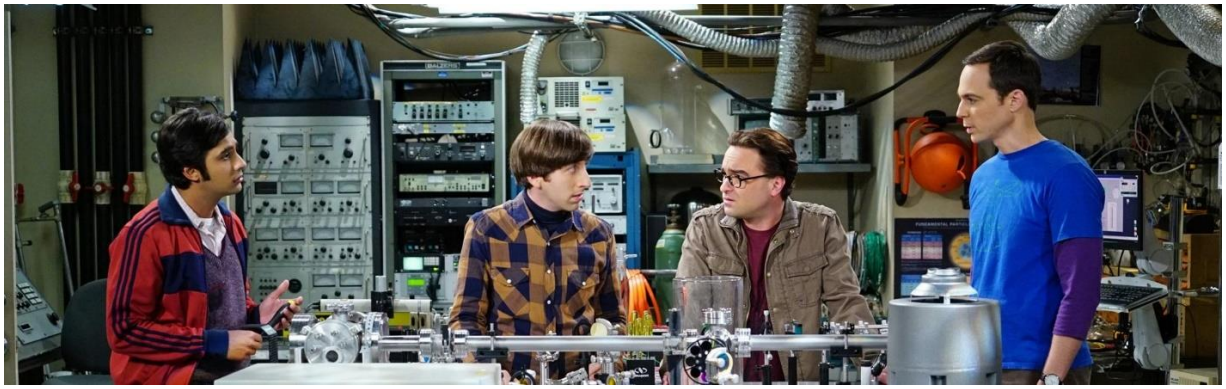
25 The Sheldon Prime

11 points

Introduction

The 73rd episode of the TV series "*The Big Bang Theory*" is very special for math lovers. In it, Sheldon Cooper asks Raj, Howard, and Leonard "What is the best number? By the way, there is only one correct answer". Sheldon explains to them that the best number is 73 because 73 is the 21st prime number. Its mirror, 37, is the 12th prime, which in turn is the mirror of 21!!! Mathematicians have named this number the Sheldon prime.



Since we are math lovers, we would like to find if there are other numbers like 73 or that are somehow related to it. To this end, we ask you to make a program that, given a natural number, indicates what type of relation it has with the Sheldon prime according to these rules:

1. A number N is a **Sheldon prime** if:
   - *N* is prime (e.g., 73)
   - *M*, which is the mirror of *N*, is prime (37)
   - The position of *N* in the prime numbers (21st) is the mirror of the position of *M* (12th)
2. A number *N* is a **relative** of the Sheldon prime if:
   - *N* is prime (e.g., 769)
   - *M*, which is the mirror of *N*, is prime (967)
   - The position of *N* (136th) is a permutation (with the same digits) of the position of *M* (163rd)
3. A number *N* is a **close friend** of the Sheldon prime if:
   - *N* is prime (e.g., 1409)
   - *M*, which is the mirror of *N*, is prime (9041)
   - The position of *N* (223rd) and the position of *M* (1123rd) are primes
4. A number *N* is a **friend** of Sheldon prime if:
   - *N* is prime (e.g., 17)
   - *M*, which is the mirror of *N*, is prime (e.g., 71)

Notice that every number can only fit in one of the categories, giving higher priority to 1 (i.e., Sheldon prime) and less priority to 4 (i.e., a friend).

Input

The input is a natural number

Output

The output is a message indicating the type of the input number with the format shown below:

- If it is a Sheldon prime the message is: "Number *N* is a Sheldon prime!"
- If it is a relative of Sheldon prime: "Number *N* is a Sheldon prime relative"
- If it is a close friend of Sheldon prime: "Number *N* is a close friend of Sheldon prime"
- If it is a friend of Sheldon prime: "Number *N* is a friend of Sheldon prime"
- If it is a number not related to a Sheldon prime: "Number *N* is not related to Sheldon prime"

Note that *N* should be the input number

Example 1

Input

```
73
```

Output

```
Number 73 is a Sheldon prime!
```

Example 2

Input

```
769
```

Output

```
Number 769 is a Sheldon prime relative
```

Example 3

Input

```
9
```

Output

```
Number 9 is not related to Sheldon prime
```

Example 4

Input

```
17
```

Output

```
Number 17 is a friend of Sheldon prime
```

Example 5

Input

```
1409
```

Output

```
Number 1409 is a close friend of Sheldon prime
```