

Pb1

variante costă

a, d, f, g, i, j

	e_1	e_2	e_3	
d_1	<div>1 *</div>	<div>1 *</div>	<div>0 8</div>	$8 \cdot 0$ verificare!
d_2	<div>2 *</div>	<div>3 7</div>	<div>0 *</div>	$7 \cdot 0$
d_3	<div>3 5</div>	<div>4 4</div>	<div>0 1</div>	$1 \cdot 0$
	5 0	4 0	8 0	

$$5x_1 + x_2 + 10x_3 + 1x_4 + 8x_5$$

$$5x_1 + x_2 = 25$$

$$x_1 = 5$$

$$\bar{x}_0 = (0, 0, 8, 0, 7, 0, 5, 4, 1) \in \mathbb{R}^9 - \text{s.b. Ned.}$$

$$\varphi(\bar{x}_0) = 8 \cdot 0 + 7 \cdot 3 + 5 \cdot 3 + 4 \cdot 4 + 1 \cdot 0 = 52 \text{ (n.w.)}$$

$$\delta_{11} = -1 + 0 - 0 + 3 = 2 > 0$$

$$\delta_{12} = -1 + 4 - 0 + 0 = 3 > 0$$

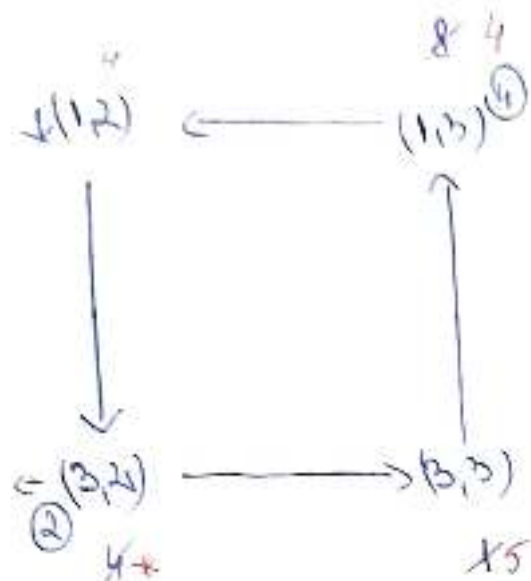
$$\delta_{21} = -2 + 3 - 4 + 3 = 0$$

$$\delta_{23} = -0 + 3 - 4 + 0 = -1$$

$\Rightarrow \exists \delta_{ij} > 0 \Rightarrow \bar{x}_0$ nu este soluție optimă

$$Ske = \max\{\delta_{11}, \delta_{12}\} = \delta_{12} \Rightarrow x_{12} \downarrow$$

Pg1



$$\Theta = \min \{(3,2); (1,3)\} = (3,2)$$

$$\Rightarrow x_{3,2} \rightarrow$$

$$\Theta = 4$$

	c_1	c_2	c_3	
b_1	<div>1 *</div>	<div>1 4</div>	<div>0 4</div>	8
b_2	<div>2 *</div>	<div>3 4</div>	<div>0 *</div>	4
b_3	<div>3 5</div>	<div>4 *</div>	<div>0 5</div>	10
	5	11	9	

! verificare!

$$\bar{x}_1 = (0, 4, 4, 0, 4, 0, 5, 0, 5) \in \mathbb{R}^9 \text{ - s.b. ned.}$$

$$f(\bar{x}_1) = 4 \cdot 1 + 4 \cdot 0 + 4 \cdot 3 + 5 \cdot 3 + 5 \cdot 0 = 40 (\mu.u.) \leq f(\bar{x}_0)? \underline{\Delta a}$$

$$\Delta_{11} = -1 + 0 - 0 + 0 = -1 < 0$$

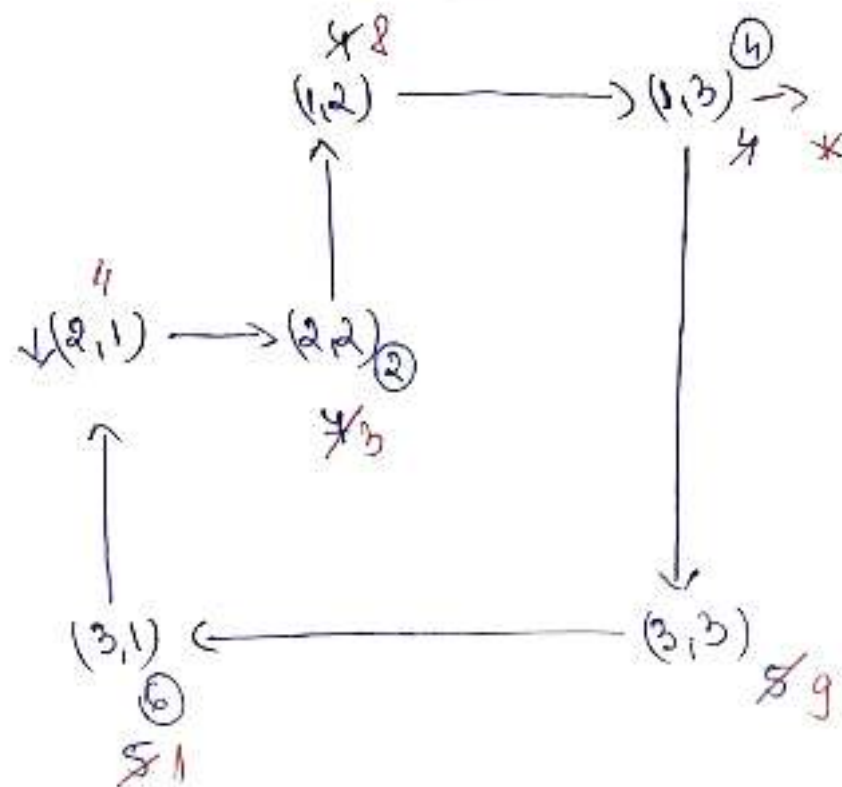
$$\Delta_{21} = -2 + 0 - 0 + 0 - 1 + 0 = -3 < 0$$

