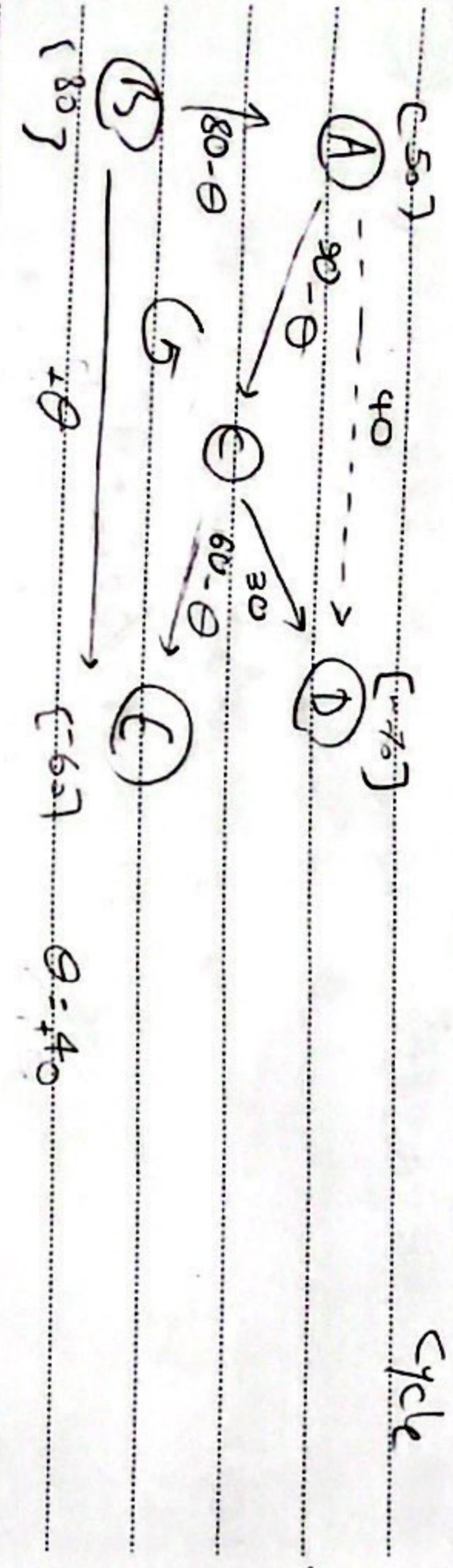
$$\bar{c}_{BE} = c_{BE} - w_B + w_E \Rightarrow 5 - 5 + (-5) = -5 \quad \times$$

