

## 11089 Fi-binary Number

A Fi-binary number is a number that contains only 0 and 1. It does not contain any leading 0. And also it does not contain 2 consecutive 1. The first few such number are 1, 10, 100, 101, 1000, 1001, 1010, 10000, 10001, 10010, 10100, 10101 and so on. You are given  $n$ . You have to calculate the  $n$ -th Fi-Binary number.

### Input

The first line of the input contains one integer  $T$  the number of test cases. Each test case contains one integer  $n$ .

### Output

For each test case output one line containing the  $n$ -th Fi-Binary number.

### Constraints

- $1 \leq N \leq 10^9$

### Sample Input

```
4
10
20
30
40
```

### Sample Output

```
10010
101010
1010001
10001001
```