

УНИВЕРСИТЕТ ИТМО
Факультет программной инженерии и компьютерной техники
Дисциплина «Дискретная математика»

Домашняя работа №2

Вариант 113

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Решение

V/V	x1	x2	x3	x4	x5	x6	x7	x8	x9	x10	x11	x12
x1	0								4	2		
x2		0	4		2				2		5	
x3		4	0	4	3	2	1		2		2	2
x4			4	0						1	3	2
x5		2	3		0			5				2
x6			2			0					5	4
x7			1				0				4	
x8					5			0		4	4	
x9	4	2	2						0	4	1	
x10	2			1				4	4	0		1
x11		5	2	3		5	4	4	1		0	5
x12			2	2	2	4				1	5	0

V/V	e1	e2	e3	e4	e5	e6	e7	e8	e9	e10	e11	e12
e1	0								4	2		
e2		0	4		2				2		5	
e3		4	0	4	3	2	1		2		2	2
e4			4	0						1	3	2
e5		2	3		0			5				2
e6			2			0					5	4
e7			1				0				4	
e8					5			0		4	4	
e9	4	2	2						0	4	1	
e10	2			1				4	4	0		1
e11		5	2	3		5	4	4	1		0	5
e12			2	2	2	4				1	5	0

	1	2	3	4	5	6	7	8	9	10	11	12
x1	0 ⁺											
x2	∞	∞	∞	∞	∞	6	6	6	6 ⁺			
x3	∞	∞	∞	7	5	5 ⁺						
x4	∞	∞	3 ⁺									
x5	∞	∞	∞	∞	5	5	5 ⁺					
x6	∞	∞	∞	∞	7	7	7	7	7	7	7	7 ⁺
x7	∞	∞	∞	∞	∞	∞	6	6	6	6 ⁺		
x8	∞	∞	6	6	6	6	6	6	6	6	6 ⁺	
x9	∞	4	4	4	4 ⁺							
x10	∞	2 ⁺										
x11	∞	∞	∞	6	6	5	5	5 ⁺				
x12	∞	∞	3	3 ⁺								

- $l(x_1) = 0^+$; $l(x_i) = \infty$, для всех $i \neq 1$, $p = x_1$
- $\Gamma_p = \{x_9, x_{10}\}$ – есть временные пометки - $[x_9, x_{10}]$, уточним:
 - ❖ $l(x_9) = \min[\infty, 0^+ + 4] = 4$
 - ❖ $l(x_{10}) = \min[\infty, 0^+ + 2] = 2$
- $l(x_i^*) = \min[l(x_i)] = l(x_{10}) = 2$
- $l(x_{10}) = 2^+$, $p = x_{10}$
- $\Gamma_p = \{x_1, x_4, x_8, x_9, x_{12}\}$ – есть временные пометки - $[x_4, x_8, x_9, x_{12}]$, уточним:
 - ❖ $l(x_4) = \min[\infty, 2^+ + 1] = 3$
 - ❖ $l(x_8) = \min[\infty, 2^+ + 4] = 6$

$$\diamond l(x_9) = \min[4, 2^+ + 4] = 4$$

$$\diamond l(x_{12}) = \min[\infty, 2^+ + 1] = 3$$

$$\blacksquare l(x_i^*) = \min[l(x_i)] = l(x_4) = 3$$

$$\blacksquare l(x_4) = 3^+, p = x_4$$

▪ $\Gamma_p = \{x_3, x_{10}, x_{11}, x_{12}\}$ – есть временные пометки - $[x_3, x_{11}, x_{12}]$, уточним:

$$\diamond l(x_3) = \min[\infty, 3^+ + 4] = 7$$

$$\diamond l(x_{11}) = \min[\infty, 3^+ + 3] = 6$$

$$\diamond l(x_{12}) = \min[3, 3^+ + 2] = 3$$

$$\blacksquare l(x_i^*) = \min[l(x_i)] = l(x_{12}) = 3$$

$$\blacksquare l(x_{12}) = 3^+, p = x_{12}$$

▪ $\Gamma_p = \{x_3, x_4, x_5, x_6, x_{10}, x_{11}\}$ – есть временные пометки - $[x_3, x_5, x_6, x_{11}]$, уточним:

