

Project Euler #230: Fibonacci Words

This problem is a programming version of [Problem 230](#) from [projecteuler.net](#)

For any two strings of digits, A and B , we define $F_{A,B}$ to be the sequence $(A, B, AB, BAB, ABBAB, \ldots)$ in which each term is the concatenation of the previous two.

Further, we define $D_{A,B}(n)$ to be the n -th digit in the first term of $F_{A,B}$ that contains at least n digits.

Example:

Let $A = 1415926535$, $B = 8979323846$. We wish to find $D_{A,B}(35)$, say.

The first few terms of $F_{A,B}$ are:

- 1415926535
- 8979323846
- 14159265358979323846
- 897932384614159265358979323846
- 14159265358979323846897932384614159265358979323846

Then $D_{A,B}(35)$ is the 35-th digit in the fifth term, which is 9.

You are given q triples (A, B, n) . For all of them find $D_{A,B}(n)$.

Input Format

First line of each test file contains a single integer q that is the number of triples. Then q lines follow, each containing two strings of decimal digits a and b and positive integer n .

Constraints

- $1 \leq q \leq 100$
- $1 \leq \text{length}(a), \text{length}(b) \leq 100$
- $1 \leq n \leq 2^{100}$

Output Format

Print exactly q lines with a single decimal digit on each: value of $D_{A,B}(n)$ for the corresponding triple.

Sample Input 0

```
2
1415926535 8979323846 35
1415926535897932384626433832795028841971693993751058209749445923078164062862089986280348253421170679
8214808651328230664709384460955058223172535940812848111745028410270193852110555964462294895493038196 104683731294243150
```

Sample Output 0

```
9
8
```