

1065 – Number Sequence

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

$$f(0) = a$$

$$f(1) = b$$

$$f(n) = f(n-1) + f(n-2), n > 1$$

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

Input starts with an integer T (≤ 10000), denoting the number of test cases.

Each test case consists of a single line containing four integers a b n m . The values of a and b range in $[0, 100]$, value of n ranges in $[0, 10^9]$ and value of m ranges in $[1, 4]$.

Output

For each case, print the case number and the last m digits of $f(n)$. However, do **NOT** print any leading zero.

Sample Input	Output for Sample Input
4	Case 1: 89
0 1 11 3	Case 2: 4296
0 1 42 4	Case 3: 7711
0 1 22 4	Case 4: 946
0 1 21 4	