$$\bar{c}_{BC} = c_{BC} - w_B + w_C \Rightarrow 2 - 5 + 0 = -3 \quad \times$$

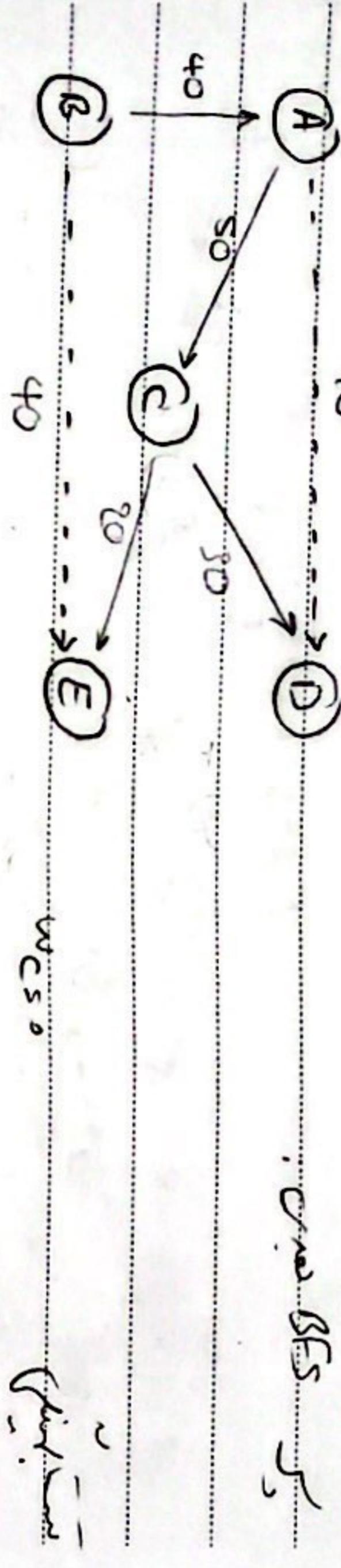
GD age: 10/14

**DP**

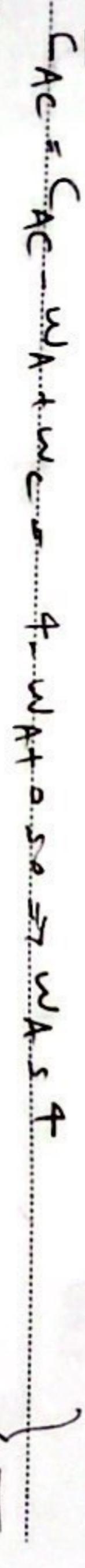
cycle



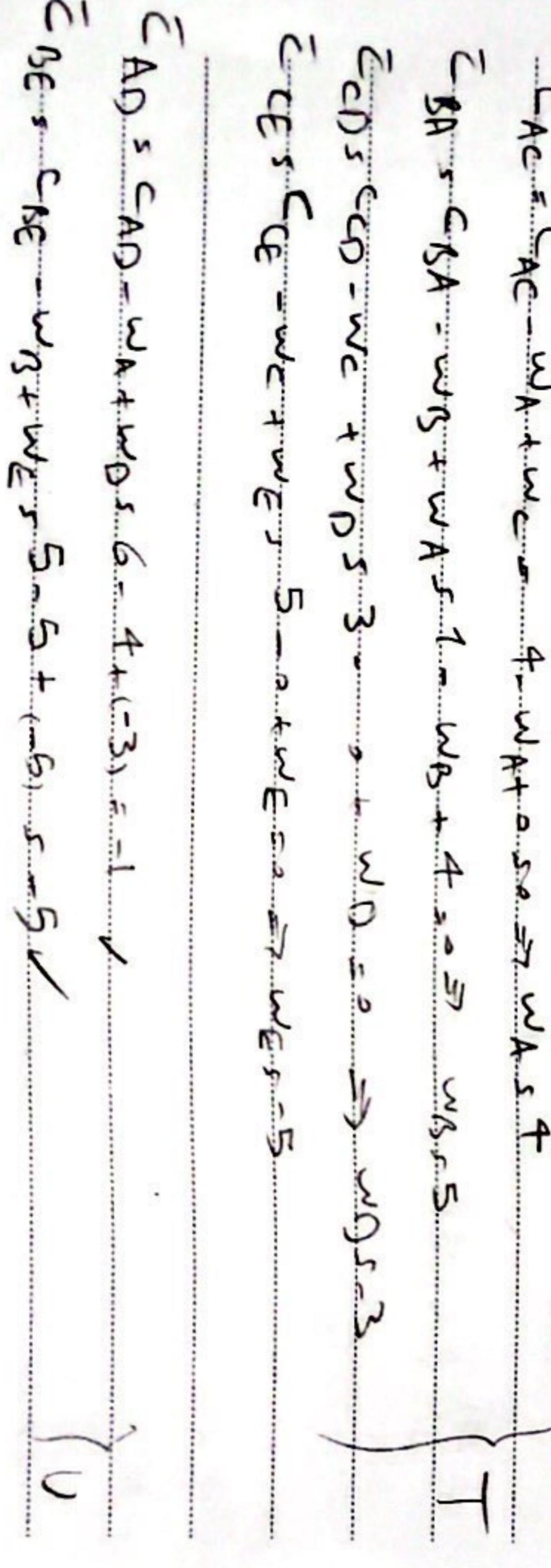
$\theta = 40$



$\theta = 40$



$\theta = 40$



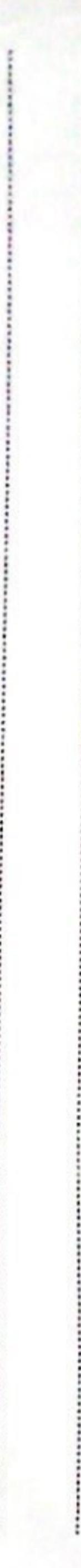
$\theta = 40$



