Flows and networks. Variant 1.

1. Find the maximum flow and minimum cut in the network with the following capacity matrix. Use Ford-Falkerson and Dinic's algorithm.

	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. Find a maximum flow, if the node a has the capacity 9, and the node d - 8.

3. Find the minimum-cost flow for the network from problem 1 with value 2/3 of the maximum flow and the following 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 and networks. Variant 2.

1. Find the maximum flow and minimum cut in the network with the following capacity matrix. Use Ford-Falkerson and Dinic's algorithm.

	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. Find a maximum flow if the arc (s, a) has a lower capacity limit 5, and (d, e) has a lower capacity limit 3.

3. Find the minimum-cost flow for the network from problem 1 with value $2/3$ of the maximum flow and the following 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 and networks. Variant 3.

1. Find the maximum flow and minimum cut in the network with the following capacity matrix. Use Ford-Falkerson and Dinic's algorithm.

	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. Find a maximum flow if the arc (s, b) has a lower capacity limit 2, and (c, t) has a lower capacity limit 7.

3. Find the minimum-cost flow for the network from problem 1 with value 2/3 of the maximum flow and the following 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 and networks. Variant 4.

1. Find the maximum flow and minimum cut in the network with the following capacity matrix. Use Ford-Falkerson and Dinic's algorithm.

	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. Find a maximum flow, if the node b has the capacity 4, and the node e - 6.

3. Find the minimum-cost flow for the network from problem 1 with value 2/3 of the maximum flow and the following 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							