Challenge: Secret Agent

Author: Okba Allaoua

Difficulty: Hard

Submission Constraints:

- Time limit per test: **0,1 seconds**
- Memory limit per test: **Default (65 MB)**

Description

Arthur Morgan, the fearless explorer of the Wild West, found himself deep in an abandoned mine. In front of him lay a locked compartment, its surface adorned with cryptic numbers. Standing by his side was John, his trusted ally and secret agent. "Arthur," John whispered, "I have a list of pins for the compartment. Let's try each one. But this lock ain't ordinary. I believe that each digit of each code I currently have can be linked to its neighbor—either the one positioned up, down, left, or right, but not diagonally."

Arthur nodded, his mind already racing with possibilities. With determination in his eyes, he turned to John. "We need to try every possible combination. Let's crack this treasure wide open!"

And so, with John's guidance and Arthur's expertise, they set out to unravel the mystery of the locked compartment deep within the mine. As they worked on each code the secret agent provided individually, trying all the variations they extracted, they remained steadfast in their pursuit.

Inputs

The input line contains one integer c—the code provided by the secret agent

Outputs

- List **all possible variations** of the code incrementally and by respecting the specific possible values for each code character.

Constraints

- All codes must be strings, because of potentially leading **0**s.
- Codes should be displayed in an incremental order.
- Code combinations respect the order of each digit's possible values. (Eg: when giving the combinations of 01 => only the values can be found with 0 are in the first digit and the ones with 1 are in the second resulting in the output: 01, 02, 04, 81, 82, 84)

Examples

Input	Output
20	10 18 20 28 30 38 50 58
006	003 005 006 009 083 085 086 089 803 805 806 809 883 885 886 889

The following description explains the first test case above:

Suppose the secret agent has given the code "20": the 2 can also be a 1, 3, or 5. same for the 0 it could also be 8. resulting in an output: 10 18 20 28 30 38 50 58, the codes are organized incrementally and you can observe that **the digits generated from the number 2 are before the ones generated from the number 0,** the codes provided are not just a 2 digits length.