5 namų darbas (3 užd.). Atsiskaityti iki gegužės 19 d. (imtinai)

Uždavinys 1 (0.2 balo). Pritaikę Floyd–Warshall algoritmą raskite trumpiausių kelių ilgius (iš kiekvienos viršūnės į kiekvieną), kai duota atstumų tarp grafo viršūnių matrica (žr. skyrelį 4.3 iš vadovėlio algoritmu_analize.pdf). Taip pat raskite trumpiausią kelią (viršūnių seką) iš 1-os viršūnės į 6-ąją.

Variantai

1.
```
  0   7   9 Inf  14 Inf
  4   0  -2  10   1   7
  3   7   0 Inf   3  10
  1   8   9   0   1   9
  4 Inf   2   3   0 Inf
  2   2   5   4 Inf   0
```

2.
```
  0   8   6 Inf  15 Inf
  7   0  -2   9   9  13
  7   8   0   9   6   7
  9   8   7   0 Inf  15
  4 Inf   3   9   0 Inf
  4   8   2  10 Inf   0
```

3.
```
  0  13 Inf  10   9 Inf
  1   0  -2  10   8  12
  9  10   0   5 Inf  10
Inf   1   7   0   1 Inf
  5   4 Inf   9   0   9
  7   7   5 Inf   4   0
```

4.
```
  0 Inf  14  13  15 Inf
  4   0  -2   4  10   6
 10 Inf   0   9   5  10
Inf   8   1   0   6 Inf
Inf   7   7   4   0  15
  3   1   5 Inf  10   0
```

5.
```
  0  12   6 Inf   6 Inf
 10   0  -2   1   3   6
  7   3   0  10 Inf Inf
Inf   2   2   0   2  14
  6 Inf   5  10   0  10
  9   1 Inf   9   5   0
```

6.
```
  0    13   Inf    14    10   Inf
  1     0    -2     5     3    15
  5     8     0   Inf     7   Inf
  3   Inf     8     0     9     8
  9     8     4     6     0     9
  6    10   Inf     3     4     0
```

7.
```
  0     8     8   Inf    15   Inf
Inf     0    -2     5     8    11
  8     9     0     4     2     9
  5   Inf     9     0     4    13
  1     7     8   Inf     0   Inf
  1     6     4     8   Inf     0
```

8.
```
  0    12    14     7    12   Inf
  7     0    -2   Inf     1    12
Inf     6     0     8     6   Inf
  9     5     8     0   Inf     9
  2   Inf     9     3     0     6
  7     7   Inf     4     1     0
```

9.
```
  0     8    11     7     6   Inf
  1     0    -2     4     2    10
Inf     9     0     8     9   Inf
 10     4     3     0     6     9
  2   Inf     2     8     0     7
  2     5   Inf     4     2     0
```

10.
```
  0     7     8     6    15   Inf
 10     0    -2     5     8    14
  6    10     0     1     2    11
  2    10     7     0     7    11
  6     3     6   Inf     0     7
  6     9     6     6     2     0
```

11.
```
  0     6     8     9     9   Inf
  2     0    -2     2     6    11
Inf     7     0     7     8    11
  7    10     6     0     8     7
 10   Inf     6     6     0    10
  1     6     6     2     5     0
```

12.

```
  0   Inf    13     6    10   Inf
  8     0    -2    10    10     9
  9   Inf     0     3     7     9
  5   Inf     8     0     2   Inf
 10     5     1     4     0    15
  8     4     4   Inf    10     0
```

13.

```
  0   Inf     9     6     8   Inf
  7     0    -2     6    10    10
Inf     7     0     2     4     6
  6     9     1     0     5     8
 10     3   Inf     8     0     7
  5     5     1     3     2     0
```

14.

```
  0    11    15    12    14   Inf
  1     0    -2     4     8     9
  6    10     0   Inf     7   Inf
  6     9     6     0   Inf     8
  6    10    10     2     0    14
  4     4   Inf     3     9     0
```

15.

```
  0     8   Inf     9     7   Inf
  6     0    -2    10   Inf     8
  2     4     0     7     7    10
  5   Inf     3     0     3   Inf
Inf     9     8     3     0     6
  3     3     5   Inf     1     0
```

