

Pepi and his friends

Input file: **standard input**
Output file: **standard output**
Time limit: 0.25 seconds
Memory limit: 8 megabytes

Pepi is an outstanding student studying Computer Science in Bucharest. In his year the total number of students is 2^N . Because Pepi cares a lot about his fellow students he doesn't bother remembering their names but he has assigned everyone, including himself, an ID from 0 to $2^N - 1$.

The students in Pepi's year have organized a charitable event for the Ukrainian people where every student came dressed in 1 of 2 colors, either yellow or blue (it is possible that everyone wore only one of the 2 colors). Unfortunately, Pepi forgot how everyone was dressed but he desperately wants to remember.

Because Pepi is a good judge of the human mind he remembers that any student $S1$ talked to one of his classmates $S2$ if and only if their ID differ by 1 bit (in their binary representation). Also, Pepi is sure that any student $S1$ did not talk to more than $\lceil \sqrt{N} \rceil$ classmates that wore the same color as $S1$. Pepi remembers clearly the fact that the number of students that wore yellow was not equal to the number of students that wore blue.

Because this problem is a trivial one for Pepi he requests that you find any possible way that he and his friends were dressed at the event.

Input

On the first line there is one number N ($1 \leq N \leq 22$) that has the meaning from the problem statement.

Output

On a single line there have to be printed 2^N values. These represent the colors Pepi and his classmates wore during the event, taking into account all the conditions Pepi remembers.

To simplify this problem the colors will be encoded: 0 meaning yellow and 1 meaning blue. A value found at the position i in the output string represents the color that the student with the ID $i - 1$ wore during the event (the first value from the output string is the color that the student with ID 0 wore).

If there is more than one solution print any of them.

Example

standard input	standard output
1	11

Note

There are 2 students with IDs ranging from 0 to 1. The student with the ID 0 talks only with the student with ID 1 and he doesn't talk to more than $\lceil \sqrt{1} \rceil = 1$ students dressed with the same color as him.

The number of students dressed in yellow is not equal to the number of students dressed in blue. So, a possible way that the students were dressed would be blue and blue (11). Of course, yellow, yellow (00) is another great solution.