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IEEEExtreme 10.0 > Goldbach's Second Conjecture

Goldbach's Second Conjecture

by IEEEExtreme

Problem

Submissions

Leaderboard

Discussions

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 " $11\ 11\ 43$ ".

Contest ends in an hourMax Score: 92pts dynamic

Submissions: 562

Max Score: 92

Difficulty: Hard

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Current Buffer (saved locally, editable)

C++



1 #include <cmath>

```
2 #include <stdio>
3 #include <vector>
4 #include <iostream>
5 #include <algorithm>
6 using namespace std;
7
8
9 int main() {
10     /* Enter your code here. Read input from STDIN. Print output to STDOUT */
11     return 0;
12 }
13
```

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Line: 1 Col: 1

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Test against custom input

Run Code

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