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$\theta = 40$

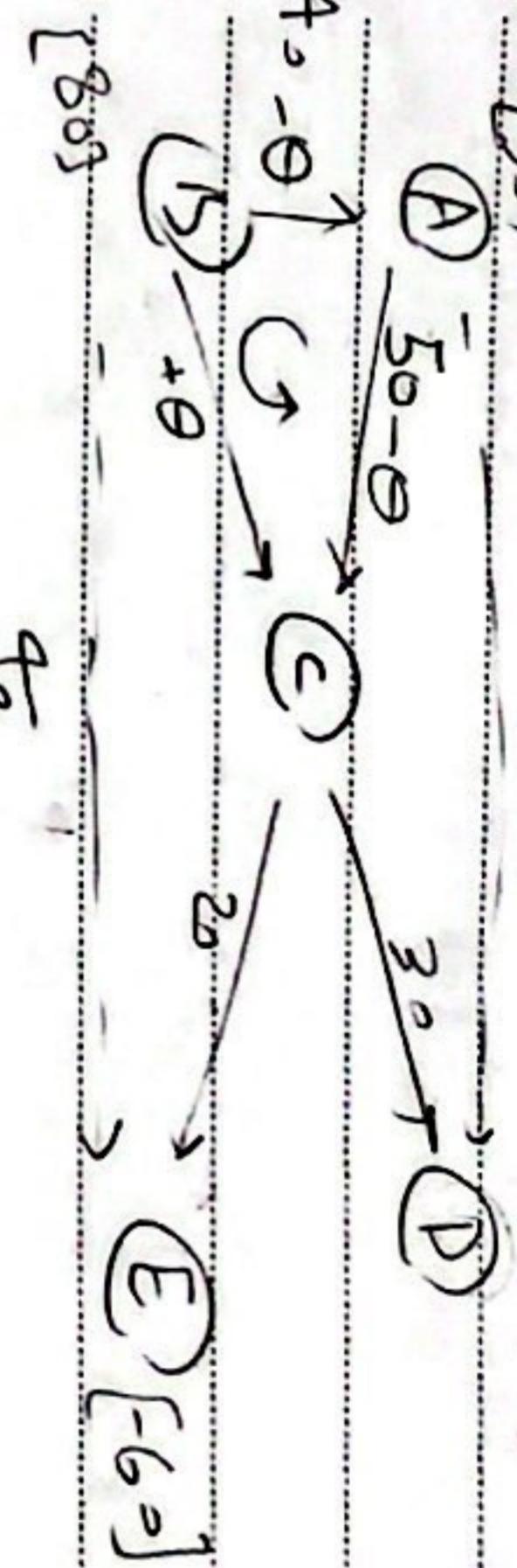
GD age: 11/14

**DP**

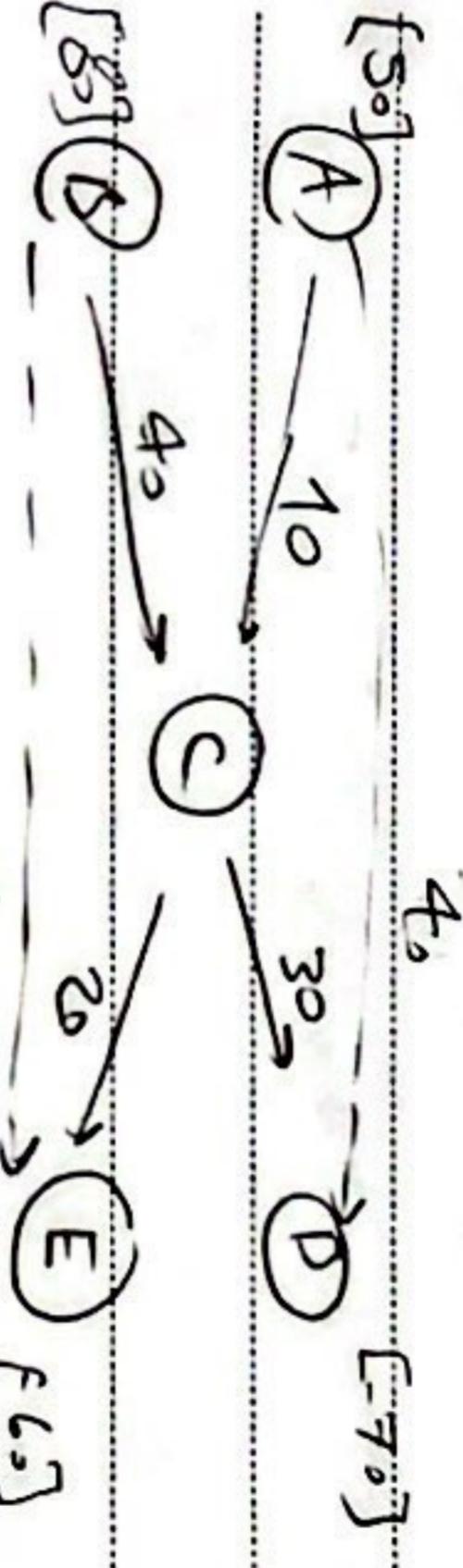
$t_0$

$t_1$

$t_2$



$\theta = 40$

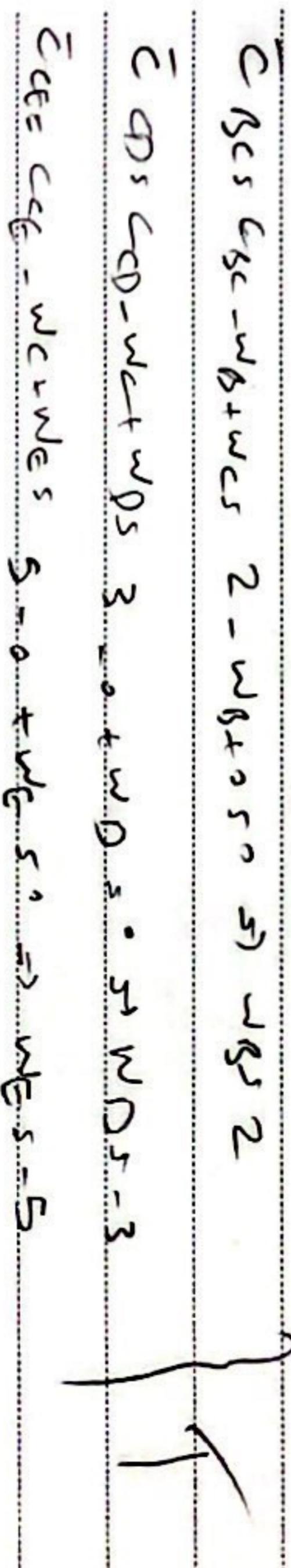


$t_1$

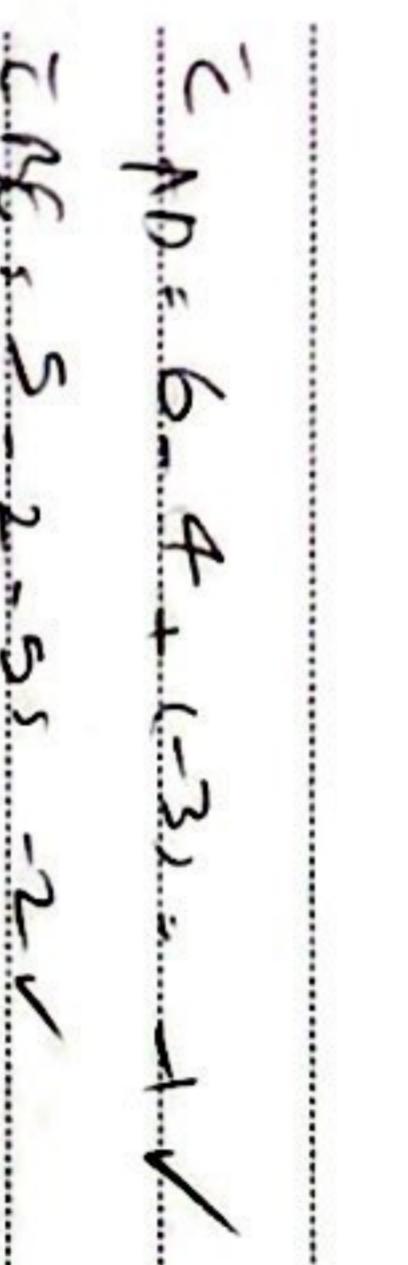
$t_2$



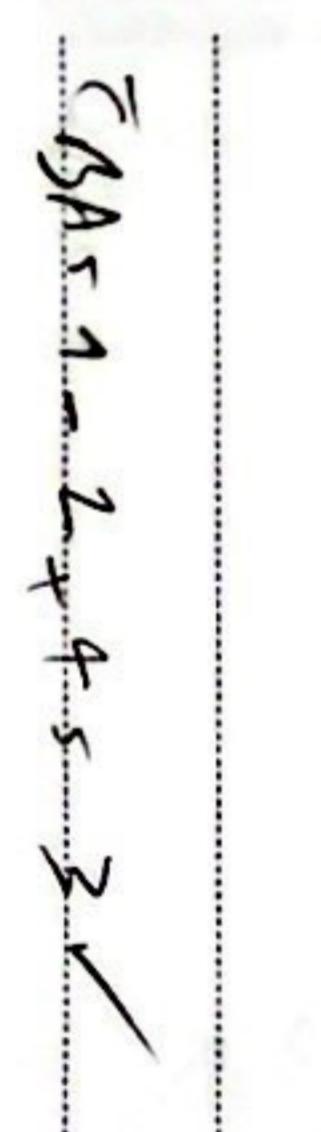