16.

```
  0   Inf    13     9     9   Inf
Inf     0    -2     5     7    12
  5     6     0   Inf     7    14
  9     1   Inf     0     1   Inf
Inf     7     6     3     0     9
  4     7     9   Inf     4     0
```

17.

```
  0    11    13    15     7   Inf
Inf     0    -2     6     4   Inf
  5     9     0   Inf     7    13
 10   Inf     5     0     9    12
  6     1     5   Inf     0     8
  7   Inf     8     7     3     0
```

18.

```
  0   14   11    9   14  Inf
  4    0   -2    7    6    6
  9  Inf    0   10   10   10
  8    7    9    0  Inf  Inf
  7    7    9  Inf    0   15
  8    1    5  Inf   10    0
```

19.

```
  0    7    6   11    8  Inf
Inf    0   -2    5    8    8
  8  Inf    0    7    4   12
  7    5    8    0    6    6
  6    7    6    8    0  Inf
  5    3    7    1  Inf    0
```

20.

```
  0    7   10   15  Inf  Inf
  8    0   -2  Inf   10    9
  6    3    0  Inf    2  Inf
Inf    8   10    0    5    7
  3    2    4    1    0   10
  6    4  Inf    2    5    0
```

21.

```
  0   11  Inf    6    6  Inf
  1    0   -2    2    7    7
  8    8    0    6    7   13
  1    7  Inf    0    3  Inf
  8    9    5    6    0   15
  5    2    8  Inf   10    0
```

22.

```
  0   13   11   15  Inf  Inf
  8    0   -2    8    9   15
Inf    3    0    5   10    6
  6  Inf    8    0    8    9
  1    2    8    4    0  Inf
  3   10    1    4  Inf    0
```

23.

```
  0  Inf   10   15    8  Inf
  9    0   -2  Inf    6    6
  3    6    0    8  Inf   10
  5    1    5    0    3    6
  2    1    9    6    0    6
Inf    1    5    1    1    0
```

24.
```
  0   12   13   10   13  Inf
  9    0   -2    5  Inf   10
  3    6    0    4  Inf   15
  8  Inf   10    0    8   13
  3    1    6  Inf    0   10
Inf    5   10    8    5    0
```

25.
```
  0   11   11    6    9  Inf
  2    0   -2   10    4   12
  7    4    0    4    2   12
  3    4    1    0  Inf   12
  2   10    1    9    0    7
  4    7    7    7    2    0
```

26.
```
  0   15  Inf   11   13  Inf
  5    0   -2   10    6   12
  4    5    0  Inf    4  Inf
  4    3   10    0    8   11
  2  Inf    7    1    0   13
  2    7  Inf    6    8    0
```

27.
```
  0    6    9   15  Inf  Inf
  6    0   -2    8    5  Inf
  8    2    0    9    4    9
Inf    6   10    0   10   14
  9    9   10    5    0   14
  6  Inf    4    9    9    0
```

28.
```
  0   14   13  Inf   11  Inf
 10    0   -2  Inf    2    9
Inf    6    0    1   10    8
  3    8   10    0    9    7
  2    5    3   10    0    7
Inf    4    3    2    2    0
```

29.
```
  0    8   14   11  Inf  Inf
  4    0   -2    9  Inf   11
  4    6    0    9    1   15
  6  Inf   10    0    6  Inf
  7    6    4  Inf    0   13
  5    6   10  Inf    8    0
```

30.

0	6	Inf	7	14	Inf
3	0	-2	1	10	Inf
3	Inf	0	8	8	15
3	4	8	0	5	6
3	7	8	Inf	0	15
8	Inf	10	1	10	0

Uždavinys 2 (0.2 balo). Duota atstumų tarp neorientuoto grafo viršūnių matrica. Raskite minimalų grafo karkasą (aprėpties medį), naudodami: (a) Kraskalo ir (b) Primo algoritmus (žr. skyrelį 4.4 iš vadovėlio algoritmu_analize.pdf).

Variantai

1.

0	2	16	10	3	6	5	7
2	0	6	Inf	12	18	14	14
16	6	0	15	9	7	1	10
10	Inf	15	0	8	5	9	15
3	12	9	8	0	15	Inf	13
6	18	7	5	15	0	15	14
5	14	1	9	Inf	15	0	18
7	14	10	15	13	14	18	0

2.

