Problem J. 31 Palindromes

Input file:	input.txt
Output file:	output.txt
Time limit:	1 second
Memory limit:	256 mebibytes

For every prefix of the given string, determine whether it is possible to split it into $1, 2, 3, 4, 5, \ldots, 31$ non-empty palindromes.

Input

The input contains a line of n lowercase Latin letters ($1 \le n \le 3 \cdot 10^5$).

Output

Print n non-negative integer numbers separated by line breaks. The i-th line should contain a decimal number. If you consider the binary representation of this decimal number, its digit on position $(j-1)$ must be equal to one if the prefix of length i can be split into j palindromes, and zero otherwise.

Example

input.txt	output.txt
abaa	1 2 5 14

Note

$1_{10} = 1_2$; $2_{10} = 10_2$; $5_{10} = 101_2$; $14_{10} = 1110_2$; $abaa = aba|a = a|b|aa = a|b|a|a$.