

Problem B

Extended One-Max Problem

Time limit: 2 seconds

An extended one-max problem is a problem for maximizing and minimizing the value of the objective function $f(s)$ of a binary string $s = \langle s_1, s_2, \dots, s_n \rangle$, where the objective function is defined as

$$f(s) = ((m \bmod 10) + 1) \times (((\mathbf{B2D}(s) + 1) \bmod (m + 1)) + 1)$$

where $m = \sum_{i=1}^n s_i$, $s_i \in \{0, 1\}$, $n \leq 20$ and $\mathbf{B2D}(s)$ is a function for converting the binary string s to a decimal value.

Input Format

The input is a number n representing the number of bits in the binary string $s = \langle s_1, s_2, \dots, s_n \rangle$, as the sample input shows.

Output Format

The output contains two binary strings s^a and s^b each of which is followed by its objective value. The difference is in that the first string s^a is the one with the maximum objective value $f(s^a) = \max f(s)$ while the second string s^b is the one with the minimum objective value $f(s^b) = \min f(s)$, as the sample output shows.

Sample Input

```
3
0
```

Output for the Sample Input

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011: 6
000: 1
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