Problem D. Determining Pythagorean Triples

Input file:	standard input
Output file:	standard output
Time limit:	2 seconds
Memory limit:	128 megabytes

A Pythagorean triple is a set of three positive integers, a,b and c, for which:

$$a^2 + b^2 = c^2$$

A Pythagorean triple is a Primitive Pythagorean Triple (PPT) if a, b and c have no common factors. Write a program which takes as input a positive integer, n, and outputs a count of:

- The number of different PPTs in which n is the hypotenuse (c).

- The number of non-primitive Pythagorean triples in which n is the hypotenuse (c).

- The number of different PPTs in which n is one of the sides (a or b).

- The number of non-primitive Pythagorean triples in which n is the one of the sides (a or b).

For the same a, b, c: b, a, c is the "same" as a, b, c (i.e it only counts once). Non-primitive Pythagorean triples are Pythagorean triples which are not PPT.

For example, in the case of $n = 65$, the following are the cases for each of the criteria above:

1. 33, 56, 65; 63, 16, 65

2. 39, 52, 65; 25, 60, 65

3. 65, 72, 97; 65, 2112, 2113

4. 65, 420, 425; 65, 156, 169

Input

Input consists of a single line containing a single non-negative decimal integer n, $(3 \leq n \leq 2500)$.

Output

There is one line of output. The single output line contains four decimal integers:

The first is the number of different PPTs in which n is the hypotenuse (c).

The second is the number of non-primitive Pythagorean triples in which n is the hypotenuse (c).

The third is the number of different PPTs in which n is the one of the sides (a or b).

The fourth is the number of non-primitive Pythagorean triples in which n is the one of the sides (a or b).

Examples

standard input	standard output
65	2 2 2 2
64	0 0 1 4
2023	0 2 2 5