OLIMPIADA DE INFORMATICĂ ÎN ECHIPE

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game

A and B participate in a game with the following rules:

- the player A always begins the game;
- he receives a natural number n greater than 1;
- the player whose turn comes next can subtract 1 from the number, or divide it by 2 (the result is the whole part of the division), then this number is given to the opponent, who will proceed in the same way;
- the game is over when a player reaches number 1.

We have two types of game, according to the way they finish:

1. The winner is the player who receives the number 1 from his opponent;
2. The loser is the player who receives the number 1 from his opponent.

A *match* is made up of several consecutive *games*, all of them being the same type. We consider that the two players know this principle before the beginning of the match and they will play optimally every time.

For example, if the game is type 1 (the winner receives the number 1) and the game begins with the value n=4, then A will be the winner because he divides by 2, while B, even if he subtracts 1 or divides by 2, will give A the number 1, so A will win.

If the game is type 2 and the game begins with the value n=4, then A will lose, because even if he subtracts 1 and gives B the number 3, or divides by 2 and gives B the number 2, B will divide this number by 2 (3/2=1, 2/2=1) and will give A the number 1, therefore A will lose.

Task

Knowing the type of the game T, the number of games G, and the starting value for each game, answer for every particular case if the player A will win (1) or will lose (0).

Input data

The standard input file will contain, on the first line, two natural numbers T and G separated by a space, representing the type of all the games (1 or 2) and the number of games. Each of the following G lines will contain a natural number which represents a starting value.

Output data

The standard output file will contain G lines, and on each line we will write the value 1 – if the number makes the player A a winner, or the value 0 – if the number makes the player A lose the game, in the same order in which we read the values in the input file.

Constraints and specifications:

- T can be 1 or 2;
- 0 < G < 10;
- 1 < starting value < 2 000 000 000.

Examples

input	output	explanation
1 4 2 3 4 2019	0 1 1 1	We have a type T=1 game. The match is made up of G=4 games 2 – losing for A (0) 3 – winning for A (1) 4 – winning for A (1) 2019 – winning for A (1)
2 4 2 3 4 123456789	1 1 0 1	We have a type T=2 and G=4 game 2 – winning 3 – winning 4 – losing 123456789 - winning

Maximum execution time: 1 second. Total memory 128 MB, out of which 64 MB for the stack.