

Blink

Unhappy with the dim lighting in his barn, Farmer John has just installed a fancy new chandelier consisting of N ($3 \leq N \leq 16$) light bulbs arranged in a circle. The cows are fascinated by this new light fixture, and enjoy playing the following game: at time T , they toggle the state of each light bulb if its neighbor to the left was turned on at time $T-1$. They continue this game for B units of time ($1 \leq B \leq 10^{15}$). Note that B might be too large to fit into a standard 32-bit integer. Given the initial states of the light bulbs, please determine their final states after B units of time have elapsed.

Input

Input description...

Output

Output description...

Example

Input:

etc.

Output:

etc.