1259 – Goldbach's Conjecture

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].

Now your task is to check whether this conjecture holds for integers up to $\mathbf{10^7}$.

Input

Input starts with an integer **T (≤ 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

1) Both **a** and **b** are prime
2) **a + b = n**
3) **a ≤ b**

Sample Input	Output for Sample Input
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, ...