Problem B. Same Digit

Little Mono is a smart child, he can do complex arithmetical operations quickly. But he only knows one digit $D(1 \le D \le 9)$. He would like to use the only digit he knows to make expressions to represent integer numbers.

A valid expression can be generated like this:

1. Any number consists of only digit D are valid expressions. E.g. if $D = 1$, then 1, 11, 111, ... are all valid expressions.
2. If A and B are valid expressions, then $(A) + (B)$ is a valid expression.
3. If A and B are valid expressions, then $(A) - (B)$ is a valid expression.
4. If A and B are valid expressions, then $(A) * (B)$ is a valid expression.
5. If A and B are valid expressions, then $(A)/(B)$ is a valid expression. (/ here produces exact value, not integer division and expression A must produce a non-zero value)
6. If A and B are valid expressions, then $(A)^{(B)}$ is a valid expression. (expression A must produce a non-negative value)
7. If A is valid expression, then $\sqrt{(A)}$ is a valid expression.(expression A must produce a non-negative value) **IMPORTANT**: a valid expression can contain at most ten $\sqrt{(A)}$ operations.
8. If A is valid expression, then $(A)!$ is a valid expression.(! here means factorial, and expression A must produce a non-negative integer)
9. If A is valid expression, then $-(A)$ is a valid expression.($-$ here means negative)

Now Little Mono would like to know the minimal number of Ds he needs to use in order to represent integer N.

Input

The first line of the input gives the number of test cases, T. T test cases follow.

Each test case contains one line consists of 2 integers D, N, indicating the digit Little Mono knows and the integer Little Mono would like to represent.

Output

For each test case, output one line containing "`Case #x: y`", where `x` is the test case number (starting from 1) and `y` is the minimal number of Ds Little Mono has to use.

Limits

- $1 \le T \le 900$.
- $1 \le D \le 9$.
- $1 \le N \le 100$.

Example

standard input	standard output
3 1 10 4 64 8 50	Case #1: 3 Case #2: 2 Case #3: 5

Note

In the first test case, Little Mono can use 3 1s as $11 - 1$ to represent 10.

In the second test case, Little Mono can use 2 4s as $\sqrt{\sqrt{\sqrt{4}}}^{(4!)}$ to represent 64.