$\theta = 40$



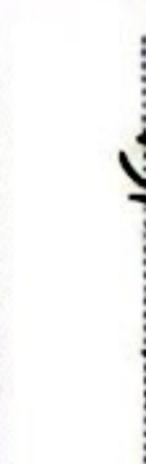
$\theta = 40$



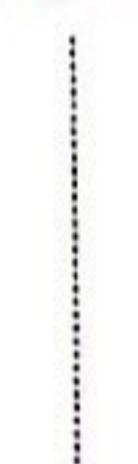
$\theta = 40$



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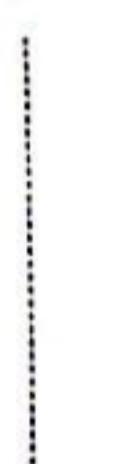
$\theta = 40$



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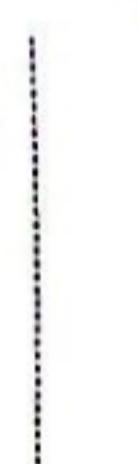
$\theta = 40$



$\theta = 40$



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$\theta = 40$



$\theta = 40$



$\theta = 40$



$\theta = 40$



$\theta = 40$

$$\textcircled{5} \quad \text{Min } 3n_{12} + 2n_{13} + 5n_{14} + 2n_{41} + n_{23} + 2n_{24} + 6n_{42} + 4n_{34} + 7n_{43}$$

S.t.

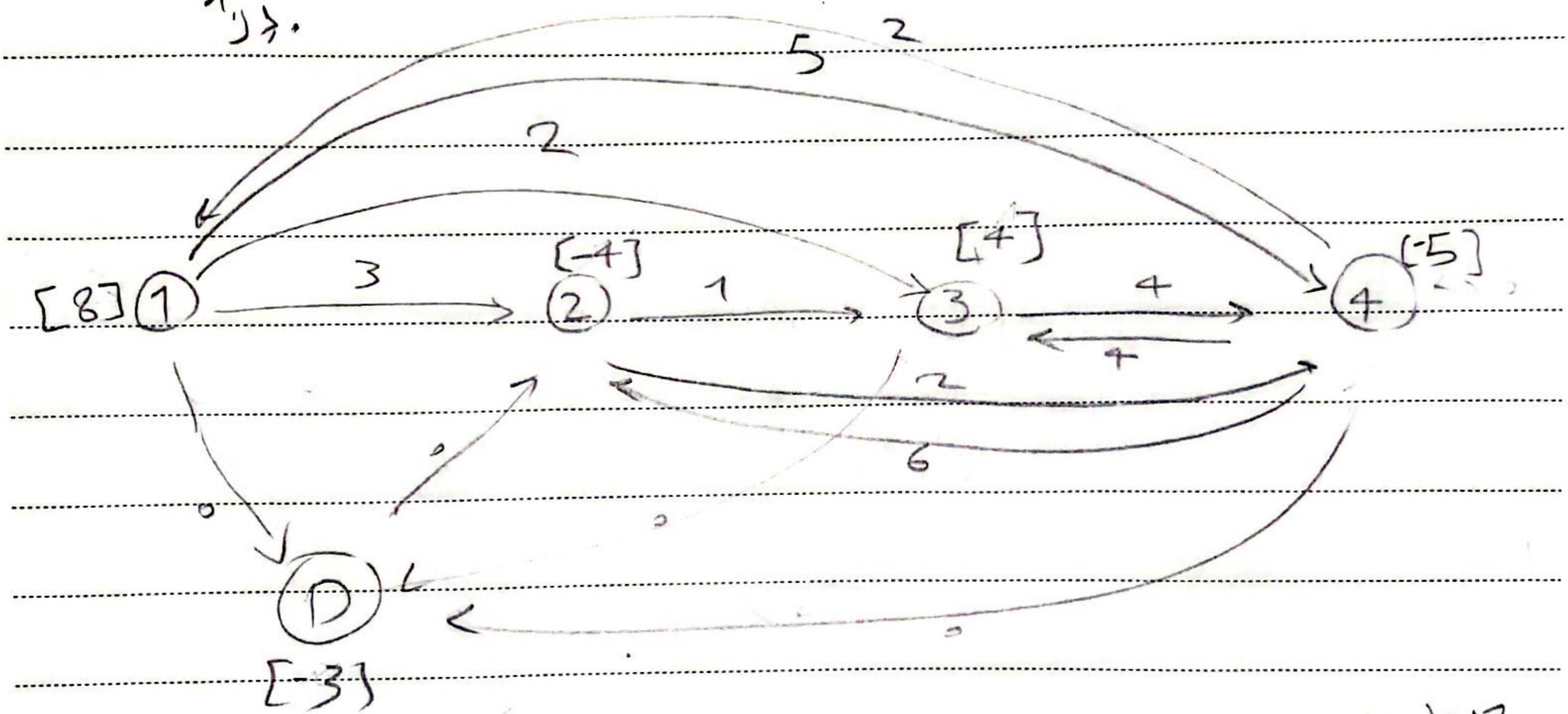
(a)

