

Skew Binary

When a number is expressed in decimal, the k -th digit represents a multiple of 10^k . (Digits are numbered from right to left, where the least significant digit is number 0.) For example,

decimal

When a number is expressed in binary, the k -th digit represents a multiple of 2^k . For example,

binary

In **skew binary**, the k -th digit represents a multiple of $2^{k+1} - 1$. The only possible digits are 0 and 1, except that the least-significant nonzero digit can be a 2. For example,

skew

The first 10 numbers in skew binary are 0, 1, 2, 10, 11, 12, 20, 100, 101, and 102. (Skew binary is useful in some applications because it is possible to add 1 with at most one carry. However, this has nothing to do with the current problem.)

Input

The input file contains one or more lines, each of which contains an integer

Output

For each number, output the decimal equivalent. The decimal value of n will be at most $2^{31} - 1 = 2147483647$.

Example

Input:

```
10120
20000000000000000000000000000000
10
10000000000000000000000000000000
11
100
```

11111000001110000101101102000
0

Output:

44
2147483646
3
2147483647
4
7
1041110737