

**2021/2022 SOUTHERN CALIFORNIA REGIONAL  
INTERNATIONAL COLLEGIATE PROGRAMMING CONTEST**

**Problem ?  
Subprime**

An open math problem: is every non-negative integer a substring of at least one prime number when expressed in base ten?

Integer  $a$  is a substring of integer  $b$  if it is equal to an integer derived from  $b$  by deleting zero or more consecutive digits of the most and least significant digits of  $b$ . For example, 123 is a substring of: 123, 56123, 123789, 50182312365, 41237912123.

Your team's job is to see how many primes, in a given range, contain a substring of a given integer. We are interested in substrings that may include significant leading zeroes.

The input is a series of 1 to 25 lines containing test cases. Each test case line contains two positive integers  $i, j$  in base ten and a string  $k$  separated by spaces.  $i$  and  $j$  are indexes into the list of primes in ascending order, with 2 being the first prime, and  $k$  is a string of at most six digits which is the integer substring to be searched for.  $k$  may be zero or have significant leading zeroes. The last test case line is followed by a line with  $i, j$ , and  $k$  equal to zero.

$$i \leq j$$

$$1 \leq i, j \leq 100000$$

For example, consider the input 1 10 9. This is a search from the first (2) through the tenth (29) primes for any containing the substring 9. The answer is 2 (19 and 29).

A given integer substring may occur more than once in a prime, but just count that as one match.

For each test case print on one line the count of the number of primes containing the substring.

*Sample Input*

```
1 10 9
1 10000 389
500 1000 43
1 100 8
8000 9000 395
50000 80000 572
90000 100000 9999
1 100000 37502
1 1000 000
1 1000 00
4509 12345 9999
0 0 0
```

**Problem ?**  
**Subprime (continued)**

*Output for the Sample Input*

2  
45  
26  
8  
0  
63  
5  
1  
0  
10  
4