Flows. Variant 1.

1. Find a maximal flow and a minimal cut in the network with the following capacity matrix.

	s	a	b	c	d	e	t
s		18	14			9	
a			8	11	7		13
b					12		19
c			10			15	
d				17		21	
e							14
t							

2. Propose an algorithm to solve the maximal flow problem in a network with several sources and sinks. Give an example.

3. Find a minimal cost flow using the Ford-Falkerson algorithm for the network from the task 1 with the flow value equal to 2/3 of the maximal flow value and with the follow1ng cost matrix.

	s	a	b	c	d	e	t
s		3	4			8	
a			2	6	4		7
b					5		8
c			3			6	
d				5		9	
e							4
t							

Flows. Variant 2.

1. Find a maximal flow and a minimal cut in the network with the following capacity matrix.

	s	a	b	c	d	e	t
s		9		11		11	
a			6		8		12
b							7
c		12				5	5
d						7	
e							9
t							

2. Propose an algorithm of a maximal flow search in a network with capacities of vertices and edges. Give an example.

3. Find a minimal cost flow using negative cost cycles for the network from the task 1 with the flow value equal to 2/3 of the maximal flow value and with the follow1ng cost matrix.

	s	a	b	c	d	e	t
s		4		6		12	
a			3		2		7
b							2
c		3				3	1
d						2	
e							8
t							

Flows. Variant 3.

1. Find a maximal flow and a minimal cut in the network with the following capacity matrix.

	s	a	b	c	d	e	t
s		10	5			8	
a				5	3		4
b				4	5	10	
c					4		9
d						5	6
e							7
t							

2. Propose an algorithm of a maximal flow search in a network with capacities of vertices and edges. Give an example.

3. Find a minimal cost flow using minimal paths for the network from the task 1 with the flow value equal to 2/3 of the maximal flow value and with the follow1ng cost matrix.

	s	a	b	c	d	e	t
s		7	2			5	
a				1	2		3
b				3	3	7	
c					1		6
d						3	4
e							4
t							

Flows. Variant 4.

1. Find a maximal flow and a minimal cut in the network with the following capacity matrix.

	s	a	b	c	d	e	t
s			5		15	9	
a					6		7
b		3		4		7	
c						8	3
d							18
e					9		5
t							

2. Propose an algorithm of a flow search in a network with upper and lower bounds of the flow in every edge. Give an example.

3. Find a minimal cost flow using negative cost cycles for the network from the task 1 with the flow value equal to 2/3 of the maximal flow value and with the follow1ng cost matrix.

	s	a	b	c	d	e	t
s			7		17	11	
a					8		9
b		5		6		9	
c						10	5
d							20
e					12		7
t							

Flows. Variant 5.

1. Find a maximal flow and a minimal cut in the network with the following capacity matrix.

	s	a	b	c	d	e	t
s		10		8			
a			8	12	10		6
b						5	11
c					4	12	
d			5				9
e					6		7
t							

2. Propose an algorithm of a flow search in a network with upper and lower bounds of the flow in every edge. Give an example.

3. Find a minimal cost flow using minimal paths for the network from the task 1 with the flow value equal to 2/3 of the maximal flow value and with the follow1ng cost matrix.

	s	a	b	c	d	e	t
s		5		7			
a			10	6	7		12
b						11	5
c					15	4	
d			11				6
e					10		9
t							