$$n_{12} + n_{13} + n_{14} - n_{41} + D_{1D} = 8$$

$$-n_{12} + n_{23} + n_{24} - n_{42} - D_{2D} = -4 \quad 0 \rightarrow +$$

$$n_{34} - n_{13} - n_{23} - n_{43} + D_{3D} = 4 \quad 2 \leftarrow -$$

$$-n_{14} - n_{34} - n_{24} + n_{41} + n_{42} - n_{43} + D_{4D} = -5$$

 $n_{ij} \geq 0$ 

الخطوات في حل المسألة

	$n_{12}$	$n_{13}$	$n_{14}$	$n_{41}$	$n_{23}$	$n_{24}$	$n_{D2}$	$n_{34}$	$n_{3D}$	$n_{41}$	$n_{42}$	$n_{43}$	$n_{4D}$	RHS
$n_1$	1	1	1	1					-1					8
$n_2$					1	1	-1						-1	-4
$n_3$					-1			1	1	1	1	1		4
$n_4$					-1		-1	-1	-1	1	1	1	1	-5
$n_D$					-1		-1	-1	-1	-1	-1	-1	-1	-3
capacities	$\infty$	$\infty$	$\infty$	$\infty$						$\infty$	$\infty$			
Obj	3	2	5	0	1	2	0	4	0	2	6	4	0	Min
NOURI	*	نوري												

$$\text{Min } 3n_{12} + 2n_{13} + 5n_{14} + 2n_{41} + n_{23} + 2n_{24} + 6n_{42} + 7n_{37} + 7n_{43} \quad (5)$$

S.t.

$$x_1 + 2 + n_{13} + n_{14} - n_{41} \leq 8 \quad S_1 \quad n_1$$

$$-n_{12} + n_{23} + n_{24} - n_{42} \geq -4 \quad S_2 \quad n_2$$

$$n_{34} - n_{13} - n_{23} - n_{43} \leq -4 \quad S_3 \quad n_3$$

$$-n_{14} - n_{34} - n_{24} + n_{41} + n_{42} + n_{43} \geq -5 \quad S_4 \quad n_4$$

"Bijlage 262 naar MCFP Jucre

$n_{1..4} \leftarrow$  Artificial var CST M  $n_5 \rightarrow$  CST  $\rightarrow$  (6)

	$n_{12}$	$n_{13}$	$n_{14}$	$n_{23}$	$n_{24}$	$n_{34}$	$S_1$	$S_2$	$S_3$	$S_4$	$n_1$	$n_2$	$n_3$	$n_4$	$n_5$	$b_{\text{new}}$
1	1	1	1	-1	-1	-1	1	1	1	1	1	1	1	1	1	8
2	-1	-1	-1	1	1	1	-1	-1	-1	-1	-1	-1	-1	-1	-1	4
3	-1	-1	-1	1	1	1	-1	-1	-1	-1	-1	-1	-1	-1	-1	4
4	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-5
5	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	3