

Rainbow Code

Timelimit: 1 sec

Problem description

Produce a code with big hamming distance: Create a sequence of codewords w_1, \dots, w_n of lengths k , where $2^k = n$ subject to the following conditions:

1. Each codeword is a string of length k over the alphabet $\{0, 1\}$.
2. All codewords are different.
3. There are exactly $n = 2^k$ many codewords.
4. Two consecutive codewords differ in at least $k - 1$ positions.

Input

A number k , the length of the codewords.

Output

$n = 2^k$ lines containing the codewords w_1, \dots, w_n .

Sample input/output

Input	Output
3	111 001 100 010 101 011 110 000