

Problem C. Fibonacci Strikes Back

Input file: *standard input*
Output file: *standard output*
Time limit: 3 seconds
Memory limit: 256 mebibytes

In this problem, you need to solve a well-known problem about P -Fibonacci sequence:

$$F_n = \begin{cases} 0 & \text{if } n = 0 \\ 1 & \text{if } n = 1 \\ PF_{n-1} + F_{n-2} & \text{otherwise} \end{cases}$$

Now given P , m and the lowest k decimal digits of F_{F_n} , you are asked to determine the minimum possible n such that $n \geq m$ and F_{F_n} has at least k lowest decimal digits as given above, or report it is impossible otherwise.

Input

The input contains several test cases. The first line contains an integer T indicating the number of test cases. The following describes all test cases. For each test case:

The only line contains two integers P , m and a string of length k , consisting of only digits, which represents the lowest k decimal digits of F_{F_n} . Note the string may contain leading zeros.

- $1 \leq T \leq 10^4$
- $1 \leq P, m \leq 10^{18}$
- $1 \leq k \leq 18$
- The sum of k in all test cases does not exceed 10^4 .
- It is guaranteed that the greatest common divisor of P and 10^{18} is less than 5 for each test case.

Output

For each test case, output a line containing “Case #x: y” (without quotes), where x is the test case number starting from 1, and y is the minimum possible n to this test case if it exists, or y is -1 otherwise.

Example

standard input	standard output
7	Case #1: 3
1 3 1	Case #2: 6
1 4 1	Case #3: 101
1 6 01	Case #4: 10
1 1 45	Case #5: 5
2 1 0482149	Case #6: -1
998 244 353	Case #7: 233
998244 1 353	

Note

When $P = 1$, $\{F_{F_n}\}_{n=0}^{\infty} = \{0, 1, 1, 1, 2, 5, 21, 233, 10946, 5702887, 139583862445, \dots\}$.

When $P = 2$, $\{F_{F_n}\}_{n=0}^{\infty} = \{0, 1, 2, 29, 13860, 44560482149, \dots\}$.