8 Collatz conjecture

5 points

Introduction

The Collatz conjecture is one of the easiest to state but difficult to prove mathematical problems. Consider a positive number greater than 1. If it's odd, multiply it by 3 and add 1. If it's even, simply divide it by 2. Then apply the same rules to the new number you got. The conjecture is about what happens as you keep repeating the process.

What will it happen? Does the number you start with affect the number you end up with? Should it end or continue to infinity? Collatz conjectured that if you run this process long enough, all starting values will lead to 1. Nowadays the conjecture has been verified up to 2^{68}... Can you write a program to find out the resulting sequence when you apply collatz conjecture to a number?

Input

The input will be a single line containing a positive number greater than 1.

Output

The output will print the sequence of numbers obtained following the Collatz conjecture rules. The numbers should be separated by characters " -> ". At the end print out the total number of steps to reach 1.

Example 1

Input

```
6
```

Output

```
6 -> 3 -> 10 -> 5 -> 16 -> 8 -> 4 -> 2 -> 1 [8]
```

Example 2

Input

```
7
```

Output

```
7 -> 22 -> 11 -> 34 -> 17 -> 52 -> 26 -> 13 -> 40 -> 20 -> 10 -> 5 -> 16 -> 8
-> 4 -> 2 -> 1 [16]
```