C. Malek Dance Club

time limit per test: 1 second
memory limit per test: 256 megabytes
input: standard input
output: standard output

As a tradition, every year before IOI all the members of Natalia Fan Club are invited to Malek Dance Club to have a fun night together. Malek Dance Club has 2^n members and coincidentally Natalia Fan Club also has 2^n members. Each member of MDC is assigned a unique id i from 0 to 2^n - 1. The same holds for each member of NFC.

One of the parts of this tradition is one by one dance, where each member of MDC dances with a member of NFC. A dance pair is a pair of numbers (a, b) such that member a from MDC dances with member b from NFC.

The complexity of a pairs' assignment is the number of pairs of dancing pairs (a, b) and (c, d) such that $a < c$ and $b > d$.

You are given a binary number of length n named x. We know that member$i$ from MDC dances with member from NFC. Your task is to calculate the complexity of this assignment modulo 1000000007 $(10^9 + 7)$.

Expression denotes applying «XOR» to numbers x and y. This operation exists in all modern programming languages, for example, in *C++* and *Java* it denotes as «`^`», in *Pascal* — «`xor`».

Input

The first line of input contains a binary number x of lenght n, $(1 \le n \le 100)$.

This number may contain leading zeros.

Output

Print the complexity of the given dance assignent modulo 1000000007 $(10^9 + 7)$.

Examples

input
11
output
6

input
01
output
2

input
1
output
1