0	1	10	Inf	11	5	17	16
1	0	14	19	17	Inf	Inf	4
10	14	0	15	Inf	20	15	5
Inf	19	15	0	20	20	10	Inf
11	17	Inf	20	0	4	18	10
5	Inf	20	20	4	0	2	10
17	Inf	15	10	18	2	0	5
16	4	5	Inf	10	10	5	0

3.

0	12	15	19	6	19	7	2
12	0	2	6	15	Inf	13	2
15	2	0	5	12	8	18	Inf
19	6	5	0	16	2	Inf	15
6	15	12	16	0	14	1	20
19	Inf	8	2	14	0	12	16
7	13	18	Inf	1	12	0	15
2	2	Inf	15	20	16	15	0

4.
```
 0   2   4   1  18   1  15  12
 2   0  13 Inf  -1   3  18   3
 4  13   0   3  11  14  16   9
 1 Inf   3   0 Inf Inf  15   4
18  -1  11 Inf   0  18 Inf Inf
 1   3  14 Inf  18   0   3  20
15  18  16  15 Inf   3   0   1
12   3   9   4 Inf  20   1   0
```

5.
```
 0  20   6  11  12  20   5   3
20   0  17   2 Inf  15   8  16
 6  17   0   3  13  12  12  11
11   2   3   0   3  10  17 Inf
12 Inf  13   3   0 Inf Inf   4
20  15  12  10 Inf   0   1   6
 5   8  12  17 Inf   1   0  13
 3  16  11 Inf   4   6  13   0
```

6.
```
 0  12   2   5  16  19  19 Inf
12   0  14   3 Inf  15   1  12
 2  14   0   6   2   4  10  15
 5   3   6   0  20   6   9  15
16 Inf   2  20   0  11 Inf   2
19  15   4   6  11   0   7   6
19   1  10   9 Inf   7   0   5
Inf 12  15  15   2   6   5   0
```

7.
```
 0   2  12   5   4  20   6  16
 2   0   7  14   4  10 Inf   1
12   7   0  -1   8  11  16   9
 5  14  -1   0  13 Inf  17   3
 4   4   8  13   0  11  13   8
20  10  11 Inf  11   0  15  10
 6 Inf  16  17  13  15   0  12
16   1   9   3   8  10  12   0
```

8.
```
 0   4   3   1 Inf  16  11   5
 4   0  10  13   5  -1  16 Inf
 3  10   0   6  11   9  13   2
 1  13   6   0   1 Inf  18   6
Inf  5  11   1   0  13   1   3
16  -1   9 Inf  13   0   9  13
11  16  13  18   1   9   0   4
 5 Inf   2   6   3  13   4   0
```

9.

0	14	3	7	4	8	14	17
14	0	14	11	Inf	14	4	16
3	14	0	8	5	16	19	7
7	11	8	0	4	17	17	3
4	Inf	5	4	0	9	8	19
8	14	16	17	9	0	1	13
14	4	19	17	8	1	0	Inf
17	16	7	3	19	13	Inf	0

10.

0	5	15	11	8	12	15	9
5	0	13	12	8	6	17	6
15	13	0	9	13	14	Inf	20
11	12	9	0	Inf	7	12	2
8	8	13	Inf	0	13	10	11
12	6	14	7	13	0	4	18
15	17	Inf	12	10	4	0	14
9	6	20	2	11	18	14	0

11.

0	14	19	19	15	9	15	10
14	0	16	19	7	17	17	Inf
19	16	0	1	7	Inf	1	4
19	19	1	0	Inf	12	9	6
15	7	7	Inf	0	19	7	-1
9	17	Inf	12	19	0	Inf	17
15	17	1	9	7	Inf	0	16
10	Inf	4	6	-1	17	16	0

12.

0	10	15	16	20	3	17	18
10	0	13	17	16	5	-1	6
15	13	0	19	2	3	11	16
16	17	19	0	Inf	1	15	19
20	16	2	Inf	0	Inf	3	18
3	5	3	1	Inf	0	16	2
17	-1	11	15	3	16	0	Inf
18	6	16	19	18	2	Inf	0

13.

