

Problem B. Binary Palindromes

Input file: input.txt
Output file: output.txt
Time limit: 0.5 seconds
Memory limit: 64 mebibytes

For each integer i from 1 to n , you must print a string s_i of length n consisting of letters 'a' and 'b' only. The string s_i must contain exactly i distinct palindrome substrings. Two substrings are considered distinct if they are different as strings.

Input

The input contains one integer n ($1 \leq n \leq 43$).

Output

You must print n lines. If for some i , the answer exists, print it in the form " $i : s_i$ " where s_i is one of possible strings. Otherwise, print " $i : NO$ ".

Example

input.txt	output.txt
4	1 : NO 2 : NO 3 : NO 4 : aaaa