

Problem I. Nondeterministic Finite Automaton

Input file: *standard input*
Output file: *standard output*
Time limit: 1 second
Memory limit: 256 mebibytes

A *nondeterministic finite automaton* (NFA) is defined as $G = (V, E_0, E_1, v_0, F)$, where (V, E_0) and (V, E_1) form two directed graphs, $v_0 \in V$ is the initial vertex, and $F \subseteq V$ is the set of accepting vertices.

We say that NFA G recognizes a 01-string $s = s_1 s_2 \dots s_n$ if and only if there exists a sequence of vertices $u_0, u_1 \dots u_n$ such that $u_0 = v_0$, the edges $\langle u_{i-1}, u_i \rangle \in E_{s_i}$ for all $i = 1, 2, \dots, n$, and $u_n \in F$.

Define $L = L(G)$ as the minimal non-negative integer such that there exists a string s of length L which G can not recognize. If no such L exists for G , we define $L(G) = -1$.

You are given n , and you need to construct an NFA $G = (V, E_0, E_1, v_0, F)$ such that $|V| = n$ and $L(G)$ is large enough. The exact constraints on n and $L(G)$ are at the bottom.

Input

The first line of input contains an integer n .

Output

Output the NFA G you found.

Suppose the vertices in V are labeled by integers $0, 1, \dots, n - 1$.

Firstly, output E_0 in the following format: The first line contains an integer $e = |E_0|$ ($0 \leq e \leq 1000$). Then e lines follow. The i -th of them contains two integers x_i and y_i ($0 \leq x_i, y_i < n$), indicating that there is an edge $\langle x_i, y_i \rangle \in E_0$. Note that $x_i = y_i$ is allowed.

Secondly, print E_1 in the same format as E_0 .

Next, print a line with the integer k .

After that, print a line containing k integers $f_1, f_2, \dots, f_k$, indicating that $F = \{f_1, f_2, \dots, f_k\}$.

Example

Below is an example that **does not** appear in the tests. Here, $L(G) = 4$, because G cannot recognize the string "1010".

standard input	standard output
3	2
	0 0
	2 2
	4
	0 1
	1 0
	0 2
	2 1
	3
	0 1 2

Note

This problem has two tests: $n = 6$ and $n = 20$.

When $n = 6$, your output's $L(G)$ should be strictly greater than 18.

When $n = 20$, your output's $L(G)$ should be strictly greater than 400.