$$\Delta_{23} = -0 + 0 - 1 + 0 = -1 < 0$$

$$\Delta_{32} = -4 + 0 - 0 + 1 = -3 < 0$$

$\Rightarrow \exists \Delta_{ij} > 0 \Rightarrow \bar{x}_1$ nu este s. optimă.

$$S_{Kc} = \max \{d_{11}; d_{21}; d_{23}\} = \{d_{21}\} \Rightarrow x_{21} \downarrow$$



$$\Theta = \min \{d_{22}; d_{13}; d_{31}\} = d_{13} \Rightarrow x_{13} \rightarrow$$

$$\Theta = 4$$

	C_1	C_2	C_3	
D_1	\times	8	\times	8
D_2	4	3	\times	7
D_3	1	\times	9	10
	5	11	9	

! verificare!

$$\bar{x}_2 = (0, 8, 0, 4, 3, 0, 1, 0, 9) \in \mathbb{R}^9 \text{ - s.b. Ned.}$$

$$\varphi(\bar{x}_2) = 8 \cdot 1 + 4 \cdot 2 + 3 \cdot 3 + 1 \cdot 3 + 9 \cdot 0 = (28 \text{ u.u.}) \leq \varphi(\bar{x}_1)? \underline{\text{No}}$$

$$J_{11} = -1 + 2 - 3 + 1 = -1$$

$$J_{12} = -0 + 1 - 3 + 2 - 3 + 0 = -3$$

$$J_{23} = -0 + 2 - 3 + 0 = -1$$

$$J_{34} = -4 + 3 - 2 + 3 = 0$$

$\Rightarrow \text{for } J_{ij} \leq 0 \Rightarrow \bar{x}_2 \text{ este } \underline{\text{s. optimă unică}}$

Concluzia pt. P.T.6.

$$\begin{cases} \text{echilibrat} \\ x_{\text{optim}} = (0, 8, 0, 4, 3, 0, 1, 0, 9) \\ \text{min} f = 28(\text{u.u.}) \end{cases}$$

Pb 2

Variaute conede

a, c, f, g, k, e

	c_1	c_2	c_3	
b_1	4	2	2	5
b_2	1	3	3	4
b_3	*	0	0	0

5 x_0 10 x_0 40 x_0

! verificare !

40

125 $x \neq 0$

60

$$g = x$$

$$2x = 16 + x$$

$$x + 12 + x = 4 + 12 + x$$

$$\bar{x}_0 = (4, 0, 0, 1, 4, 7, 0, 6, 0) \in \mathbb{R}^9 - \text{s.b. Ned.}$$

$$f(\bar{x}_0) = 4 \cdot 2 + 1 \cdot 3 + 4 \cdot 3 + 7 \cdot 4 + 6 \cdot 0 = 51 (\text{mu.})$$

$$\delta_{12} = -2 + 3 - 3 + 2 = 0$$

$$\delta_{13} = -5 + 4 - 3 + 2 = -2$$

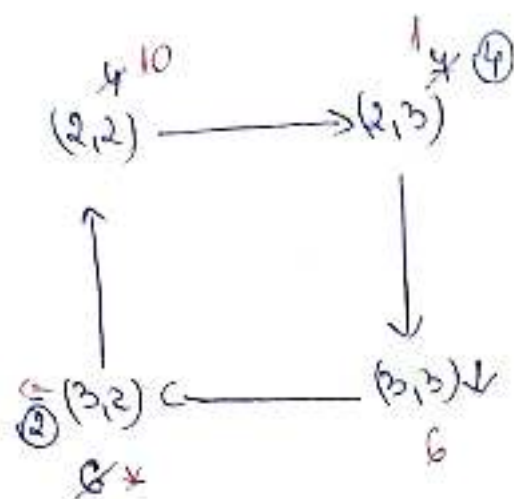
$$\delta_{31} = -0 + 3 - 3 + 0 = 0$$

$$\delta_{33} = -0 + 0 - 3 + 4 = 1 > 0$$

$$s.k.e = \max \{ \delta_{33} \} - \delta_{33} \rightarrow x_{33} \downarrow$$

$\Rightarrow \exists f_{ij} > 0 \Rightarrow \bar{x}_0$ nu este solutia optima

Pg 1



$$\Theta = \min\{(3,2); (2,3)\} = (3,2) \Rightarrow$$

$$\Rightarrow x_{32} \rightarrow$$

$$\Theta = 6$$

	C_1	C_2	C_3	
f_1	4	*	*	4
f_2	1	10	1	12
f_3	*	*	6	6
	5	10	4	

! verificare!

