Factorial Boxes

1 Problem Statement

In order to continue growing his students' love for CP, Ryan has decided to order a new stock of brand new CP books. The books have been printed and need to be moved to the library in boxes. Ryan's favourite delivery service (and the only one he'll use) only delivers boxes in fixed sizes. Specifically, a box of type n can hold up to $n!$ books.

$$n! = 1 \times 2 \times 3 \times ... \times (n-1) \times n$$

Ryan wants to minimise the number of boxes he needs. For example, with 17 books, he can use

1. 2 boxes of $3! = 6$
2. 2 boxes of $2! = 2$
3. 1 box of $1! = 1$

Which is the minimum number of boxes he needs to use to store 17 books. In general, for N books find p integers $a_1, a_2...a_p$ non-negative integers with $a_p > 0$ such that

$$N = a_1 \times 1! + a_2 \times 2! + ... + a_p \times p!$$

such that $a_i + a_2 + ... + a_p$ is minimised.

2 limits

$1 <= N <= 500000000$

3 Input

Input consists of 1 integer, N.

4 Output

The first line of output should consist of 1 integer p. The next line of input should contain p space-separated integers, containing integers $a_1, a_2...a_p$.

5 Sample Input

17

6 Sample Output

3
1 2 2