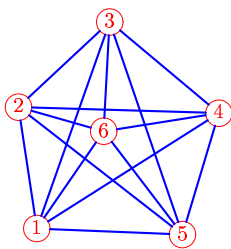


## Алгоритм отжига

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  $\mathbf{Z}$  и выпавшие при этом вероятности перехода  $\mathbf{P}_k$ ,  $k = 1, \dots, 4$ . 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.** *Авелину Габриэл Ндинду*

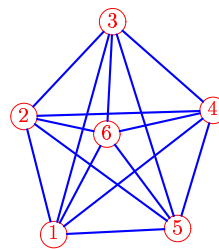


$\mathbf{V} = [1, 4, 5, 3, 6, 2, 1].$   
 $\mathbf{Z} = [V_3 \rightleftharpoons V_4], [V_4 \rightleftharpoons V_5],$   
 $[V_2 \rightleftharpoons V_3], [V_5 \rightleftharpoons V_2].$   
 $\mathbf{P} = 38, 71, 93, 84.$

Ребро	$L_{i,j}$
1-2	23
1-3	41
1-4	40
1-5	27
1-6	22
2-3	23
2-4	37
2-5	39
2-6	16
3-4	27
3-5	42
3-6	20
4-5	24
4-6	22
5-6	24

**Задача 13.2.**

*Алексеев Даниил*

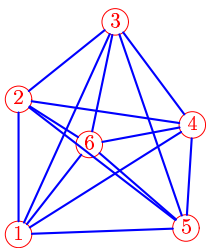


$\mathbf{V} = [1, 2, 3, 4, 5, 6, 1].$   
 $\mathbf{Z} = [V_3 \rightleftharpoons V_4], [V_4 \rightleftharpoons V_5],$   
 $[V_2 \rightleftharpoons V_3], [V_5 \rightleftharpoons V_2].$   
 $\mathbf{P} = 69, 70, 95, 58.$

Ребро	$L_{i,j}$
1-2	23
1-3	41
1-4	38
1-5	23
1-6	21
2-3	24
2-4	35
2-5	36
2-6	16
3-4	25
3-5	41
3-6	21
4-5	23
4-6	20
5-6	22

**Задача 13.3.**

*Алешин Владислав*

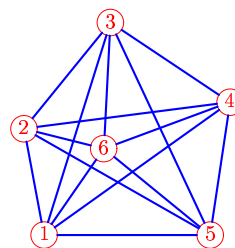


$\mathbf{V} = [1, 4, 5, 6, 3, 2, 1].$   
 $\mathbf{Z} = [V_3 \rightleftharpoons V_4], [V_4 \rightleftharpoons V_5],$   
 $[V_2 \rightleftharpoons V_3], [V_5 \rightleftharpoons V_6].$   
 $\mathbf{P} = 53, 93, 88, 90.$

Ребро	$L_{i,j}$
1-2	25
1-3	44
1-4	38
1-5	31
1-6	21
2-3	23
2-4	33
2-5	40
2-6	16
3-4	24
3-5	41
3-6	23
4-5	19
4-6	19
5-6	24

**Задача 13.4.**

*Андреев Данил*

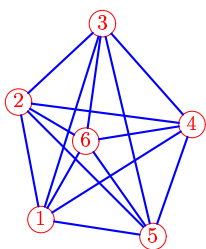


$\mathbf{V} = [1, 4, 2, 5, 6, 3, 1].$   
 $\mathbf{Z} = [V_4 \rightleftharpoons V_6], [V_5 \rightleftharpoons V_6],$   
 $[V_3 \rightleftharpoons V_4], [V_6 \rightleftharpoons V_2].$   
 $\mathbf{P} = 88, 63, 36, 73.$

Ребро	$L_{i,j}$
1-2	20
1-3	42
1-4	43
1-5	31
1-6	20
2-3	26
2-4	39
2-5	40
2-6	15
3-4	27
3-5	44
3-6	24
4-5	25
4-6	25
5-6	26

**Задача 13.5.**

*Арабаджиев Денис*

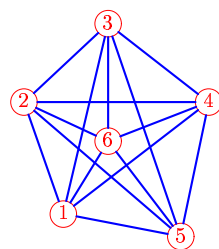


$\mathbf{V} = [1, 4, 5, 3, 6, 2, 1].$   
 $\mathbf{Z} = [V_3 \rightleftharpoons V_5], [V_4 \rightleftharpoons V_5],$   
 $[V_5 \rightleftharpoons V_6], [V_6 \rightleftharpoons V_2].$   
 $\mathbf{P} = 71, 31, 26, 22.$