0	10	8	18	17	16	16	Inf
10	0	Inf	20	10	12	8	11
8	Inf	0	9	5	13	12	7
18	20	9	0	10	Inf	6	18
17	10	5	10	0	17	17	15
16	12	13	Inf	17	0	9	8
16	8	12	6	17	9	0	12
Inf	11	7	18	15	8	12	0

14.

0	4	3	Inf	14	3	Inf	19
4	0	13	12	13	Inf	18	1
3	13	0	16	4	2	2	6
Inf	12	16	0	10	7	20	20
14	13	4	10	0	4	14	16
3	Inf	2	7	4	0	7	11
Inf	18	2	20	14	7	0	14
19	1	6	20	16	11	14	0

15.

0	11	9	16	17	13	7	7
11	0	5	18	16	6	14	18
9	5	0	11	7	Inf	Inf	8
16	18	11	0	15	18	5	4
17	16	7	15	0	14	12	10
13	6	Inf	18	14	0	1	Inf
7	14	Inf	5	12	1	0	12
7	18	8	4	10	Inf	12	0

16.

0	2	20	Inf	17	18	Inf	7
2	0	15	18	15	6	8	16
20	15	0	13	13	5	13	14
Inf	18	13	0	7	Inf	6	4
17	15	13	7	0	14	17	18
18	6	5	Inf	14	0	15	Inf
Inf	8	13	6	17	15	0	9
7	16	14	4	18	Inf	9	0

17.

0	-1	8	19	17	11	3	Inf
-1	0	12	13	18	14	15	17
8	12	0	1	14	16	13	15
19	13	1	0	1	19	13	6
17	18	14	1	0	Inf	3	1
11	14	16	19	Inf	0	Inf	2
3	15	13	13	3	Inf	0	1
Inf	17	15	6	1	2	1	0

18.

0	10	-1	3	4	10	19	15
10	0	18	11	20	20	10	1
-1	18	0	Inf	10	11	5	Inf
3	11	Inf	0	1	7	2	6
4	20	10	1	0	5	Inf	8
10	20	11	7	5	0	17	7
19	10	5	2	Inf	17	0	13
15	1	Inf	6	8	7	13	0

19.

0	11	14	11	8	11	Inf	-2
11	0	17	6	1	16	6	Inf
14	17	0	14	15	2	9	9
11	6	14	0	Inf	10	1	5
8	1	15	Inf	0	5	11	17
11	16	2	10	5	0	19	4
Inf	6	9	1	11	19	0	17
-2	Inf	9	5	17	4	17	0

20.

0	Inf	16	Inf	7	10	12	5
Inf	0	10	15	11	14	11	5
16	10	0	3	16	19	14	14
Inf	15	3	0	6	8	14	Inf
7	11	16	6	0	Inf	15	2
10	14	19	8	Inf	0	14	9
12	11	14	14	15	14	0	15
5	5	14	Inf	2	9	15	0

21.

0	9	17	6	11	Inf	Inf	6
9	0	Inf	6	Inf	11	12	15
17	Inf	0	17	14	16	17	12
6	6	17	0	8	7	12	4
11	Inf	14	8	0	1	18	18
Inf	11	16	7	1	0	17	Inf
Inf	12	17	12	18	17	0	5
6	15	12	4	18	Inf	5	0

22.

0	12	12	17	5	3	10	6
12	0	Inf	1	19	5	16	Inf
12	Inf	0	3	Inf	11	1	11
17	1	3	0	2	19	12	12
5	19	Inf	2	0	10	Inf	19
3	5	11	19	10	0	19	18
10	16	1	12	Inf	19	0	20
6	Inf	11	12	19	18	20	0

23.

0	3	19	19	14	14	12	10
3	0	16	9	7	Inf	3	9
19	16	0	14	10	5	14	1
19	9	14	0	Inf	5	5	Inf
14	7	10	Inf	0	11	10	6
14	Inf	5	5	11	0	Inf	16
12	3	14	5	10	Inf	0	20
10	9	1	Inf	6	16	20	0

24.

0	Inf	4	Inf	20	2	9	Inf
Inf	0	13	14	19	5	4	17
4	13	0	5	14	3	7	11
Inf	14	5	0	7	Inf	6	18
20	19	14	7	0	18	1	12
2	5	3	Inf	18	0	Inf	16
9	4	7	6	1	Inf	0	5
Inf	17	11	18	12	16	5	0

25.

