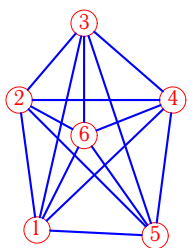


## Алгоритм отжига

Найти длину гамильтонова цикла  $S_4$  в полном графе  $K_6$  после четырех циклов решения задачи методом отжига. Даны расстояния  $L_{i,j}$  между вершинами. Даны также: начальная последовательность вершин  $L_0$ , последовательность замен вершин  $Z$  и выпавшие при этом вероятности перехода  $P_k$ ,  $k = 1, \dots, 4$ . Переход на худшее ( $\Delta S_k = S_k - S_{k-1} > 0$ ) решение допустим, если  $P_* = 100e^{-\Delta S_k/T_k} > P_k$ , где снижение температуры происходит по закону  $T_{k+1} = 0.5T_k$  от  $T_1 = 100$  независимо от того, принято решение или нет. Если  $\Delta S_k \leq 0$ , то новое решение принимается.

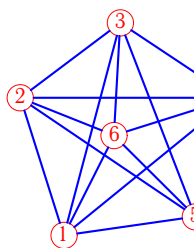
**Задача 13.1.** *Алексин Игорь*



Ребро	$L_{i,j}$
1-2	24
1-3	40
1-4	35
1-5	22
1-6	20
2-3	19
2-4	29
2-5	36
2-6	14
3-4	22
3-5	42
3-6	21
4-5	26
4-6	18
5-6	23

$V = [1, 4, 5, 3, 6, 2, 1].$   
 $Z = [V_3 \rightleftharpoons V_5], [V_4 \rightleftharpoons V_5],$   
 $[V_5 \rightleftharpoons V_6], [V_2 \rightleftharpoons V_3].$   
 $P = 88, 41, 71, 26.$

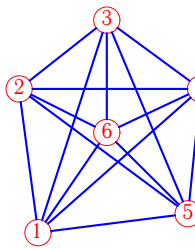
**Задача 13.2.** *Байкова Мария*



Ребро	$L_{i,j}$
1-2	27
1-3	41
1-4	41
1-5	25
1-6	21
2-3	23
2-4	40
2-5	40
2-6	19
3-4	25
3-5	39
3-6	21
4-5	23
4-6	23
5-6	21

$V = [1, 4, 3, 5, 6, 2, 1].$   
 $Z = [V_4 \rightleftharpoons V_6], [V_3 \rightleftharpoons V_5],$   
 $[V_5 \rightleftharpoons V_2], [V_6 \rightleftharpoons V_2].$   
 $P = 84, 89, 34, 100.$

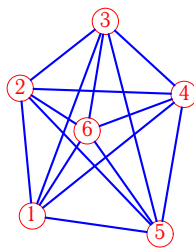
**Задача 13.3.** *Бак Илья*



Ребро	$L_{i,j}$
1-2	27
1-3	42
1-4	41
1-5	28
1-6	23
2-3	21
2-4	34
2-5	39
2-6	18
3-4	22
3-5	39
3-6	21
4-5	23
4-6	19
5-6	21

$V = [1, 4, 5, 2, 6, 3, 1].$   
 $Z = [V_5 \rightleftharpoons V_6], [V_3 \rightleftharpoons V_5],$   
 $[V_4 \rightleftharpoons V_6], [V_6 \rightleftharpoons V_2].$   
 $P = 66, 22, 84, 23.$

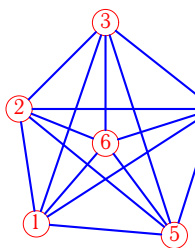
**Задача 13.4.** *Гольденберг Павел*



Ребро	$L_{i,j}$
1-2	24
1-3	39
1-4	36
1-5	24
1-6	19
2-3	20
2-4	31
2-5	38
2-6	15
3-4	20
3-5	41
3-6	21
4-5	26
4-6	19
5-6	24

$V = [1, 3, 5, 2, 4, 6, 1].$   
 $Z = [V_5 \rightleftharpoons V_2], [V_6 \rightleftharpoons V_2],$   
 $[V_4 \rightleftharpoons V_6], [V_3 \rightleftharpoons V_4].$   
 $P = 32, 76, 28, 68.$

