Tower Breakers

HackerRank

Two players are playing a game of Tower Breakers! Player 1 always moves first, and both players always play optimally.The rules of the game are as follows:

- Initially there are n towers.
- Each tower is of height m.
- The players move in alternating turns.
- In each turn, a player can choose a tower of height x and reduce its height to y, where $1 \leq y < x$ and y evenly divides x.
- If the current player is unable to make a move, they lose the game.

Given the values of n and m, determine which player will win. If the first player wins, return 1. Otherwise, return 2.

Example. $n = 2$
$m = 6$

There are 2 towers, each 6 units tall. Player 1 has a choice of two moves:
- remove 3 pieces from a tower to leave 3 as $6 \text{ modulo } 3 = 0$
- remove 5 pieces to leave 1

Let Player 1 remove 3. Now the towers are 3 and 6 units tall.

Player 2 matches the move. Now the towers are both 3 units tall.

Now Player 1 has only one move.

Player 1 removes 2 pieces leaving 1. Towers are 1 and 2 units tall.
Player 2 matches again. Towers are both 1 unit tall.

Player 1 has no move and loses. Return 2.

Function Description

Complete the *towerBreakers* function in the editor below.

towerBreakers has the following paramter(s):

- *int n:* the number of towers
- *int m:* the height of each tower

Returns

- *int:* the winner of the game

Input Format

The first line contains a single integer t, the number of test cases.
Each of the next t lines describes a test case in the form of 2 space-separated integers, n and m.

Constraints

- $1 \leq t \leq 100$
- $1 \leq n, m \leq 10^6$

Sample Input

```
STDIN    Function
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2        t = 2
2 2      n = 2, m = 2
1 4      n = 1, m = 4
```

Sample Output

```
2
1
```

Explanation

We'll refer to player 1 as $P1$ and player 2 as $P2$

In the first test case, $P1$ chooses one of the two towers and reduces it to 1. Then $P2$ reduces the remaining tower to a height of 1. As both towers now have height 1, $P1$ cannot make a move so $P2$ is the winner.

In the second test case, there is only one tower of height 4. $P1$ can reduce it to a height of either 1 or 2. $P1$ chooses 1 as both players always choose optimally. Because $P2$ has no possible move, $P1$ wins.