

# Problem B

## Yet another Number Sequence

**Input:** standard input  
**Output:** standard output  
**Time Limit:** 3 seconds

Let's define another number sequence, given by the following function:

$$\begin{aligned} f(0) &= a \\ f(1) &= b \\ f(n) &= f(n-1) + f(n-2), \quad n > 1 \end{aligned}$$

When  $a = 0$  and  $b = 1$ , this sequence gives the Fibonacci Sequence. Changing the values of  $a$  and  $b$ , you can get many different sequences. Given the values of  $a$ ,  $b$ , you have to find the last  $m$  digits of  $f(n)$ .

### Input

The first line gives the number of test cases, which is less than **10001**. Each test case consists of a single line containing the integers **a b n m**. The values of **a** and **b** range in **[0,100]**, value of **n** ranges in **[0, 1000000000]** and value of **m** ranges in **[1, 4]**.

### Output

For each test case, print the last  $m$  digits of  $f(n)$ . However, you should **NOT** print any leading zero.

### Sample Input

```
4
0 1 11 3
0 1 42 4
0 1 22 4
0 1 21 4
```

### Output for Sample Input

```
89
4296
7711
946
```

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