



# Party Lamps

IOI 98

To brighten up the gala dinner of the IOI'98 we have a set of  $N$  ( $10 \leq N \leq 100$ ) colored lamps numbered from 1 to  $N$ .

The lamps are connected to four buttons:

- Button 1: When this button is pressed, all the lamps change their state: those that are ON are turned OFF and those that are OFF are turned ON.
- Button 2: Changes the state of all the odd numbered lamps.
- Button 3: Changes the state of all the even numbered lamps.
- Button 4: Changes the state of the lamps whose number is of the form  $3xK+1$  (with  $K \geq 0$ ), i.e., 1,4,7,...

A counter  $C$  records the total number of button presses.

When the party starts, all the lamps are ON and the counter  $C$  is set to zero.

You are given the value of counter  $C$  ( $0 \leq C \leq 10000$ ) and the final state of some of the lamps after some operations have been executed. Write a program to determine all the possible final configurations of the  $N$  lamps that are consistent with the given information, without repetitions.

**PROGRAM NAME: lamps**

## INPUT FORMAT

No lamp will be listed twice in the input.

Line 1:	$N$
Line 2:	Final value of $C$
Line 3:	Some lamp numbers ON in the final configuration, separated by one space and terminated by the integer -1.
Line 4:	Some lamp numbers OFF in the final configuration, separated by one space and terminated by the integer -1.

## SAMPLE INPUT (file lamps.in)

```
10
1
-1
7 -1
```

In this case, there are 10 lamps and only one button has been pressed. Lamp 7 is OFF in the final configuration.

## OUTPUT FORMAT

Lines with all the possible final configurations (without repetitions) of all the lamps. Each line has N characters, where the first character represents the state of lamp 1 and the last character represents the state of lamp N. A 0 (zero) stands for a lamp that is OFF, and a 1 (one) stands for a lamp that is ON. The lines must be ordered from least to largest (as binary numbers).

If there are no possible configurations, output a single line with the single word 'IMPOSSIBLE'

## SAMPLE OUTPUT (file lamps.out)

```
0000000000
0101010101
0110110110
```

In this case, there are three possible final configurations:

- All lamps are OFF
- Lamps 1, 3, 5, 7, 9 are OFF and lamps 2, 4, 6, 8, 10 are **ON**.
- Lamps 1, 4, 7, 10 are OFF and lamps 2, 3, 5, 6, 8, 9 are **ON**.

**Submit a solution:**

Choose File

No file chosen

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