



COMPETITIE

PROG-A-THON

9: Complicated Constants

Level: easy/intermediate

Time limit: 2.000 seconds

You have come upon a piece of code that uses a lot of “magical constants”: a logical expression that checks if an integer x belongs to a certain set of constraints:

```
x >= 5 && x <= 10 ||
x >= 7 && x <= 20 ||
x <= 2 ||
x >= 21 && x <= 25 ||
x >= 8 && x <= 10 ||
x >= 100
```

But as you know, “magical constants” are not something you want in your code. You have to refactor the expression and all similar ones so that it still gives the same result, but it uses as few integer constants as possible.

Integers in this problem, including integer x , come from the range of all signed 16 bit integers starting from -2^{15} ($-32\ 768$) to $2^{15}-1$ ($32\ 767$) inclusive.

Input

The input contains at most 1000 lines. Each line consists of either one comparison or two comparisons separated by *logical and* operator “&&”. Each comparison starts with “x”, followed by *greater-or-equals* operator “>=” or *less-or-equals* operator “<=”, followed by an integer constant. When two comparisons are in the same line, the first one is always *greater-or-equals*, followed by *less-or-equals*. All lines, but the last one, are terminated by *logical or* operator “||”. All tokens in a line are separated by a single space and there are no trailing or leading spaces.

Output

Output the refactored expression in the same format as the input. The lines can be arranged in any order, as long as the expression is in the right format. The output has to produce the same Boolean results for all integers x , and contain the minimal possible number of integer constants. Numbers must be formatted without leading zeros and there must be precisely one space between tokens on a line. Write a single line with the word “true” if the expression is true on all integers. Write a single line with the word “false” if the expression is false on all integers.

Sample input 1

```
x >= 5 && x <= 10 ||  
x >= 7 && x <= 20 ||  
x <= 2 ||  
x >= 21 && x <= 25 ||  
x >= 8 && x <= 10 ||  
x >= 100
```

Sample input 2

```
x >= 11 && x <= 2
```

Sample input 3

```
x <= 7 ||  
x >= 2
```

Sample output 1

```
x <= 2 ||  
x >= 5 && x <= 25 ||  
x >= 100
```

Sample output 2

```
false
```

Sample output 3

```
true
```