0	16	9	13	17	16	7	4
16	0	20	10	14	8	4	Inf
9	20	0	16	11	4	13	6
13	10	16	0	10	14	14	15
17	14	11	10	0	15	17	18
16	8	4	14	15	0	15	19
7	4	13	14	17	15	0	14
4	Inf	6	15	18	19	14	0

26.

0	15	16	3	14	9	12	7
15	0	1	16	Inf	9	13	10
16	1	0	19	12	4	6	20
3	16	19	0	2	15	15	13
14	Inf	12	2	0	Inf	4	Inf
9	9	4	15	Inf	0	Inf	12
12	13	6	15	4	Inf	0	19
7	10	20	13	Inf	12	19	0

27.

0	16	13	8	Inf	7	5	13
16	0	Inf	12	17	10	19	17
13	Inf	0	10	1	Inf	4	10
8	12	10	0	18	18	3	10
Inf	17	1	18	0	6	11	14
7	10	Inf	18	6	0	Inf	10
5	19	4	3	11	Inf	0	15
13	17	10	10	14	10	15	0

28.

0	19	8	17	3	3	11	13
19	0	4	11	7	6	11	1
8	4	0	Inf	Inf	3	20	12
17	11	Inf	0	8	4	3	4
3	7	Inf	8	0	5	5	4
3	6	3	4	5	0	11	11
11	11	20	3	5	11	0	15
13	1	12	4	4	11	15	0

29.

0	17	8	3	5	4	9	17
17	0	5	11	3	18	5	15
8	5	0	11	Inf	Inf	17	7
3	11	11	0	3	12	Inf	Inf
5	3	Inf	3	0	2	13	8
4	18	Inf	12	2	0	13	20
9	5	17	Inf	13	13	0	6
17	15	7	Inf	8	20	1	0

30.

0	9	13	13	17	10	7	9
9	0	11	10	9	5	18	20
13	11	0	8	15	5	5	Inf
13	10	8	0	Inf	19	5	2
17	9	15	Inf	0	Inf	17	16
10	5	5	19	Inf	0	Inf	6
7	18	5	5	17	Inf	0	10
9	20	Inf	16	2	6	10	0

Uždavinys 3 (0.1 balo). Duota neorientuoto grafo viršūnių gretimumo matrica. Nubraižykite grafą ir raskite jo viršūnių apėjimo tvarką vykdant (a) paiešką gilyn ir (b) paiešką platyn. Paieška prasideda iš pirmos viršūnės. Esant kelioms galimybėms visada pirmiausia imama viršūnė su mažiausiu numeriu.

Variantai

1.

0	1	1	0	0	0	0	0
1	0	0	1	1	0	1	1
1	0	0	1	0	0	1	1
0	1	1	0	1	0	0	0
0	1	0	1	0	0	0	0
0	0	0	0	0	0	1	0
0	1	1	0	0	1	0	1
0	1	1	0	0	0	1	0

2.

0	0	0	1	1	1	1	0
0	0	0	0	1	0	0	1
0	0	0	0	0	1	1	0
1	0	0	0	1	1	0	0
1	1	0	1	0	0	1	1
1	0	1	1	0	0	0	0
1	0	1	0	1	0	0	0
0	1	0	0	1	0	0	0

3.

```
0 1 0 1 0 1 0 1
1 0 0 0 1 0 1 1
0 0 0 1 0 0 0 0
1 0 1 0 0 1 0 0
0 1 0 0 0 0 1 0
1 0 0 1 0 0 1 0
0 1 0 0 1 1 0 0
1 1 0 0 0 0 0 0
```

4.

```
0 1 1 0 0 0 1 1
1 0 0 0 0 1 1 1
1 0 0 0 0 1 1 0
0 0 0 0 0 0 0 1
0 0 0 0 0 0 1 1
0 1 1 0 0 0 1 1
1 1 1 0 1 1 0 1
1 1 0 1 1 1 1 0
```

5.

```
0 0 1 0 0 1 0 0
0 0 1 0 0 1 1 1
1 1 0 1 1 0 0 0
0 0 1 0 0 1 0 1
0 0 1 0 0 1 1 1
1 1 0 1 1 0 1 1
0 1 0 0 1 1 0 1
0 1 0 1 1 1 1 0
```