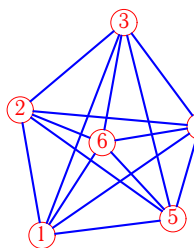
**Задача 13.5.** *Гусев Сергей*



Ребро	$L_{i,j}$
1-2	22
1-3	40
1-4	40
1-5	26
1-6	20
2-3	23
2-4	37
2-5	37
2-6	17
3-4	26
3-5	42
3-6	22
4-5	25
4-6	21
5-6	21

$V = [1, 3, 4, 5, 6, 2, 1].$   
 $Z = [V_4 \rightleftharpoons V_6], [V_5 \rightleftharpoons V_6],$   
 $[V_6 \rightleftharpoons V_2], [V_3 \rightleftharpoons V_5].$   
 $P = 71, 34, 44, 24.$

**Задача 13.6.** *Ерёмин Станислав*

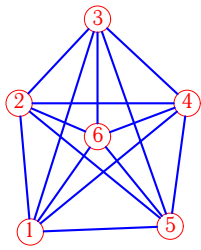


Ребро	$L_{i,j}$
1-2	24
1-3	43
1-4	36
1-5	25
1-6	21
2-3	25
2-4	34
2-5	35
2-6	16
3-4	24
3-5	38
3-6	23
4-5	18
4-6	18
5-6	19

$V = [1, 3, 4, 5, 2, 6, 1].$   
 $Z = [V_3 \rightleftharpoons V_5], [V_4 \rightleftharpoons V_5],$   
 $[V_5 \rightleftharpoons V_2], [V_6 \rightleftharpoons V_2].$   
 $P = 31, 26, 75, 29.$

**Задача 13.7.**

*Ермолаева Наталья*

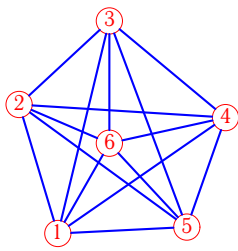


$V = [1, 2, 4, 3, 5, 6, 1].$   
 $Z = [V_3 \rightleftharpoons V_4], [V_2 \rightleftharpoons V_4],$   
 $[V_4 \rightleftharpoons V_5], [V_5 \rightleftharpoons V_6].$   
 $P = 58, 69, 69, 77.$

Ребро	$L_{i,j}$
1-2	24
1-3	42
1-4	38
1-5	26
1-6	22
2-3	21
2-4	31
2-5	36
2-6	16
3-4	23
3-5	41
3-6	22
4-5	23
4-6	18
5-6	21

**Задача 13.9.**

*Кленова Ирина*

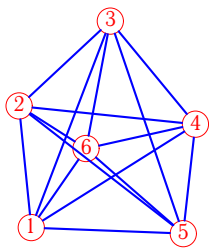


$V = [1, 4, 5, 3, 6, 2, 1].$   
 $Z = [V_3 \rightleftharpoons V_4], [V_4 \rightleftharpoons V_5],$   
 $[V_5 \rightleftharpoons V_6], [V_6 \rightleftharpoons V_2].$   
 $P = 69, 51, 56, 36.$

Ребро	$L_{i,j}$
1-2	25
1-3	41
1-4	38
1-5	24
1-6	19
2-3	23
2-4	39
2-5	39
2-6	18
3-4	28
3-5	41
3-6	23
4-5	22
4-6	22
5-6	21

**Задача 13.11.**

*Михайлов Дмитрий*

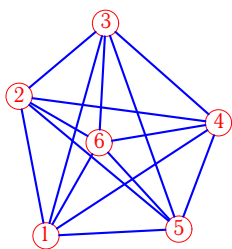


$V = [1, 4, 5, 6, 3, 2, 1].$   
 $Z = [V_3 \rightleftharpoons V_4], [V_4 \rightleftharpoons V_6],$   
 $[V_5 \rightleftharpoons V_6], [V_6 \rightleftharpoons V_2].$   
 $P = 73, 33, 88, 37.$

Ребро	$L_{i,j}$
1-2	23
1-3	41
1-4	36
1-5	28
1-6	18
2-3	23
2-4	33
2-5	39
2-6	15
3-4	25
3-5	42
3-6	24
4-5	20
4-6	21
5-6	24