$$\bar{x}_1 = (4, 0, 0, 1, 10, 1, 0, 0, 6) \in \mathbb{R}^9 - \text{s.b. Ned.}$$

$$f(\bar{x}_1) = 4 \cdot 2 + 1 \cdot 3 + 10 \cdot 3 + 1 \cdot 1 + 6 \cdot 0 = 45(\text{www}) \leq f(\bar{x}_0)? \Delta a$$

$$\Delta_{12} = -2 + 3 - 3 + 2 = 0$$

$$\Delta_{13} = -5 + 4 - 3 + 2 = -2$$

$$\Delta_{31} = -0 + 3 - 4 + 0 = -1$$

$$\Delta_{32} = -0 + 3 - 4 + 0 = -1$$

$\Rightarrow \text{toti } \Delta_{ij} \leq 0 \Rightarrow \bar{x}_1 \text{ este s. optimă unică}$

Concluzia pl. P.T.E. :

$$\begin{cases} \text{echilibrat} \\ x_{\text{optim}} = (4, 0, 0, 1, 10, 1, 0, 0, 6) \\ \min f = 45 (\text{u.m.}) \end{cases}$$

Pb 3

	C_1	C_2	C_3	
D_1	4 3	1 1	* 0	8 $\times 0$! verificare!
D_2	* 1	8 4	4 0	12 $\times 0$
D_3	* 2	* 2	10 0	10 $\times 0$
	4 $\times 0$	9 $\times 0$	14 $\times 0$	

$$\begin{array}{r}
 10 \\
 8 + 2 + 10 \\
 20 = 10 + 10 \\
 10 = 5 + 5 \\
 \hline
 10
 \end{array}$$

$$\bar{x}_0 = (4, 1, 0, 0, 8, 4, 0, 0, 10) \in \mathbb{R}^9 \text{ - s.b. Ned.}$$

$$f(\bar{x}_0) = 4 \cdot 3 + 1 \cdot 1 + 8 \cdot 4 + 4 \cdot 0 + 10 \cdot 0 = 54 \text{ (u.m.)}$$

$$d_{13} = -0 + 1 - 4 + 0 = -3$$

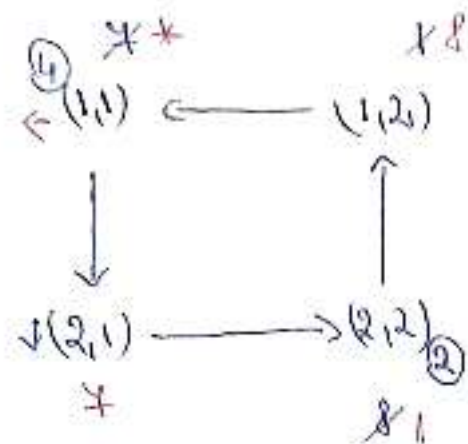
$$d_{21} = -1 + 4 - 1 + 0 = 2 > 0$$

$$d_{31} = -2 + 0 - 1 + 4 - 0 + 0 = 1 > 0$$

$$d_{32} = -2 + 4 - 0 + 0 = 2 > 0$$

$\Rightarrow \exists d_{ij} > 0 \Rightarrow \bar{x}_0$ nu este s. optimă.

$$s_{ke} = \max\{d_{21}; d_{31}; d_{32}\} = d_{21} \Rightarrow x_{21} \downarrow$$



$$\Theta = \min\{(2,2); (1,1)\} = (1,1) \Rightarrow x_{11} \rightarrow$$

$$\Theta = 4$$

	C_1	C_2	C_3	
x_1	<div>3 *</div>	<div>1 8</div>	<div>0 *</div>	8
x_2	<div>1 4</div>	<div>4 1</div>	<div>0 4</div>	12! <u>verificare!</u>
x_3	<div>2 *</div>	<div>2 *</div>	<div>0 10</div>	10
	4	9	14	

$$\bar{x}_1 = (0, 8, 0, 4, 1, 4, 0, 0, 10) \in \mathbb{R}^9 \text{ - s.b. Ned.}$$

$$f(\bar{x}_1) = 8 \cdot 1 + 4 \cdot 1 + 1 \cdot 4 + 4 \cdot 0 + 10 \cdot 0 = 19 \leq f(x_0)? \text{ Da}$$

(u.u.)

