

Digit Root

A *Digit Root* is a feature of numbers used in mathematical recreation, but can also be used to check the results of simple operations such as sum and multiplication. One of its main properties is that the *Digit Root* of a number is always equal to *Digit Root* of the sum of its digits.

For example, the *Digit Root* of 18446744073709551615 is the same as 87 because $1+8+4+4+6+7+4+4+0+7+3+7+0+9+5+5+1+6+1+5=87$, and is the same as 15 because $8+7=15$, which in turn is the same as 6, since $1+5=6$. Therefore the *Digit Root* of all these numbers is 6 since 6 is its own *Digit Root*.

Your task is, given the two integers, **B** and **E**, calculate the *Digit Root* of $\mathbf{B^E}$ (**B** raised to the **E**-th power).

Input

The input consists of two lines. The first contains the number **B** ($1 \leq \mathbf{B} \leq 10^{10^5}$). The second contains the number **E** ($1 \leq \mathbf{E} \leq 10^{10^5}$).

Output

The output consists of a single line containing the *Digit Root*.

Example

Input:

2

7

Output:

2

Example

Input:

25

5

Output:

4

Example

Input:

6

10

Output:

9