6.

```
0 1 1 1 1 0 1 1
1 0 0 0 1 1 1 0
1 0 0 0 0 1 0 0
1 0 0 0 1 1 1 0
1 1 0 1 0 0 0 0
0 1 1 1 0 0 0 1
1 1 0 1 0 0 0 1
1 0 0 0 0 1 1 0
```

7.

```
0 0 1 0 1 0 1 0
0 0 1 0 0 0 0 0
1 1 0 0 1 0 0 0
0 0 0 0 0 0 0 1
1 0 1 0 0 0 0 0
0 0 0 0 0 0 0 0
1 0 0 0 0 0 0 0
0 0 0 1 0 0 0 0
```

8.

```
0 0 0 1 0 0 1 0
0 0 0 1 0 0 0 0
0 0 0 0 0 1 0 1
1 1 0 0 1 1 1 1
0 0 0 1 0 1 0 1
0 0 1 1 1 0 0 1
1 0 0 1 0 0 0 1
0 0 1 1 1 1 1 0
```

9.

```
0 1 0 1 0 0 1 0
1 0 0 1 0 0 1 0
0 0 0 0 1 1 0 1
1 1 0 0 0 0 0 1
0 0 1 0 0 0 0 0
0 0 1 0 0 0 1 0
1 1 0 0 0 1 0 0
0 0 1 1 0 0 0 0
```

10.

```
0 0 1 1 0 0 0 0
0 0 1 0 1 1 0 1
1 1 0 0 1 1 1 0
1 0 0 0 1 0 1 0
0 1 1 1 0 0 1 0
0 1 1 0 0 0 0 1
0 0 1 1 1 0 0 1
0 1 0 0 0 1 1 0
```

11.

```
0 1 1 1 1 1 1 0
1 0 1 0 0 0 0 0
1 1 0 1 0 1 0 0
1 0 1 0 1 0 0 0
1 0 0 1 0 0 0 0
1 0 1 0 0 0 0 1
1 0 0 0 0 0 0 0
0 0 0 0 0 1 0 0
```

12.

```
0 1 1 0 1 1 1 0
1 0 0 0 1 1 1 0
1 0 0 1 0 1 1 1
0 0 1 0 1 0 1 0
1 1 0 1 0 0 0 1
1 1 1 0 0 0 1 1
1 1 1 1 0 1 0 1
0 0 1 0 1 1 1 0
```

13.

```
0 0 0 0 1 0 0 1
0 0 1 0 0 1 0 1
0 1 0 1 0 1 0 0
0 0 1 0 1 1 0 1
1 0 0 1 0 0 1 1
0 1 1 1 0 0 0 1
0 0 0 0 1 0 0 1
1 1 0 1 1 1 1 0
```

14.

```
0 0 0 1 1 1 0 1
0 0 1 0 1 1 0 0
0 1 0 1 1 0 1 0
1 0 1 0 1 1 0 1
1 1 1 1 0 0 1 1
1 1 0 1 0 0 0 1
0 0 1 0 1 0 0 1
1 0 0 1 1 1 1 0
```

15.

```
0 1 1 0 0 1 0 1
1 0 1 1 0 1 0 1
1 1 0 1 0 1 1 0
0 1 1 0 0 0 0 1
0 0 0 0 0 0 1 1
1 1 1 0 0 0 1 0
0 0 1 0 1 1 0 1
1 1 0 1 1 0 1 0
```

16.

```
0 0 1 1 0 0 0 1
0 0 1 0 0 0 0 1
1 1 0 0 1 1 0 1
1 0 0 0 1 1 1 0
0 0 1 1 0 1 0 0
0 0 1 1 1 0 1 1
0 0 0 1 0 1 0 0
1 1 1 0 0 1 0 0
```

17.

```
0 0 1 1 1 1 0 0
0 0 1 0 1 1 0 0
1 1 0 0 1 0 0 0
1 0 0 0 0 1 0 0
1 1 1 0 0 1 0 0
1 1 0 1 1 0 0 0
0 0 0 0 0 0 0 1
0 0 0 0 0 0 1 0
```