$$J_{11} = -3 + 1 - 4 + 1 = -5$$

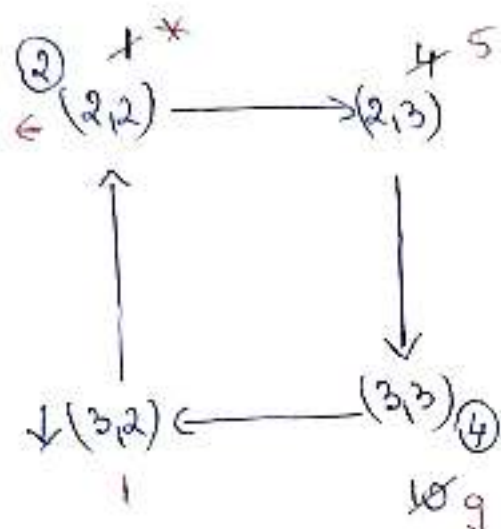
$$J_{13} = -0 + 0 - 4 + 1 = -3$$

$$J_{31} = -2 + 1 - 0 + 0 = -1$$

$$J_{32} = -2 + 4 - 0 + 0 = 2 > 0$$

$\Rightarrow \exists J_{ij} > 0 \Rightarrow \bar{x}_1$ nu este
s. optimă

$$S_{KE} = \max \{J_{32}\} = J_{32} \Rightarrow x_{32} \downarrow$$



$$\Theta = \min \{(2,2), (3,3)\} = (2,2) \Rightarrow x_{22} \rightarrow$$

$$\Theta = 1$$

	C_1	C_2	C_3	
f_1	<div><div>*</div><div>3</div></div>	<div><div>8</div><div>1</div></div>	<div><div>*</div><div>0</div></div>	8
f_2	<div><div>7</div><div>1</div></div>	<div><div>*</div><div>4</div></div>	<div><div>5</div><div>0</div></div>	12
f_3	<div><div>*</div><div>2</div></div>	<div><div>1</div><div>2</div></div>	<div><div>9</div><div>0</div></div>	10
	7	9	14	

! verificare!

$$\bar{x}_2 = (0, 8, 0, 7, 0, 5, 0, 1, 9) \in \mathbb{R}^9 - \text{s. b. Ned.}$$

$$f(\bar{x}_2) = 8 \cdot 1 + 7 \cdot 1 + 5 \cdot 0 + 1 \cdot 2 + 9 \cdot 0 = 17 \leq f(\bar{x}_1)? \underline{\text{Da}}$$

(w.w.)

$$\delta_{11} = -3 + 2 - 2 + 1 = -2$$

$$\delta_{13} = -0 + 1 - 2 + 0 = -1$$

$$\delta_{22} = -4 + 2 - 0 + 0 = -2$$

$$\delta_{31} = -2 + 1 - 0 + 0 = -1$$

\Rightarrow ~~tot~~ $\delta_{ij} \leq 0 \Rightarrow \bar{x}_2$ este solutie optimă unică

Concluzia pt. P.T.E.:

$$\left\{ \begin{array}{l} \text{echilibrat} \\ x_{\text{optim}} = (0, 8, 0, 7, 0, 5, 0, 1, 9) \\ \min f = 17 (\text{u.u.}) \end{array} \right.$$

	C_1	C_2	C_3	
d_1	<div><div></div><div>2</div></div> 1	<div><div></div><div>1</div></div> 4	<div><div></div><div>3</div></div> *	8
d_2	<div><div></div><div>1</div></div> 6	<div><div></div><div>3</div></div> *	<div><div></div><div>2</div></div> 2	8 ! <u>verificare!</u>
d_3	<div><div></div><div>0</div></div> *	<div><div></div><div>0</div></div> *	<div><div></div><div>0</div></div> 8	8
	7	7	10	

$$\bar{x}_1 = (1, 4, 0, 6, 0, 2, 0, 0, 8) \in \mathbb{R}^9 \text{ - s.b. Ned.}$$

$$f(\bar{x}_1) = 1 \cdot 2 + 4 \cdot 1 + 6 \cdot 1 + 2 \cdot 2 + 8 \cdot 0 = 19 (\text{u.w.}) \leq f(\bar{x}_0)? \text{ Da}$$

$$d_{13} = -3 + 2 - 1 + 2 = 0$$

$$d_{22} = -3 + 1 - 2 + 1 = -3$$

$$d_{31} = -0 + 1 - 2 + 0 = -1$$

$$d_{32} = -0 + 1 - 2 + 1 - 2 + 0 = -2$$

\Rightarrow toți $d_{ij} \leq 0 \Rightarrow \bar{x}_1$ este
soluție optimă
unică

Concluzia p.T.T.E.:

$$\begin{cases} \text{echilibrat} \\ x_{\text{optim}} = (1, 4, 0, 6, 0, 2, 0, 0, 8) \\ \min f = 19 (\text{u.w.}) \end{cases}$$

Pb 5

Variante corecte
a

	C_1	C_2	C_3
D_1	5 2	* 1	9 0
D_2	4 3	2 2	* 0
D_3	* 1	5 2	* 0
	$\frac{9}{4}0$	$\frac{7}{9}0$	$\frac{4}{0}$

~~14~~ 50 ! verificare!

