UVa Online Judge

11120 Very Funny, Mr. Feynman!

The digital expansion of the irrational number π has since long attracted all kinds of people who try to find regularities, oddities and curiosa in it. There even are people who try to memorise as many digits as possible, and competitions on various levels are held. If you look at the first thousand or so digits of π, you might notice the six consecutive nines, starting at place 762 ([1]):

3.
14159265358979323846264338327950288419716939937510582097494459230781640628620899862803482534211
70679821480865132823066470938446095505822317253594081284811174502841027019385211055596446229489
54930381964428810975665933446128475648233786783165271201909145648566923460348610454326648213393
60726024914127372458700660631558817488152092096282925409171536436789259036001133053054882046652
13841469519415116094330572703657595919530921861173819326117931051185480744623799627495673518857
52724891227938183011949129833673362440656643086021394946395224737190702179860943702770539217176
29317675238467481846766940513200056812714526356082778577134275778960917363717872146844090122495
34301465495853710507922796892589235420199561121290219608640344181598136297747713099605187072113
4**999999**837297804995105973173281609631859502445945534690830264252230825334468503526193118817101 0
00313783875288658753320838142061717766914730359825349042875546873115956286388235378759375195778
18577805321712268066130019278766111959092164201989380952572010654858632788659361533818279682303
01952035301852968995773622599413891249721775283479131515574857242454150695950829533116861727855
88907509838175463746493931925506040092770167113900984882401 2...

To π-memorisers and other curiosa seekers, this repeat of nines is known as the Feynman point. Wikipedia ([2]):

> The name refers to a remark made by the physicist Richard Feynman, expressing a wish to memorise the digits of π as far as that point so that when reciting them, he would be able to end with "... nine, nine, nine, nine, nine, nine, and so on."

To appreciate the oddity of this repeat of six digits so early in the sequence, you may like to know that the first repeats of six for the digits 0 to 8 occur at positions 1699927, 255945, 963024, 710100, 828499, 244453, 252499, 399579 and 222299 respectively ([3]).

The Problem

In this problem we will seek repeats in an other class of irrational numbers: the square roots of primes upto one million. More specific, we will try to find the first occurence of a repeat of three (or more) digits in the decimal expansion of the square root.

The number of digits that occur before the first repeat of three is called the prefix length. Among the square roots of primes, there are quite a few that start off with three the same digits and thus have a prefix length of zero; $\sqrt{79} = 8.8881944\ldots$, $\sqrt{1109} = 33.3016516\ldots$ and $\sqrt{1973} = 44.4184646\ldots$ being the first. We ignore the decimal dot, so $\sqrt{723407} = 850.533362\ldots$ has a prefix length of 4 before the digit 3 repeats three times. Within the range specified, $\sqrt{581149}$ has the longest prefix: 1387 digits precede the first repeat of three.

Input

A number of cases each on a line by itself. Each case consists of one number: a prime number smaller than 1000000. The number '0' terminates the input and should not be processed.

Output

For each prime in the input, one line containing three numbers: the prime, the prefix length and the repeated digit, separated by one space.

Notes:

[1] http://3.14159265358979323846264338327950288419716939937510582097494459 2.com
[2] http://en.wikipedia.org/wiki/Feynman_point
[3] http://mathworld.wolfram.com/PiDigits.html

Sample Input

```
79
723407
581149
0
```

Sample Output

```
79 0 8
723407 4 3
581149 1387 6
```