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.

<table>
<thead>
<tr>
<th>Sample input</th>
<th>Sample output</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>0011</td>
</tr>
<tr>
<td>3</td>
<td>00010111</td>
</tr>
<tr>
<td>4</td>
<td>000010011010111</td>
</tr>
</tbody>
</table>

**Problem information**

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Generation: 2013-09-02 15:42:29

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