Problem 7: Squarish Numbers

Overview

Each year, on the first Saturday of December, several thousand college students will compete in the William Lowell Putnam Mathematical Competition\(^1\). Basically, the competition is a six-hour exam consisting of two three-hour sessions with six problems each. Each problem is worth up to ten points. And yet, the median score is often below three (out of one hundred twenty!)

Problem

On this year’s Putnam Exam, Problem B2 started with the following definition: “Define a positive integer \(n\) to be squarish if either \(n\) is itself a perfect square or the distance from \(n\) to the nearest perfect square is a perfect square. For example, 2016 is squarish because the nearest perfect square to 2016 is \(45^2=2025\) and \(2025-2016=9\) is a perfect square. (Of the positive integers between 1 and 10, only 6 and 7 are not squarish.)”

In this problem, you will be asked to find the number of squarish numbers in a range.

Input

The input to this problem consists of a single line of text containing two positive integers – both less than 2,000,000. The first integer will always be less than or equal to the second.

Output

The output consists of a single line of text (formatted as in the examples) that shows the number of squarish numbers contained in the range specified by the input. Do not worry about grammar in the case of a single squarish number falling in the range.

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\(^1\) To learn more about the exam, visit https://en.wikipedia.org/wiki/William_Lowell_Putnam_Mathematical_Competition
Example 1

Input
1 10

Output
There are 8 squarish numbers in the range 1 to 10.

Example 2

Input
20 80

Output
There are 23 squarish numbers in the range 20 to 80.

Example 3

Input
834 836

Output
There are 0 squarish numbers in the range 834 to 836.