

Recursive Digit Sum

We define super digit of an integer x using the following rules:

Given an integer, we need to find the *super digit* of the integer.

- If x has only 1 digit, then its super digit is x .
- Otherwise, the super digit of x is equal to the super digit of the sum of the digits of x .

For example, the super digit of **9875** will be calculated as:

```
super_digit(9875)    9+8+7+5 = 29
super_digit(29)       2 + 9 = 11
super_digit(11)       1 + 1 = 2
super_digit(2)        = 2
```

Example

$n = '9875'$

$k = 4$

The number p is created by concatenating the string n k times so the initial $p = 9875987598759875$.

```
superDigit(p) = superDigit(9875987598759875)
               9+8+7+5+9+8+7+5+9+8+7+5+9+8+7+5 = 116
superDigit(p) = superDigit(116)
               1+1+6 = 8
superDigit(p) = superDigit(8)
```

All of the digits of p sum to **116**. The digits of **116** sum to **8**. **8** is only one digit, so it is the super digit.

Function Description

Complete the function *superDigit* in the editor below. It must return the calculated super digit as an integer.

superDigit has the following parameter(s):

- *string n*: a string representation of an integer
- *int k*: the times to concatenate n to make p

Returns

- *int*: the super digit of n repeated k times

Input Format

The first line contains two space separated integers, n and k .

Constraints

- $1 \leq n < 10^{100000}$

- $1 \leq k \leq 10^5$

Sample Input 0

148 3

Sample Output 0

3

Explanation 0

Here $n = 148$ and $k = 3$, so $p = 148148148$.

```
super_digit(P) = super_digit(148148148)
               = super_digit(1+4+8+1+4+8+1+4+8)
               = super_digit(39)
               = super_digit(3+9)
               = super_digit(12)
               = super_digit(1+2)
               = super_digit(3)
               = 3
```

Sample Input 1

9875 4

Sample Output 1

8

Sample Input 2

123 3

Sample Output 2

9

Explanation 2

Here $n = 123$ and $k = 3$, so $p = 123123123$.

```
super_digit(P) = super_digit(123123123)
               = super_digit(1+2+3+1+2+3+1+2+3)
               = super_digit(18)
               = super_digit(1+8)
               = super_digit(9)
               = 9
```