

## 20 Happy numbers

8 points

### Introduction

We all want to be happy and numbers are no different. But, mathematically, a happy number complies with the following:

In order to know if a number is happy, you have to replace the number by the sum of the squares of its digits and repeat the process until the number equals 1 (where it will stay). In this case, it is a happy number. If it loops endlessly in a cycle, never reaching 1, then it is an unhappy number (or sad number).

For example, 19 is happy, as the associated sequence is:

$$1^2 + 9^2 = 82$$

$$8^2 + 2^2 = 68$$

$$6^2 + 8^2 = 100$$

$$1^2 + 0^2 + 0^2 = 1$$

Write a program that, given a number  $n$ , finds all happy numbers smaller than  $n$ .

### Input

The input of the program is a positive integer.

20

### Output

The program must find all happy numbers smaller than the provided one.

1

7

10

13

19