$$\diamond l(x_3) = \min[7, 3^+ + 2] = 5$$

$$\diamond l(x_5) = \min[\infty, 3^+ + 2] = 5$$

$$\diamond l(x_6) = \min[\infty, 3^+ + 4] = 7$$

$$\diamond l(x_{11}) = \min[6, 3^+ + 5] = 6$$

$$\blacksquare l(x_i^*) = \min[l(x_i)] = l(x_9) = 4$$

$$\blacksquare l(x_9) = 4^+, p = x_9$$

▪ $\Gamma_p = \{x_1, x_2, x_3, x_{10}, x_{11}\}$ – есть временные пометки - $[x_2, x_3, x_{11}]$, уточним:

$$\diamond l(x_2) = \min[\infty, 4^+ + 2] = 6$$

$$\diamond l(x_3) = \min[5, 4^+ + 2] = 5$$

$$\diamond l(x_{11}) = \min[6, 4^+ + 1] = 5$$

$$\blacksquare l(x_i^*) = \min[l(x_i)] = l(x_3) = 5$$

$$\blacksquare l(x_3) = 5^+, p = x_3$$

▪ $\Gamma_p = \{x_2, x_4, x_5, x_6, x_7, x_9, x_{11}, x_{12}\}$ – есть временные пометки - $[x_2, x_5, x_6, x_7, x_{11}]$, уточним:

$$\diamond l(x_2) = \min[6, 5^+ + 4] = 6$$

$$\diamond l(x_5) = \min[5, 5^+ + 3] = 5$$

$$\diamond l(x_6) = \min[7, 5^+ + 2] = 7$$

$$\diamond l(x_7) = \min[\infty, 5^+ + 1] = 6$$

$$\diamond l(x_{11}) = \min[5, 5^+ + 2] = 5$$

$$\blacksquare l(x_i^*) = \min[l(x_i)] = l(x_5) = 5$$

$$\blacksquare l(x_5) = 5^+, p = x_5$$

▪ $\Gamma_p = \{x_2, x_3, x_8, x_{12}\}$ – есть временные пометки - $[x_2, x_8]$, уточним:

$$\diamond l(x_2) = \min[6, 5^+ + 2] = 6$$

$$\diamond l(x_8) = \min[6, 5^+ + 5] = 6$$

$$\blacksquare l(x_i^*) = \min[l(x_i)] = l(x_{11}) = 5$$

$$\blacksquare l(x_{11}) = 5^+, p = x_{11}$$

▪ $\Gamma_p = \{x_2, x_3, x_4, x_6, x_7, x_8, x_9, x_{12}\}$ – есть временные пометки - $[x_2, x_6, x_7, x_8]$, уточним:

$$\diamond l(x_2) = \min[6, 5^+ + 5] = 6$$

$$\diamond l(x_6) = \min[7, 5^+ + 5] = 7$$

$$\diamond l(x_7) = \min[6, 5^+ + 4] = 6$$

$$\diamond l(x_8) = \min[6, 5^+ + 4] = 6$$

$$\blacksquare l(x_i^*) = \min[l(x_i)] = l(x_2) = 6$$

$$\blacksquare l(x_2) = 6^+, p = x_2$$

▪ $\Gamma_p = \{x_3, x_5, x_9, x_{11}\}$ – нет временных пометок

$$\blacksquare l(x_i^*) = \min[l(x_i)] = l(x_7) = 6$$

$$\blacksquare l(x_7) = 6^+, p = x_7$$

▪ $\Gamma_p = \{x_3, x_{11}\}$ – нет временных пометок

$$\blacksquare l(x_i^*) = \min[l(x_i)] = l(x_8) = 6$$

$$\blacksquare l(x_8) = 6^+, p = x_8$$

▪ $\Gamma_p = \{x_5, x_{10}, x_{11}\}$ – нет временных пометок

$$\blacksquare l(x_i^*) = \min[l(x_i)] = l(x_6) = 7$$

$$\blacksquare l(x_6) = 7^+, p = x_6$$

- $\Gamma_p = \{x_3, x_{11}, x_{12}\}$ – нет временных пометок

Все вершины постоянные