6 20

50

$$9+4+4+5 = 14+6+5$$

$$16+x = 25$$

$$\boxed{x=9}$$

$$\bar{x}_0 = (5, 0, 9, 4, 2, 0, 0, 5, 0) \in \mathbb{R}^9 \text{ - s.b. Ned.}$$

$$f(\bar{x}_0) = 5 \cdot 2 + 9 \cdot 0 + 4 \cdot 3 + 2 \cdot 2 + 5 \cdot 2 = 36 \text{ (u.m.)}$$

$$d_{12} = -1 + 2 - 3 + 2 = 0$$

$$d_{23} = -0 + 0 - 2 + 3 = 1 > 0$$

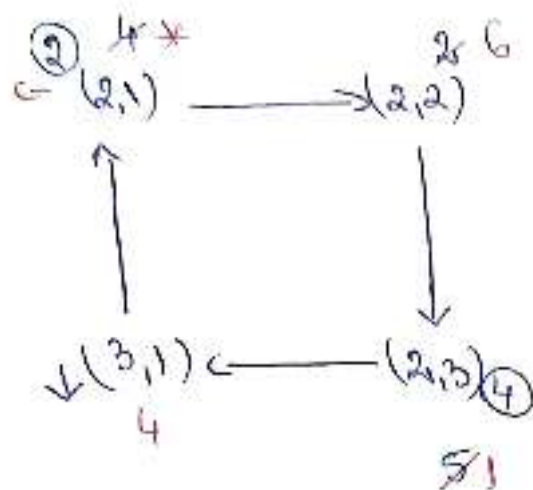
$$d_{31} = -1 + 3 - 2 + 2 = 2 > 0$$

$$d_{33} = -0 + 2 - 2 + 3 - 2 + 0 = 1 > 0$$

$\Rightarrow \exists d_{ij} > 0 \Rightarrow \bar{x}_0$ nu este
s. optimă

$$s_{ke} = \max\{d_{12}, d_{31}, d_{33}\} = d_{31} \Rightarrow x_{31} \downarrow$$

Pb 1



$$\Theta = \min\{(2,1); (2,3)\} = (2,1) \Rightarrow x_2 \rightarrow$$

$$\Theta = 4$$

	C_1	C_2	C_3	
D_1	5	*	9	14
D_2	*	6	*	6
D_3	4	1	*	5
	9	7	9	

! verificare!

$$\bar{x}_1 = (5, 0, 9, 0, 6, 0, 4, 1, 0) \in \mathbb{R}^9 \text{ - s.b. Ned.}$$

$$f(\bar{x}_1) = 5 \cdot 2 + 9 \cdot 0 + 6 \cdot 2 + 4 \cdot 1 + 1 \cdot 2 = 28 (\text{u. vv.}) \leq f(\bar{x}_0)? \underline{\text{Da}}$$

$$\delta_{12} = -1 + 2 - 1 + 2 = 2 > 0$$

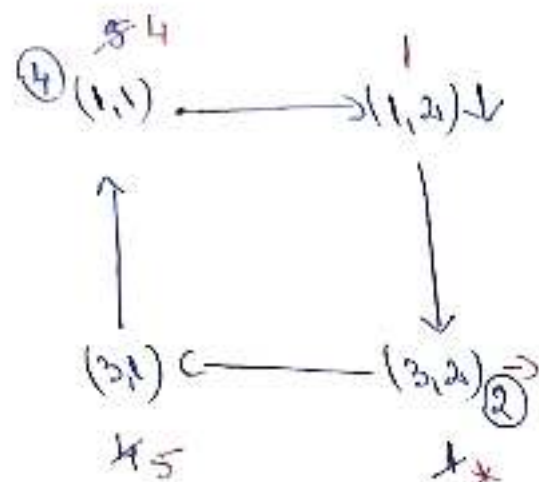
$$\delta_{21} = -3 + 2 - 2 + 1 = -2$$

$$\delta_{23} = -0 + 2 - 2 + 1 - 2 + 0 = -1$$

$$\delta_{33} = -0 + 1 - 2 + 0 = -1$$

$\Rightarrow \exists \delta_{ij} > 0 \Rightarrow \bar{x}_1$ nu este s. optimă

$$s_k = \max\{\delta_{12}\} = \delta_{12} \Rightarrow x_{12} \leftarrow$$



$$\Theta = \min\{(1,1); (2,2)\} = (2,2) \Rightarrow x_{32} \Rightarrow$$

$$\Theta = 1$$

	C_1	C_2	C_3	
D_1	4	1	9	14
D_2	*	6	*	6
D_3	5	*	*	5
	9	7	9	

! verificare!