**Задача 13.13.**

*Пур Мохаммад Бехруз*

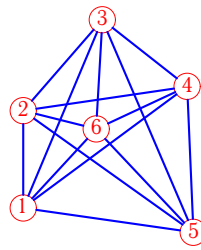


$V = [1, 4, 5, 3, 2, 6, 1].$   
 $Z = [V_5 \rightleftharpoons V_2], [V_4 \rightleftharpoons V_6],$   
 $[V_6 \rightleftharpoons V_2], [V_3 \rightleftharpoons V_4].$   
 $P = 36, 44, 42, 31.$

Ребро	$L_{i,j}$
1-2	26
1-3	41
1-4	39
1-5	25
1-6	20
2-3	21
2-4	38
2-5	39
2-6	17
3-4	28
3-5	41
3-6	22
4-5	21
4-6	23
5-6	22

**Задача 13.8.**

*Зайцев Андрей*

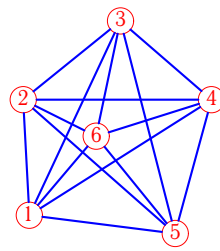


$V = [1, 4, 2, 3, 5, 6, 1].$   
 $Z = [V_3 \rightleftharpoons V_4], [V_4 \rightleftharpoons V_6],$   
 $[V_5 \rightleftharpoons V_2], [V_6 \rightleftharpoons V_2].$   
 $P = 97, 91, 22, 93.$

Ребро	$L_{i,j}$
1-2	18
1-3	38
1-4	38
1-5	32
1-6	20
2-3	22
2-4	31
2-5	39
2-6	14
3-4	20
3-5	43
3-6	20
4-5	27
4-6	19
5-6	26

**Задача 13.10.**

*Миронов Вадим*

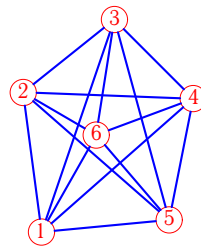


$V = [1, 5, 3, 4, 6, 2, 1].$   
 $Z = [V_4 \rightleftharpoons V_6], [V_5 \rightleftharpoons V_2],$   
 $[V_3 \rightleftharpoons V_4], [V_6 \rightleftharpoons V_2].$   
 $P = 91, 64, 64, 75.$

Ребро	$L_{i,j}$
1-2	21
1-3	40
1-4	40
1-5	27
1-6	19
2-3	23
2-4	35
2-5	38
2-6	15
3-4	22
3-5	41
3-6	22
4-5	26
4-6	23
5-6	23

**Задача 13.12.**

*Огневский Павел*

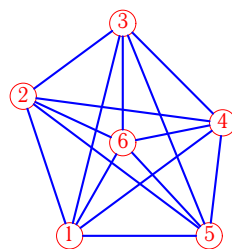


$V = [1, 3, 4, 5, 6, 2, 1].$   
 $Z = [V_5 \rightleftharpoons V_2], [V_4 \rightleftharpoons V_6],$   
 $[V_6 \rightleftharpoons V_2], [V_3 \rightleftharpoons V_4].$   
 $P = 28, 48, 90, 38.$

Ребро	$L_{i,j}$
1-2	26
1-3	42
1-4	38
1-5	24
1-6	21
2-3	22
2-4	32
2-5	36
2-6	16
3-4	21
3-5	39
3-6	22
4-5	23
4-6	19
5-6	21

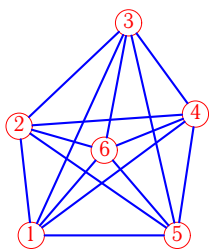
**Задача 13.14.**

*Кондратьев Илья*



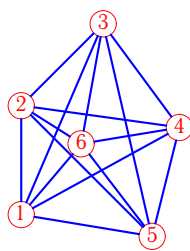
$V = [1, 4, 5, 2, 3, 6, 1].$   
 $Z = [V_4 \rightleftharpoons V_6], [V_5 \rightleftharpoons V_2],$   
 $[V_6 \rightleftharpoons V_2], [V_2 \rightleftharpoons V_3].$   
 $P = 92, 76, 87, 75.$

Ребро	$L_{i,j}$
1-2	27
1-3	41
1-4	36
1-5	26
1-6	20
2-3	23
2-4	38
2-5	44
2-6	20
3-4	26
3-5	43
3-6	22
4-5	21
4-6	19
5-6	24

