Task Konstrukcija

Let G be a directed acyclic graph. If $c_1, c_2, c_3, \ldots c_n$ are distinct vertices of G such that there is a path from c_1 to c_2, there is a path from c_2 to c_3, . . . and there is a path from c_{n-1} to c_n, we say that array $C = (c_1, c_2, c_3, \ldots c_n)$ is an ordered array starting at c_1 and ending at c_n. Note that between neighbouring elements c_i and c_{i+1} of ordered array C it isn't necessary to exist a direct edge, it is enough for the path to exist from c_i to c_{i+1}.

For this definition of an ordered array $C = (c_1, c_2, c_3, \ldots c_n)$, we define its length $len(C) = n$. Therefore, the length of an ordered array is equal to the number of vertices it holds. Note that the ordered array can have a length of 1 when holding a single vertex which represents both its beginning and its end.

Also, for an ordered array $C = (c_1, c_2, c_3, \ldots c_n)$ we can define its sign as $sgn(C) = (-1)^{len(C)+1}$. For vertices x and y of G, let's denote with $S_{x,y}$ a set of all ordered arrays that start in x and end in y.

Finally, we define the tension between nodes x and y as $tns(x, y) = \sum_{C \in S_{x,y}} sgn(C)$. Therefore, the tension between nodes x and y equals the sum of signs of all ordered arrays that start in x and end in y.

An integer K is given. Your task is to construct a directed acyclic graph with **at most 1000** vertices and **at most 1000** edges for which $tns(1, N) = K$ holds. Number N in the previous expression denotes the number of vertices in a graph. Vertices of a graph should be indexed using positive integers from 1 to N.

Input

The first line contains an integer K ($|K| \leq 10^{18}$) from the task description.

Output

In the first line you should output the number of vertices and the number of edges of the constructed graph. Let's denote the number of vertices of that graph with N ($1 \leq N \leq 1000$), and the number of edges with M ($0 \leq M \leq 1000$).

In the i-th of the next M lines you should output two distinct integers X_i and Y_i ($1 \leq X_i, Y_i \leq N$), which represent the i-th edge which is directed from vertex with index X_i towards vertex with index Y_i. Each edge must appear only once in the output.

Also, the absolute value of tension between each two nodes in the graph must be less or equal to 2^{80}.

If there are multiple solutions, output any of them.

Scoring

Subtask	Score	Constraints
1	15	$1 \leq K < 500$
2	15	$-300 < K \leq 1$
3	20	$\|K\| < 10000$
4	60	No additional constraints.

Examples

input	input	input
0	1	2
output	**output**	**output**
6 6 1 4 1 5 4 3 5 3 3 2 2 6	1 0	6 8 1 2 1 3 1 4 1 5 5 4 2 6 3 6 4 6

Clarification of the first example: The constructed graph has 6 vertices. Ordered arrays that start in 1 and end in 6 are: $(1,6)$, $(1,4,6)$, $(1,5,6)$, $(1,3,6)$, $(1,2,6)$, $(1,4,3,6)$, $(1,4,2,6)$, $(1,5,3,6)$, $(1,5,2,6)$, $(1,3,2,6)$, $(1,4,3,2,6)$, $(1,5,3,2,6)$. Their lengths are (in order): $1,2,2,2,2,3,3,3,3,3,4,4$, so their signs are $-1,1,1,1,1,-1,-1,-1,-1,-1,1,1$. Therefore, the tension between 1 and 6 is equal to $-1+1+1+1+1-1-1-1-1-1+1+1=0$.