$$\bar{x}_2 = (4, 1, 9, 0, 6, 0, 5, 0, 0) \in \mathbb{R}^9 - \text{s.o. Ned.}$$

$$f(\bar{x}_2) = 4 \cdot 2 + 1 \cdot 1 + 9 \cdot 0 + 6 \cdot 2 + 5 \cdot 1 = 26 (\text{n.u.v.}) \leq f(\bar{x}_1)? \text{ Da}$$

$$d_{21} = -3 + 2 - 1 + 2 = 0$$

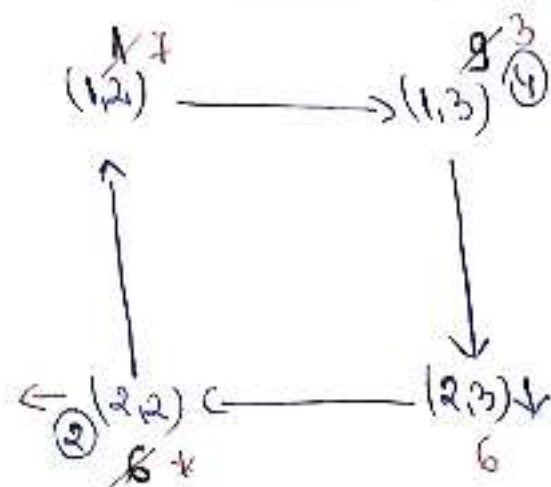
$$d_{23} = -0 + 2 - 1 + 0 = 1 > 0$$

$$d_{32} = -2 + 1 - 2 + 1 = -2$$

$$d_{33} = -0 + 0 - 2 + 1 = -1$$

$\Rightarrow \exists d_{ij} > 0 \Rightarrow \bar{x}_2$ nu este s. optimă

$$Ske = \max \{d_{23}\} = d_{23} \Rightarrow x_{23} \downarrow$$



$$\Theta = \min\{(2,2); (1,3)\} = (2,2) \Rightarrow$$

$$\Rightarrow x_{22} \rightarrow$$

$$\Theta = 6$$

	C_1	C_2	C_3	
D_1	4	4	3	14
D_2	*	*	6	6 ! <u>verificare!</u>
D_3	5	*	*	5
	9	7	9	

$$\bar{x}_3 = (4, 4, 3, 0, 0, 6, 5, 0, 0) \in R - \text{s.b. Ned.}$$

$$f(\bar{x}_3) = 4 \cdot 2 + 4 \cdot 1 + 3 \cdot 0 + 6 \cdot 0 + 5 \cdot 1 = 20 (\text{n.u.}) \leq f(\bar{x}_2) \text{ ? Da}$$

$$d_{21} = -3 + 2 - 0 + 0 = -1$$

$$d_{22} = -2 + 1 - 0 + 0 = -1$$

$$d_{32} = -2 + 1 - 2 + 1 = -2$$

$$d_{33} = -0 + 0 - 2 + 1 = -1$$

\Rightarrow totuși $d_{ij} \leq 0 \Rightarrow \bar{x}_3$ este
soluție optimă
unică

Concluzia pt. P.T.E.:

$\left\{ \begin{array}{l} \text{echilibrat} \\ x_{\text{optim}} = (4, 4, 3, 0, 0, 6, 5, 0, 0) \\ \min f = 20 (\mu\text{m}) \end{array} \right.$

P36

Variable correct

	C_1	C_2	C_3	
	b_1	b_2	b_3	
d_1	3 4	2 1	1 *	8 0
d_2	1 *	3 6	2 4	12 0
d_3	0 *	0 *	0 6	60
	4 0	4 0	10 0	

! verificarea!

$\pi + 4 + 0 = 8 + 4 + 0$
 $24 = 14 + 10$
 $x = 10$

$$\bar{x}_0 = (4, 1, 0, 0, 6, 4, 0, 0, 6) \in \mathbb{R}^9 \text{ - s.b. Ned.}$$

$$f(\bar{x}_0) = 4 \cdot 3 + 1 \cdot 2 + 6 \cdot 3 + 4 \cdot 2 + 6 \cdot 0 = 49 \text{ (u.m.)}$$

$$d_{13} = -1 + 2 - 3 + 2 = 0$$

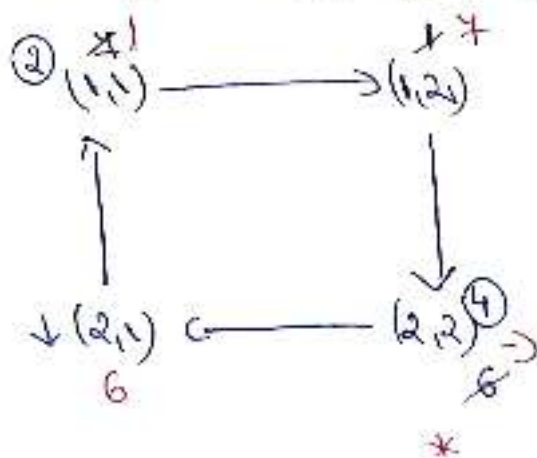
$$d_{21} = -1 + 3 - 2 + 3 = 3 > 0$$

$$d_{31} = -0 + 3 - 2 + 3 - 2 + 0 = 2 > 0$$

$$d_{32} = -0 + 3 - 2 + 0 = 1 > 0$$

$\Rightarrow \exists d_{ij} > 0 \Rightarrow \bar{x}_0$ nu este s. optimă

$$s_k = \max\{d_{21}, d_{31}, d_{32}\} = d_{21} \Rightarrow x_{21} \downarrow$$



$$\Theta = \min\{(1,1); (2,2) \} = (2,2) \Rightarrow$$

$$\Rightarrow x_{22} \rightarrow$$

$$\Theta = 6$$

Pg 1

	C_1	C_2	C_3	
D_1	1	4	*	8
D_2	6	*	4	10
D_3	*	*	6	6
	7	7	10	

verificare!

