

Kick Start 2017 - Round G

Huge Numbers

Problem

Professor Shekhu has another problem for Akki today. He has given him three positive integers **A**, **N** and **P** and wants him to calculate the remainder when $A^{N!}$ is divided by **P**. As usual, **N!** denotes the product of the first **N** positive integers.

Input

The first line of the input gives the number of test cases, **T**. **T** lines follow. Each line contains three integers **A**, **N** and **P**, as described above.

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 answer.

Limits

$1 \leq T \leq 100$.

Time limit: 40 seconds per test set.

Memory limit: 1GB.

Small dataset (Test set 1 - Visible)

$1 \leq A \leq 10$.

$1 \leq N \leq 10$.

$1 \leq P \leq 10$.

Large dataset (Test set 2 - Hidden)

$1 \leq A \leq 10^5$.

$1 \leq N \leq 10^5$.

$1 \leq P \leq 10^5$.

Sample

Sample Input

```
2
2 1 2
3 3 2
```

Sample Output

```
Case #1: 0
Case #2: 1
```

In Sample Case #1, the answer is the remainder when $2^{1!} = 2$ is divided by 2, which is 0.

In Sample Case #2, the answer is the remainder when $3^{3!} = 3^6 = 729$ is divided by 2, which is 1.