



Bitwise Tic-Tac-Toe

Problem Statement

Professor Bitt has been playing a fun mental game by himself, where he writes a random 25-bit integer N in binary (with leading zeros) and fills its bits into a 5x5 grid row-by-row with the most significant bit in the top-left cell and the least significant bit in the bottom-right. For instance, the number 25564500 (11000 01100 00101 01010 10100), would be written in the grid as follows:

```
1 1 0 0 0
0 1 1 0 0
0 0 1 0 1
0 1 0 1 0
1 0 1 0 0
```

After that, he would see if the grid could create an `o` , `x` , or `No Win` board. An `o` board has at least one line of all `o` s (a row, a column, or either of the two main diagonals), an `x` board has at least one line of all `1` s (a row, a column, or either of the two main diagonals), and a `No Win` board has neither. One board can have both `o` and `x` at the same time.

For each outcome, can it be reached by flipping at most 3 bits (possibly none)?

For example, the grid earlier has `No Win` originally.

```
1 1 0 0 0
0 1 1 0 0
0 0 1 0 1
0 1 0 1 0
1 0 1 0 0
```

Professor Bitt flips the 2 bits on the top left so `o` wins.

```
[0] [0] 0 0 0
0 1 1 0 0
0 0 1 0 1
0 1 0 1 0
1 0 1 0 0
```

He could also flip 2 bits on the top right so `x` wins.

```
1 1 0 0 [1]
0 1 1 [1] 0
0 0 1 0 1
0 1 0 1 0
1 0 1 0 0
```

Hence this number is able to produce `o` , `x` , and `No Win` .

Input Format

A single line containing one integer N ($0 \leq N \leq 2^{25} - 1$).

Output Format

Print every obtainable outcome separated by commas, with the order being `0`, `x`, `No Win` and no space around the commas.

Sample Input 1

```
25564500
```

Sample Output 1

```
0,x,No Win
```

Sample Input 2

```
1327232
```

Sample Output 2

```
0,No Win
```

Explanation for Sample 2

1327232 (`00001 01000 10000 00100 00000`) in the grid would be:

```
0 0 0 0 1
0 1 0 0 0
1 0 0 0 0
0 0 1 0 0
0 0 0 0 0
```

As we can see, there are 5 consecutive `0`s at the bottom row (and vertically on the fourth column), so the initial board already has `0` winning.

Then, if we flip one bit on the bottom row:

```
0 0 0 0 1
0 1 0 0 0
1 0 0 0 0
0 0 1 0 0
0 0 0 1 0
```

It would be `No Win`.

No line contains more than one `1`, so making any line all 1s needs at least 4 flips, and `x` is impossible.

Sample Input 3

4

Sample Output 3

0

Explanation of Sample 3

4 (00000 00000 00000 00000 00100) in the grid would be:

```
0 0 0 0 0
0 0 0 0 0
0 0 0 0 0
0 0 0 0 0
0 0 1 0 0
```

There are 5 consecutive 0 s in all directions, so it's an o board. Rows 1–4 are all 0 s, and each flip touches only one row, so breaking all four needs at least 4 flips, so No win is impossible. The only 1 sits in row 5 column 3, so every line has at most one 1 when flipping, making x impossible, resulting in 0 as the output.

Sample Input 4

1015808

Sample Output 4

0,X

Explanation of Sample 4

1015808 (00000 11111 00000 00000 00000) in the grid would be:

```
0 0 0 0 0
1 1 1 1 1
0 0 0 0 0
0 0 0 0 0
0 0 0 0 0
```

Row 2 is all 1 s and rows 1, 3, 4, and 5 are all 0 s, so the board is already both o and x . No win needs a flip in each of those four zero rows, which is more than 3 flips.