$$\bar{x}_1 = (1, 4, 0, 6, 0, 4, 0, 0, 6) \in \mathbb{R}^9 - \text{s.b. Ned.}$$

$$f(\bar{x}_1) = 1 \cdot 3 + 4 \cdot 2 + 6 \cdot 1 + 4 \cdot 2 + 6 \cdot 0 = 31 \text{ u.m.} \leq f(\bar{x}_0)? \text{ Da}$$

$$d_{13} = -1 + 3 - 1 + 2 = 3 > 0$$

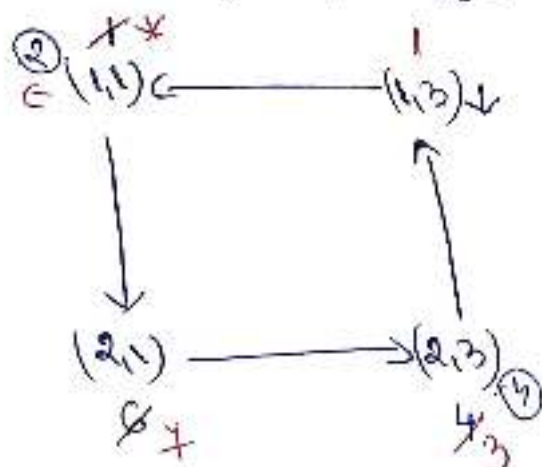
$$d_{22} = -3 + 2 - 3 + 1 = -3$$

$$d_{31} = -0 + 1 - 2 + 0 = -1$$

$$d_{32} = -0 + 2 - 3 + 1 - 2 + 0 = -2$$

$\Rightarrow \exists d_{ij} > 0 \Rightarrow \bar{x}_1$ nu este
s. optimă

$$Ske = \max \{d_{13}\} \Rightarrow x_{13} \downarrow$$



$$\Theta = \min \{(1,1); (2,3)\} = (1,1) \Rightarrow$$

$$\Rightarrow x_{11} \rightarrow$$

$$\Theta = 1$$

	C_1	C_2	C_3	
D_1	<div> <div>3</div> <div>*</div> </div>	<div> <div>2</div> <div>4</div> </div>	<div> <div>1</div> <div>1</div> </div>	8
D_2	<div> <div>1</div> <div>4</div> </div>	<div> <div>3</div> <div>*</div> </div>	<div> <div>2</div> <div>3</div> </div>	10
D_3	<div> <div>0</div> <div>*</div> </div>	<div> <div>0</div> <div>*</div> </div>	<div> <div>0</div> <div>6</div> </div>	6
	7	7	10	

! verificare!

$$\bar{x}_2 = (0, 7, 1, 7, 0, 3, 0, 0, 6) \in \mathbb{R}^9 \text{ - s.b. Ned.}$$

$$f(\bar{x}_2) = 7 \cdot 2 + 1 \cdot 1 + 7 \cdot 1 + 3 \cdot 2 + 6 \cdot 0 = 28 (\mu.m.) \leq f(\bar{x}_1)? \underline{\text{Da}}$$

$$d_{11} = -3 + 1 - 2 + 1 = -3$$

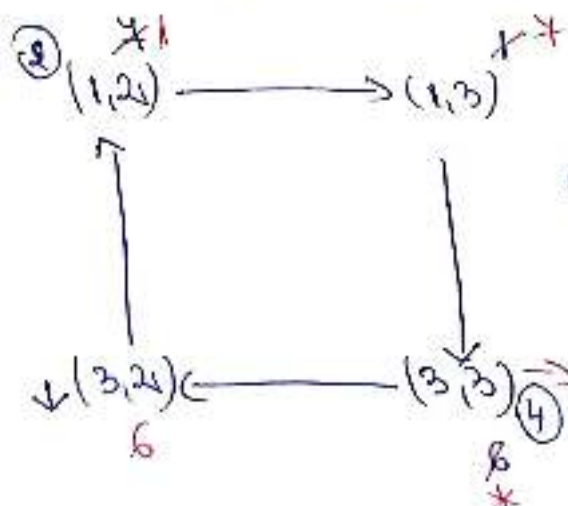
$$d_{22} = -3 + 2 - 1 + 2 = 0$$

$$d_{31} = -0 + 1 - 2 + 0 = -1$$

$$d_{32} = -0 + 2 - 1 + 0 = 1 > 0$$

$\Rightarrow \exists d_{ij} > 0 \Rightarrow \bar{x}_2$ nu este s. optimă

$$\theta_k = \max \{d_{32}\} = d_{32} \Rightarrow x_{32} \downarrow$$



$$\theta = \min \{(1,2); (3,3)\} = (3,3) \Rightarrow$$

$$\Rightarrow x_{33} \rightarrow$$

$$\theta = 6$$

Pg 3

	C_1	C_2	C_3	
D_1	<div><div></div><div>3</div></div> *	<div><div></div><div>2</div></div> 1	<div><div></div><div>1</div></div> *	8
D_2	<div><div>1</div><div></div></div> 7	<div><div>3</div><div></div></div> *	<div><div>2</div><div></div></div> 3	10
D_3	<div><div>0</div><div></div></div> *	<div><div>0</div><div></div></div> 6	<div><div>0</div><div></div></div> *	6
	7	7	10	

