Dense Planting

Input file:	`standard input`
Output file:	`standard output`
Time limit:	2 seconds
Memory limit:	1024 megabytes

You are given an integer K. Construct an undirected graph that satisfies the following conditions:

- The number of vertices N is between 1 and 100 (inclusive).
- The number of edges M is at most 1000.
- Assuming all edges are distinguishable, there are exactly K spanning trees in the graph. In other words, among the 2^M ways of choosing some edges from the M edges and removing the rest, there are exactly K ways such that the remaining edges form a tree.

Input

The input is given from Standard Input in the following format:

K

- K is an integer.
- $1 \leq K \leq 10^9$

Output

Output an undirected graph that satisfies the conditions in the following format. If there are multiple graphs that satisfy the conditions, you may output any of them.

N M
U_1 V_1
$\vdots$
U_M V_M

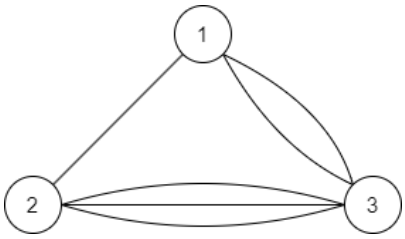
U_i, V_i $(1 \leq i \leq M)$ represent that the i-th edge connects vertices U_i and V_i.

Examples

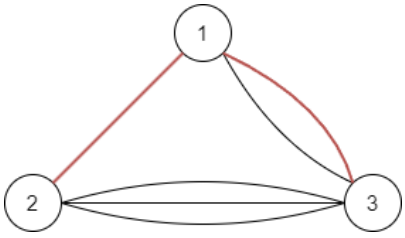
standard input	standard output
11	3 6 1 2 1 3 1 3 2 3 2 3 2 3
54	4 10 1 2 2 3 2 3 2 3 3 4 3 4 3 4 4 1 4 1 4 1

Note

In the first example, the output graph is represented by the following diagram:



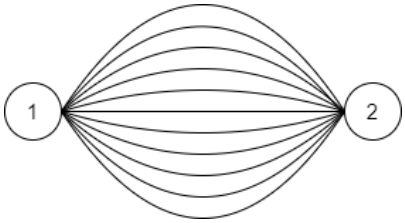
For example, choosing the following 2 edges forms a spanning tree of this graph:



- A spanning tree consisting of edges $1-2$ and $1-3$ can be selected in 2 ways.
- A spanning tree consisting of edges $1-2$ and $2-3$ can be selected in 3 ways.
- A spanning tree consisting of edges $1-3$ and $2-3$ can be selected in 6 ways.

Therefore, there are a total of 11 spanning trees.

Additionally, the following graph also has 11 spanning trees, so the following output is also considered correct:



standard output
2 11 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2