18.

```
0 1 1 0 0 1 1 1
1 0 0 1 1 0 1 0
1 0 0 1 0 1 0 0
0 1 1 0 1 1 1 1
0 1 0 1 0 1 1 0
1 0 1 1 1 0 0 1
1 1 0 1 1 0 0 0
1 0 0 1 0 1 0 0
```

19.

```
0 0 0 1 0 1 1 1
0 0 1 1 1 1 1 1
0 1 0 1 1 1 0 0
1 1 1 0 0 1 0 1
0 1 1 0 0 0 1 1
1 1 1 1 0 0 0 1
1 1 0 0 1 0 0 1
1 1 0 1 1 1 1 0
```

20.

```
0 1 1 0 1 1 1 1
1 0 1 0 1 1 1 0
1 1 0 0 0 0 0 0
0 0 0 0 1 0 0 0
1 1 0 1 0 1 0 0
1 1 0 0 1 0 1 1
1 1 0 0 0 1 0 1
1 0 0 0 0 1 1 0
```

21.

```
0 1 1 1 0 0 1 0
1 0 0 0 1 0 1 1
1 0 0 0 0 1 0 1
1 0 0 0 1 1 0 1
0 1 0 1 0 0 0 0
0 0 1 1 0 0 0 1
1 1 0 0 0 0 0 1
0 1 1 1 0 1 1 0
```

22.

```
0 1 0 0 0 0 0 0
1 0 0 1 0 1 1 1
0 0 0 0 1 0 0 0
0 1 0 0 1 0 1 1
0 0 1 1 0 0 1 1
0 1 0 0 0 0 0 1
0 1 0 1 1 0 0 1
0 1 0 1 1 1 1 0
```

23.

```
0 1 1 0 1 1 1 1
1 0 0 1 0 1 1 0
1 0 0 0 1 1 1 1
0 1 0 0 1 1 1 1
1 0 1 1 0 0 0 0
1 1 1 1 0 0 1 1
1 1 1 1 0 1 0 1
1 0 1 1 0 1 1 0
```

24.

```
0 1 0 0 0 0 1 0
1 0 0 1 1 0 1 1
0 0 0 1 1 1 0 1
0 1 1 0 0 0 0 0
0 1 1 0 0 1 0 1
0 0 1 0 1 0 1 0
1 1 0 0 0 1 0 0
0 1 1 0 1 0 0 0
```

25.

```
0 0 1 0 1 0 0 0
0 0 0 1 1 0 1 0
1 0 0 1 1 0 1 0
0 1 1 0 0 0 1 1
1 1 1 0 0 0 1 1
0 0 0 0 0 0 1 1
0 1 1 1 1 1 0 1
0 0 0 1 1 1 1 0
```

26.

```
0 1 0 1 1 1 1 1
1 0 0 1 0 0 0 1
0 0 0 1 0 0 1 0
1 1 1 0 0 1 0 0
1 0 0 0 0 0 0 1
1 0 0 1 0 0 1 1
1 0 1 0 0 1 0 0
1 1 0 0 1 1 0 0
```

27.

```
0 0 1 0 0 1 1 1
0 0 1 0 0 1 0 0
1 1 0 0 0 1 1 1
0 0 0 0 0 1 0 0
0 0 0 0 0 0 0 1
1 1 1 1 0 0 0 1
1 0 1 0 0 0 0 0
1 0 1 0 1 1 0 0
```

28.

```
0 1 0 0 1 1 1 1
1 0 1 1 0 0 1 0
0 1 0 0 1 0 1 1
0 1 0 0 0 0 0 1
1 0 1 0 0 0 1 0
1 0 0 0 0 0 0 1
1 1 1 0 1 0 0 0
1 0 1 1 0 1 0 0
```

29.

```
0 1 1 1 0 0 1 0
1 0 1 0 0 0 1 1
1 1 0 0 1 0 0 1
1 0 0 0 1 0 1 1
0 0 1 1 0 0 1 0
0 0 0 0 0 0 0 0
1 1 0 1 1 0 0 0
0 1 1 1 0 0 0 0
```

30.

```
0 1 0 0 1 0 0 1
1 0 1 1 0 0 1 0
0 1 0 1 1 1 1 1
0 1 1 0 0 1 0 0
1 0 1 0 0 1 1 1
0 0 1 1 1 0 1 1
0 1 1 0 1 1 0 1
1 0 1 0 1 1 1 0
```