! verificare !

$$\bar{x}_3 = (0, 1, 7, 7, 0, 3, 0, 6, 0) \in \mathbb{R}^9 \text{ - s.b. Ned.}$$

$$f(\bar{x}_3) = 1 \cdot 2 + 7 \cdot 1 + 7 \cdot 1 + 3 \cdot 2 + 6 \cdot 0 = 22 \text{ (u.u.u.)} \leq f(\bar{x}_2)? \underline{\text{Da}}$$

$$d_{11} = -3 + 1 - 2 + 1 = -3$$

$$d_{22} = -3 + 2 - 1 + 2 = 0$$

$$d_{31} = -0 + 1 - 2 + 1 - 2 + 0 = -2$$

$$d_{33} = -0 + 1 - 2 + 0 = -1$$

\Rightarrow ~~Ati~~ $d_{ij} \leq 0 \Rightarrow \bar{x}_3$ este
soluție optimă
neunică.

Concluzia pt. P.T.E.:

echilibrat

$$\left\{ \begin{array}{l} x_{\text{optim}} = (0, 1, 7, 7, 0, 3, 0, 6, 0) \\ \text{min } f = 22 \text{ (u.u.u.)} \end{array} \right.$$

variable corale
 $c_1, d_1, e_1, f_1, h_1, j_1$

	c_1	c_2			
b_1	4	1	3	*	0
b_2	*	4	2	6	0
b_3	*	7	3	*	0
	4_0	13_0	11_0	4_0	0

5x0
 10x0
 7x0

$$16 + x = 5 + 10 + 7 + x$$

$$\bar{x}_0 = (4, 1, 0, 0, 4, 6, 0, 7, 0) \in \mathbb{R}^9 \text{ s.b. Ned.}$$

$$f(\bar{x}_0) = 4 \cdot 1 + 1 \cdot 2 + 4 \cdot 2 + 6 \cdot 0 + 7 \cdot 3 = 35 \text{ u.m.}$$

$$d_{13} = -0 + 0 - 2 + 2 = 0$$

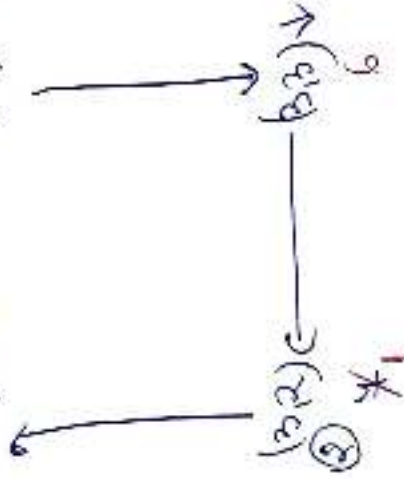
$$d_{21} = -1 + 1 - 2 + 2 = 0$$

$$d_{31} = -4 + 1 - 2 + 3 = -2$$

$$d_{33} = -0 + 3 - 2 + 0 = 1 > 0$$

$$Ske = \max \{d_{33}\} = d_{33} \Rightarrow x_{33} \downarrow$$

$$x_{10} \xrightarrow{-6} (2, 2) \xrightarrow{(4)} (2, 3) \rightarrow$$



$$\Theta = \min \{ (2, 2); (2, 3); (2, 6); (3, 6); (3, 3) \} \Rightarrow$$

$$\Rightarrow x_{23} \Rightarrow$$

$$\Theta = 6$$

	C_1	C_2	C_3	
D_1	1 4	2 1	0 *	5
D_2	1 *	2 10	0 *	10
D_3	4 *	3 1	0 6	7
	4	12	6	

verificare!

$$\bar{x}_1 = (4, 1, 0, 0, 10, 0, 0, 1, 6) \in \mathbb{R}^9 - \text{s.e. Ned.}$$

$$f(\bar{x}_1) = 4 \cdot 1 + 1 \cdot 2 + 10 \cdot 2 + 1 \cdot 3 + 6 \cdot 0 = 29 \text{ (u.m.)} \leq f(\bar{x}_0)? \text{ Da}$$

$$d_{13} = -0 + 0 - 3 + 2 = -1$$

$$d_{21} = -1 + 2 - 2 + 1 = 0$$

$$d_{23} = -0 + 2 - 3 + 0 = -1$$

$$d_{31} = -4 + 1 - 2 + 3 = -2$$

\Rightarrow totu $d_{ij} \leq 0 \Rightarrow \bar{x}_1$ este
soluție optimă
nouă

Concluzia pt. P.T.E.:

echilibrat

$$x_{\text{opt}} = (4, 1, 0, 0, 10, 0, 0, 1, 6)$$

$$\min f = 29 \text{ (u.m.)}$$