

## Adding fingers

P55691\_en

Divuitè Concurs de Programació de la UPC - Final (2020-10-07)

Consider a game for two players playing alternatively. Both players show a certain number of fingers in each hand. Let  $X$  be the player that moves next, and let  $Y$  be the other player. Let  $a$  and  $b$  be the number of fingers shown by  $X$ , and let  $c$  and  $d$  be the number of fingers shown by  $Y$ . In each turn, these are the allowed moves:

1. Add mod 5 as many fingers as  $X$  has in a non-empty hand (a hand showing at least one finger) to one of  $Y$ 's non-empty hands. That is:

$$\left\{ \begin{array}{ll} (a,b)(c,d) \rightarrow (a,b)(c+a,d) & \text{if } a,c \neq 0 \\ (a,b)(c,d) \rightarrow (a,b)(c,d+a) & \text{if } a,d \neq 0 \\ (a,b)(c,d) \rightarrow (a,b)(c+b,d) & \text{if } b,c \neq 0 \\ (a,b)(c,d) \rightarrow (a,b)(c,d+b) & \text{if } b,d \neq 0 \end{array} \right.$$

2. "Move" the fingers in one of  $X$ 's hands to the other hand, provided that none of them are empty. Again, the operations are made mod 5:

$$\left\{ \begin{array}{ll} (a,b)(c,d) \rightarrow (a+b,0)(c,d) & \text{if } a,b \neq 0 \\ (a,b)(c,d) \rightarrow (0,a+b)(c,d) & \text{if } a,b \neq 0 \end{array} \right.$$

3. "Redistribute" the fingers in  $X$ 's hands, if one of them is empty:

$$\left\{ \begin{array}{ll} (a,0)(c,d) \rightarrow (x,y)(c,d) & \text{if } x+y = a \text{ and } 0 < x,y < a \\ (0,b)(c,d) \rightarrow (x,y)(c,d) & \text{if } x+y = b \text{ and } 0 < x,y < b \end{array} \right.$$

Both players play perfectly. The first player to get to  $(0,0)$  loses the game. A game that never ends is considered to be a draw.

### Input

Input consists of several cases, each one with  $a$ ,  $b$ ,  $c$  and  $d$ , all between 0 and 4. Assume  $a + b > 0$  and  $c + d > 0$ .

### Output

For every case, tell if  $X$  will win, if  $X$  will lose, or if the game is a draw.

#### Sample input

```
2 4 0 3
1 0 4 0
0 1 0 1
3 0 2 3
3 3 0 4
1 1 1 1
```

#### Sample output

```
WIN
WIN
LOSE
LOSE
DRAW
DRAW
```

## **Problem information**

Author : Marc Felipe

Generation : 2020-10-07 09:59:50

© *Jutge.org*, 2006–2020.

<https://jutge.org>