Goldbach's Second Conjecture

locked

by *IEEEXtreme*

An integer $p > 1$ is called a prime if its only divisors are *1* and p itself. A famous conjecture about primes is Goldbach's conjecture, which states that

> Every *even* integer greater than *2* can be expressed as the sum of *two* primes.

The conjecture dates back to the year 1742, but still no one has been able to come up with a proof or find a counterexample to it. We considered asking you prove it here, but realized it would be too easy. Instead we present here a more difficult conjecture, known as Goldbach's second conjecture:

> Every *odd* integer greater than *5* can be expressed as the sum of *three* primes.

In this problem we will provide you with an odd integer N greater than 5, and ask you to either find three primes p_1, p_2, p_3 such that $p_1 + p_2 + p_3 = N$, or inform us that N is a counterexample to Goldbach's second conjecture.

Input Format

The input contains a single odd integer $5 < N \leq 10^{18}$.

Output Format

Output three primes, separated by a single space on a single line, whose sum is N. If there are multiple possible answers, output any one of them. If there are no possible answers, output a single line containing the text "*counterexample*" (without quotes).

Sample Input

```
65
```

Sample Output

```
23 31 11
```

Explanation

In the sample input N is 65. Consider the three integers 11, 23, 31. They are all prime, and their sum is 65. Hence they form a valid answer. That is, a line containing "11 23 31", "23 31 11", or any permutation of the three integers will be accepted. Other possible answers include "11 37 17" and "11 11 43".

Max Score: 92pts dynamic

Submissions: 573

Max Score: 92

Difficulty: Hard

More

Current Buffer (saved locally, editable) BASH

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1
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Upload Code as File

Test against custom input

Run Code

Submit Code