

Problem E. Hamming

Input file: *standard input*
Output file: *standard output*
Time limit: 25 seconds
Memory limit: 1024 mebibytes

You are given a binary string s of length n . Compute the sum of pairwise Hamming distances between all subsequences of string s with length exactly k for all k from 1 to n . Since the answers can be very large, find them modulo 40961.

Hamming distance between two strings of equal length is the number of positions in which these two strings are different.

Input

The only line of input contains a string s of length n ($1 \leq n \leq 8 \cdot 10^3$) containing only characters “0” and “1”.

Output

Print n numbers: k -th of them must be the sum of pairwise Hamming distances between all subsequences of string s with length exactly k , taken modulo 40961.

Examples

<i>standard input</i>
11000110111001
<i>standard output</i>
48 4056 15326 31033 20654 29362 32472 13700 21357 12217 20411 12456 212 0
<i>standard input</i>
000
<i>standard output</i>
0 0 0