Ребро	$L_{i,j}$
1-2	22
1-3	38
1-4	33
1-5	21
1-6	17
2-3	21
2-4	33
2-5	35
2-6	14
3-4	25
3-5	41
3-6	22
4-5	22
4-6	20
5-6	22

**Задача 13.6.**

*Клепиков Владимир*

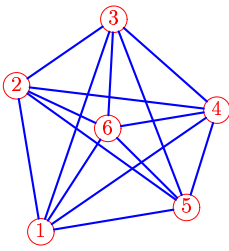


$\mathbf{V} = [1, 5, 4, 3, 6, 2, 1].$   
 $\mathbf{Z} = [V_3 \rightleftharpoons V_5], [V_4 \rightleftharpoons V_5],$   
 $[V_5 \rightleftharpoons V_6], [V_2 \rightleftharpoons V_3].$   
 $\mathbf{P} = 88, 91, 37, 90.$

Ребро	$L_{i,j}$
1-2	22
1-3	37
1-4	34
1-5	22
1-6	16
2-3	21
2-4	34
2-5	39
2-6	17
3-4	24
3-5	42
3-6	22
4-5	26
4-6	20
5-6	22

**Задача 13.7.**

*Кузнев Владимир*

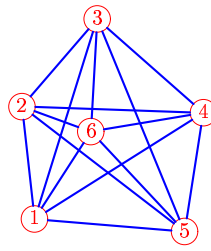


$V = [1, 3, 4, 5, 2, 6, 1].$   
 $Z = [V_4 \rightleftharpoons V_5], [V_3 \rightleftharpoons V_5],$   
 $[V_5 \rightleftharpoons V_2], [V_6 \rightleftharpoons V_2].$   
 $P = 49, 36, 26, 39.$

Ребро	$L_{i,j}$
1-2	28
1-3	42
1-4	40
1-5	28
1-6	23
2-3	22
2-4	38
2-5	39
2-6	19
3-4	26
3-5	38
3-6	20
4-5	19
4-6	21
5-6	21

**Задача 13.8.**

*Мазур Илья*



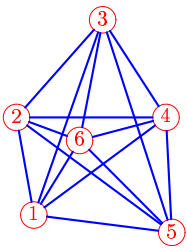
$V = [1, 3, 4, 5, 2, 6, 1].$   
 $Z = [V_5 \rightleftharpoons V_2], [V_4 \rightleftharpoons V_5],$   
 $[V_2 \rightleftharpoons V_3], [V_3 \rightleftharpoons V_4].$   
 $P = 56, 54, 40, 42.$

Ребро	$L_{i,j}$
1-2	21
1-3	39
1-4	37
1-5	28
1-6	19
2-3	21
2-4	34
2-5	38
2-6	14
3-4	26
3-5	43
3-6	21
4-5	22
4-6	21
5-6	26

**Задача 13.9.**

*Муширла Жеремиаи*

*Жоау*

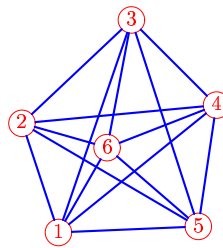


$V = [1, 5, 4, 6, 3, 2, 1].$   
 $Z = [V_2 \rightleftharpoons V_3], [V_3 \rightleftharpoons V_5],$   
 $[V_4 \rightleftharpoons V_6], [V_5 \rightleftharpoons V_6].$   
 $P = 33, 31, 29, 36.$

Ребро	$L_{i,j}$
1-2	18
1-3	39
1-4	31
1-5	26
1-6	16
2-3	24
2-4	28
2-5	36
2-6	12
3-4	22
3-5	42
3-6	23
4-5	21
4-6	17
5-6	24

**Задача 13.10.**

*Нечаева Полина*



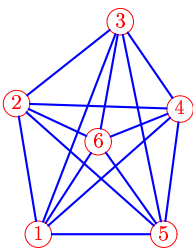
$V = [1, 4, 5, 6, 2, 3, 1].$   
 $Z = [V_4 \rightleftharpoons V_5], [V_5 \rightleftharpoons V_6],$   
 $[V_3 \rightleftharpoons V_5], [V_6 \rightleftharpoons V_2].$   
 $P = 46, 28, 87, 17.$

