

# Problem K. Goldbach's Conjecture

**Time limit** 4000 ms

**Mem limit** 65536 kB

Goldbach's conjecture is one of the oldest unsolved problems in number theory and in all of mathematics. It states:

Every even integer, greater than 2, can be expressed as the sum of two primes [1].

Your task is to check whether this conjecture holds for integers up to  $10^7$ .

## Input

Input starts with an integer  $T$  ( $\leq 300$ ), denoting the number of test cases.

Each case starts with a line containing an integer  $n$  ( $4 \leq n \leq 10^7$ ,  $n$  is even).

## Output

For each case, print the case number and the number of ways you can express  $n$  as sum of two primes. To be more specific, we want to find the number of  $(a, b)$  where:

- Both  $a$  and  $b$  are prime,
- $a + b = n$  and
- $a \leq b$ .

## Sample

Input	Output
2 6 4	Case 1: 1 Case 2: 1

## Note

[1] An integer is said to be prime, if it is divisible by exactly two different integers. First few primes are  $\{2, 3, 5, 7, 11, 13, \dots\}$ .