Xuora
Problem ID: xuora

Given a single integer n, find the minimum possible integer m such that we can choose n distinct positive integers less than or equal to m with bitwise XOR equal to 0.

Input

Your program will receive input from standard input.

You will receive a single line containing the integer n.

Output

Your program should write to standard output.

On the first line, print a single integer m, the answer to the problem.

On the second line, print $m - n$ space-separated integers which are the integers that are **not** chosen as part of the n distinct numbers with bitwise XOR equal to 0. If there are multiple possible answers, print any one of them.

It is guaranteed that for the given test cases, $m - n \leq 2 \cdot 10^5$.

Constraints

- $3 \leq n \leq 10^{18}$

Subtasks

You will get points for each subtask when you pass all of the testcases of the subtask.

1. $3 \leq n \leq 20$ (23 points)
2. $3 \leq n \leq 500$ (21 points)
3. $3 \leq n \leq 10^{18}$ (56 points)

Sample Explanation

In Sample Input 1, the smallest possible m is 5, and we can choose 4 integers $\{2, 3, 4, 5\}$ with bitwise XOR equal to 0, and leave $\{1\}$.

In Sample Input 2, the smallest possible m is 9, and we can choose 5 integers $\{3, 4, 6, 8, 9\}$ with bitwise XOR equal to 0, and leave $\{1, 2, 5, 7\}$.

Sample Input 1	Sample Output 1
4	5 1

Sample Input 2	Sample Output 2
5	9 1 2 5 7