

“Pinary” number is a positive number using only two digits “0” and “1” with usual rule that it must not begin with a 0, and the additional rule that two successive digits must not be both “1”. This means that the factor “11” is forbidden in the string. So the allowed Pinary writings are 1, 10, 100, 101, 1000, 1001, . . . , 100010101010100010001. For example, “100101000” is a Pinary number, but neither “0010101” nor “10110001” are Pinary numbers.

Each Pinary number represents a positive integer in the order they appear (using length order, lexicographic order), that is, 1 is mapped to 1, 10 is mapped to 2. And 100, 101 and 1000 are mapped to 3, 4 and 5, respectively. You are to write a program to generate Pinary number representations for integers given.

Input

Your program is to read from standard input. The input consists of T test cases. The number of test cases T is given in the first line of the input. Each test case starts with a line containing a positive integer $2 < K < 90,000,000$.

Output

Your program is to write to standard output. Print exactly one line for each test case. For each test case, print the Pinary number representation for input integer.

Sample Input

```
3
7
2000
22
```

Sample Output

```
1010
1001000001001000
1000001
```