Problem D. Divisions

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

Nami will get a sequence S of n positive integers $S_1, S_2, \ldots, S_n$ soon and she wants to divide it into two subsequences.

At first, Nami has two empty sequences S_A and S_B. She will consider each integer in S in order, and append it to either S_A or S_B. Nami calls sequences S_A, S_B she gets in the end a division of S. Note that S_A and S_B are different and subsequences can be empty, so there are 2^n ways to divide S into S_A and S_B, which means there are 2^n possible divisions of S.

For a division, supposing that there are n_A integers in S_A and n_B integers in S_B, Nami will call it a great division if and only if the following conditions hold:

- $S_{A,1} \le S_{A,2} \le \cdots \le S_{A,n_A}$
- $S_{B,1} \ge S_{B,2} \ge \cdots \ge S_{B,n_B}$

Nami defines the greatness of S as the number of different great divisions of S. Now Nami gives you a magic number k, and your task is to find a sequence S with the greatness equal to k for her.

Note that the length of S should not exceed 365 and the positive integers in S should not exceed 10^8.

If there are several possible sequences, you can print any of them. If there is no sequence with the greatness equal to k, print -1.

Input

A single line contains an integer k ($0 \le k \le 10^8$) – the magic number from Nami.

Output

If there is no sequence with the greatness equal to k, print -1 in a single line.

Otherwise, in the first line, print the length n ($1 \le n \le 365$) of the sequence S.

In the second line, print n positive integers $S_1, S_2, \ldots, S_n$ ($1 \le S_i \le 10^8$) – the sequence for Nami.

Examples

standard input	standard output
1	6 1 1 4 5 1 4
2	1 1

Note

For the sequence $S = 1, 1, 4, 5, 1, 4$, it can be shown that the only great division of S is:

- $S_A = 1, 1, 4, 4$, $S_B = 5, 1$

For the sequence $S = 1$, it can be shown that all the divisions of S are great:

- $S_A = 1$, S_B is empty
- S_A is empty, $S_B = 1$