

# 11<sup>th</sup> South African Regional ACM Collegiate Programming Contest

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## Problem 3 - Red Balloon Sophie

### Problem Description

A prime number is an integer greater than 1 that is only divisible by 1 and itself. The first five primes are 2, 3, 5, 7, 11. A Sophie Germain prime is an integer  $p$  such that both  $p$  and  $2p + 1$  are prime. The first five Sophie Germain primes are 2, 3, 5, 11, 23.

Your task is to count the number of Sophie Germain primes there are between 1 and  $N$  inclusive, for various  $N$ .

### Input

The input consists of multiple test cases. Each test case contains a single line containing the integer  $N$ . The end of input is indicated by a line containing the integer 0.

There will be at most 20 test cases, and the value of  $N$  in each test case will be between 1 and 10 000, inclusive.

### Output

For each test case, output the number of Sophie Germain primes that are between 1 and  $N$ , inclusive, on a separate line.

### Sample Input

23  
4  
100  
0

### Sample Output

5  
2  
10

### Time Limit

5 seconds