**Задача 13.15.***Попов Алексей*

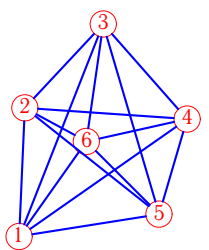
$V = [1, 3, 4, 5, 6, 2, 1].$   
 $Z = [V_2 \rightleftharpoons V_4], [V_5 \rightleftharpoons V_6],$   
 $[V_3 \rightleftharpoons V_5], [V_6 \rightleftharpoons V_2].$   
 $P = 47, 79, 79, 67.$

Ребро	$L_{i,j}$
1-2	20
1-3	44
1-4	38
1-5	27
1-6	21
2-3	28
2-4	33
2-5	36
2-6	16
3-4	21
3-5	41
3-6	24
4-5	23
4-6	18
5-6	21

**Задача 13.16.***Сбытова Екатерина*

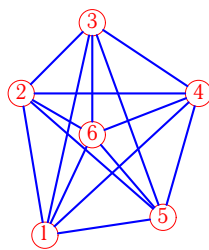
$V = [1, 5, 6, 2, 3, 4, 1].$   
 $Z = [V_3 \rightleftharpoons V_5], [V_4 \rightleftharpoons V_5],$   
 $[V_2 \rightleftharpoons V_3], [V_5 \rightleftharpoons V_6].$   
 $P = 55, 39, 54, 44.$

Ребро	$L_{i,j}$
1-2	20
1-3	39
1-4	34
1-5	25
1-6	17
2-3	22
2-4	30
2-5	35
2-6	13
3-4	24
3-5	41
3-6	23
4-5	21
4-6	18
5-6	22

**Задача 13.17.***Сурков Роман*

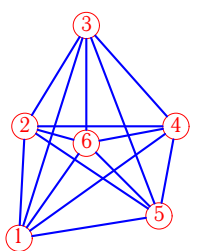
$V = [1, 2, 4, 3, 5, 6, 1].$   
 $Z = [V_3 \rightleftharpoons V_5], [V_4 \rightleftharpoons V_6],$   
 $[V_5 \rightleftharpoons V_2], [V_6 \rightleftharpoons V_2].$   
 $P = 52, 33, 85, 33.$

Ребро	$L_{i,j}$
1-2	24
1-3	43
1-4	38
1-5	26
1-6	22
2-3	21
2-4	30
2-5	32
2-6	13
3-4	24
3-5	37
3-6	22
4-5	18
4-6	19
5-6	19

**Задача 13.18.***Ткачев Константин*

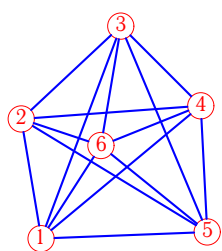
$V = [1, 3, 4, 5, 6, 2, 1].$   
 $Z = [V_4 \rightleftharpoons V_6], [V_5 \rightleftharpoons V_6],$   
 $[V_3 \rightleftharpoons V_4], [V_2 \rightleftharpoons V_3].$   
 $P = 88, 43, 54, 26.$

Ребро	$L_{i,j}$
1-2	27
1-3	41
1-4	39
1-5	22
1-6	21
2-3	19
2-4	33
2-5	35
2-6	15
3-4	24
3-5	39
3-6	21
4-5	24
4-6	21
5-6	20

**Задача 13.19.***Толченова Екатерина*

$V = [1, 2, 3, 4, 5, 6, 1].$   
 $Z = [V_4 \rightleftharpoons V_5], [V_5 \rightleftharpoons V_6],$   
 $[V_2 \rightleftharpoons V_3], [V_3 \rightleftharpoons V_4].$   
 $P = 21, 40, 32, 48.$

Ребро	$L_{i,j}$
1-2	21
1-3	42
1-4	36
1-5	26
1-6	22
2-3	22
2-4	28
2-5	30
2-6	12
3-4	25
3-5	38
3-6	22
4-5	17
4-6	17
5-6	19

**Задача 13.20.***Фадеев Александр*

$V = [1, 3, 4, 2, 5, 6, 1].$   
 $Z = [V_4 \rightleftharpoons V_5], [V_3 \rightleftharpoons V_5],$   
 $[V_5 \rightleftharpoons V_2], [V_6 \rightleftharpoons V_2].$   
 $P = 97, 94, 96, 92.$

Ребро	$L_{i,j}$
1-2	23
1-3	42
1-4	39
1-5	31
1-6	21
2-3	25
2-4	34
2-5	41
2-6	16
3-4	21
3-5	42
3-6	23
4-5	24
4-6	20
5-6	26