

Problem J. Two Rectangles

Input file: `two-rectangles.in`
Output file: `two-rectangles.out`
Time limit: 2 seconds
Memory limit: 256 mebibytes

In this problem, you have to find two rectangles with the given total area which have the minimum possible total perimeter.

Recall that the area of a rectangle having sides of length m and n is $m \cdot n$, and its perimeter is $2 \cdot (m + n)$.

Given an integer $s \geq 2$, consider two rectangles with positive integer lengths of sides such that the sum of their areas is s . What is the minimum possible sum of their perimeters?

Formally, choose four positive side lengths a , b , c and d so that the total area $a \cdot b + c \cdot d$ equals s and the total perimeter $2 \cdot (a + b) + 2 \cdot (c + d)$ is minimum possible.

Input

The first line of input contains one integer s ($2 \leq s \leq 10^{18}$).

Output

On the first line, print one number: the minimum possible total perimeter. On the second line, print a and b , the side lengths of the first rectangle, separated by a space. On the third line, print c and d , the side lengths of the second rectangle, also separated by a space. If there is more than one possible answer, print any one of them.

Examples

<code>two-rectangles.in</code>	<code>two-rectangles.out</code>
5	12 1 1 2 2
8	16 3 2 1 2

Explanations

In the first example, the only optimal answer is to choose squares of sizes 1×1 and 2×2 . They can be printed in any order.

In the second example, there is another optimal answer: instead of rectangles 1×2 and 2×3 , we can choose two squares of size 2×2 each.