

Problem F- Binary

You've just discovered that any number can be written in binary representation and decided to convert as many numbers as you can into binary and write them down. You started with 0, then wrote 1, 10, 11, 100, and so on (you did not put spaces or commas between the numbers). At around 10000 you decided that it is too boring and should be automated, so you are going to write a computer program that will help you: it will produce the k^{th} digit of the binary sequence.

011011100101110111

10001001101010111100

110111101111100001000110

010100111010010101101101

0111110001100111010110111100

111011111011111100000100001.....

Input Specification:

There will be multiple test cases (at most 10000). Each test case will be represented by a single integer, k ($0 \leq k \leq 10^9$). All integers in the input will be separated by spaces and/or new lines. Input will be terminated by the end of file.

Output Specification:

For each test case, output the k^{th} character of the binary sequence (indexing starts with 0), on a line by itself.

Sample Input:

```
0 1 2 3 4
5 6 7
1000000000
```

Sample Output:

```
0
1
1
0
1
1
1
0
0
```