1124 - Goldbach's Conjecture

Description

In 1742, Christian Goldbach, a German amateur mathematician, sent a letter to Leonhard Euler in which he made the following conjecture: Every even number greater than 4 can be written as the sum of two odd prime numbers. For example: 8 = 3 + 5. Both 3 and 5 are odd prime numbers. 20 = 3 + 17 = 7 + 13. 42 = 5 + 37 = 11 + 31 = 13 + 29 = 19 + 23. Today it is still unproven whether the conjecture is right. (Oh wait, I have the proof of course, but it is too long to write it on the margin of this page.) Anyway, your task is now to verify Goldbach's conjecture for all even numbers less than a million.

Input specification

The input will contain one or more test cases. Each test case consists of one even integer **n** with **6 <= n < 10^6**. Input will be terminated by a value of **0 for n**.

Output specification

For each test case, print one line of the form **n = a + b**, where **a** and **b** are odd primes. Numbers and operators should be separated by exactly one blank like in the sample output below. If there is more than one pair of odd primes adding up to **n**, choose the pair where the difference **b - a** is maximized. If there is no such pair, print a line saying "*Goldbach's conjecture is wrong.*"

Sample input

```
8
20
42
0
```

Sample output

```
8 = 3 + 5
20 = 3 + 17
42 = 5 + 37
```

Hint(s)

Source	Xtreme Programming Problem Archive
Added by	**ejaltuna**
Addition date	2011-10-13 17:35:12.0
Time limit (ms)	1000
Test limit (ms)	1000
Memory limit (kb)	131072
Output limit (mb)	64
Size limit (bytes)	100000
Enabled languages	C C# C++ Java Pascal Perl PHP Python Ruby Text