Ребро	$L_{i,j}$
1-2	21
1-3	42
1-4	38
1-5	26
1-6	18
2-3	28
2-4	36
2-5	38
2-6	16
3-4	22
3-5	41
3-6	24
4-5	23
4-6	22
5-6	22

**Задача 13.11.**

*Фернанду Марселину*

*Жулиу*



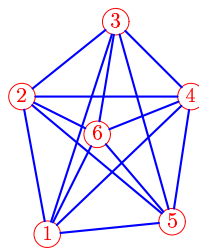
$V = [1, 3, 4, 5, 6, 2, 1].$   
 $Z = [V_4 \rightleftharpoons V_5], [V_5 \rightleftharpoons V_2],$   
 $[V_6 \rightleftharpoons V_2], [V_2 \rightleftharpoons V_4].$   
 $P = 74, 91, 60, 78.$

Ребро	$L_{i,j}$
1-2	25
1-3	43
1-4	35
1-5	23
1-6	21
2-3	25
2-4	31
2-5	37
2-6	17
3-4	20
3-5	41
3-6	23
4-5	24
4-6	16
5-6	21

**Задача 13.12.**

*Хименес Мендиета*

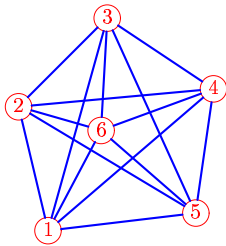
*Хулио Сэсар*



$V = [1, 4, 3, 2, 5, 6, 1].$   
 $Z = [V_3 \rightleftharpoons V_5], [V_5 \rightleftharpoons V_2],$   
 $[V_6 \rightleftharpoons V_2], [V_4 \rightleftharpoons V_5].$   
 $P = 68, 43, 75, 26.$

Ребро	$L_{i,j}$
1-2	26
1-3	42
1-4	37
1-5	23
1-6	21
2-3	22
2-4	32
2-5	37
2-6	16
3-4	20
3-5	39
3-6	21
4-5	24
4-6	19
5-6	21

**Задача 13.13.** *Хохрякова Анастасия*



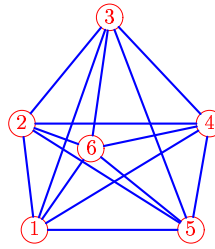
$V = [1, 2, 4, 5, 6, 3, 1].$   
 $Z = [V_3 \rightleftharpoons V_4], [V_4 \rightleftharpoons V_6],$   
 $[V_5 \rightleftharpoons V_2], [V_6 \rightleftharpoons V_2].$   
 $P = 65, 61, 76, 73.$

Ребро	$L_{i,j}$
1-2	24
1-3	41
1-4	41
1-5	28
1-6	21
2-3	23
2-4	37
2-5	39
2-6	16
3-4	24
3-5	40
3-6	21
4-5	23
4-6	22
5-6	23

**Задача 13.14.**

*Чинжанжа Жозе*

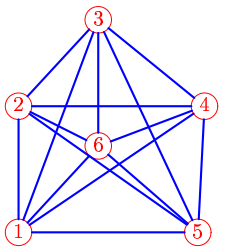
*Португал*



$V = [1, 4, 5, 3, 6, 2, 1].$   
 $Z = [V_3 \rightleftharpoons V_4], [V_4 \rightleftharpoons V_5],$   
 $[V_5 \rightleftharpoons V_6], [V_2 \rightleftharpoons V_3].$   
 $P = 85, 23, 76, 31.$

Ребро	$L_{i,j}$
1-2	20
1-3	42
1-4	38
1-5	29
1-6	18
2-3	26
2-4	35
2-5	37
2-6	14
3-4	27
3-5	43
3-6	25
4-5	20
4-6	23
5-6	24

**Задача 13.15.** *Шабанианборуджени С.*



$V = [1, 4, 3, 5, 6, 2, 1].$   
 $Z = [V_3 \rightleftharpoons V_5], [V_4 \rightleftharpoons V_6],$   
 $[V_5 \rightleftharpoons V_6], [V_6 \rightleftharpoons V_2].$   
 $P = 59, 77, 42, 67.$

Ребро	$L_{i,j}$
1-2	24
1-3	42
1-4	42
1-5	34
1-6	22
2-3	22
2-4	35
2-5	41
2-6	17
3-4	26
3-5	44
3-6	24
4-5	24
4-6	21
5-6	25