
De Bruijn sequences (1)**P85110_en**

A binary de Bruijn sequence of order n is a cyclic sequence of zeros and ones such that every possible subsequence of n consecutive digits appears exactly once. Please compute the lexicographically smallest de Bruijn sequence of order n .

Input

Input consists of several cases, each with an integer number n between 1 and 15.

Output

For every case, print the lexicographically smallest de Bruijn sequence of order n .

Hint

A “reasonable” backtracking algorithm should be fast enough to get this problem accepted.

Sample input 1

```
2
3
4
```

Sample output 1

```
0011
00010111
0000100110101111
```

Problem information

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