Challenge NPC

Input file:	`standard input`
Output file:	`standard output`
Time limit:	1 second
Memory limit:	256 megabytes

Sugar is a SAT-based Constraint Solver. Constraint Satisfaction Problem (CSP) is encoded to a Boolean CNF formula, and it is solved by an external SAT solver.

— Sugar: a SAT-based Constraint Solver

It is well known that finding the chromatic number of a graph is an NPC problem. However, little tarjen claims that he can solve this problem with a simple greedy algorithm:

Color the vertices from 1 to n. For each vertex u, assign the minimum excluded (MEX) positive integer of $\{col_v | v < u, (v, u) \in E\}$ to col_u, where E is the edge set of the graph. For example, $\text{MEX}(\{1, 1, 2, 4\}) = 3$, $\text{MEX}(\varnothing) = 1$.

You want to show that this greedy algorithm is completely wrong. Construct a graph such that you can color this graph in c colors, but the greedy algorithm will color this graph with at least $c + k$ colors.

Input

The only line contains one integer k ($1 \le k \le 500$).

Output

The first line contains three integers n, m, and c ($1 \le n \le 1024, 0 \le m \le \frac{n(n-1)}{2}, 1 \le c \le n$) , representing the number of vertices, the number of edges, and the number of colors you can use to color this graph.

The following line contains n integers $col_1, col_2 \dots col_n$ ($1 \le col_i \le c$), representing your coloring.

The following m lines each contain two integers u, v ($1 \le u, v \le n$, $u \ne v$, $col_u \ne col_v$), representing an edge in your graph.

If there are multiple solutions, output any.

Example

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