



D • Counting Pythagorean Triples

Time Limit: 2 seconds

Memory Limit: 128MB

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:

1. The number of different *PPTs* in which n is the hypotenuse (c).
2. The number of *non-primitive Pythagorean triples* in which n is the hypotenuse (c).
3. The number of different *PPTs* in which n is one of the sides (a or b).
4. 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).



The 2022 Greater NY Regional Contest

Sample 1:

Sample Input	Sample Output
65	2 2 2 2

Sample 2:

Sample Input	Sample Output
64	0 0 1 4

Sample 3:

Sample Input	Sample Output
2023	0 2 2 5