Submissions

Scaled Triangle
9pt | Not attempted **83/100 users** correct (83%)
13pt | Not attempted **78/87 users** correct (90%)

Painting a Fence
7pt | Not attempted **190/199 users** correct (95%)
13pt | Not attempted **113/144 users** correct (78%)

Rainbow Trees
9pt | Not attempted **71/90 users** correct (79%)
15pt | Not attempted **68/72 users** correct (94%)

Bus Stops
8pt | Not attempted **51/57 users** correct (89%)
26pt | Not attempted **16/23 users** correct (70%)

Top Scores

bmerry	100
dzhulgakov	100
gawry	100
dgozman	100
halyavin	100
pashka	100
mystic	100
Klinck	80
.Invader	76
DmitryKlenov	76

Problem D. Bus Stops

This contest is open for practice. You can try every problem as many times as you like, though we won't keep track of which problems you solve. Read the Quick-Start Guide to get started.

Small input 8 points	Solve D-small
Large input 26 points	Solve D-large

Problem

In the First City of Mars there are **N** bus stops, all aligned in a straight line of length **N**-1 km. The mayor likes to keeps things simple, so he gave the bus stops numbers from 1 to **N**, and separated adjacent stops by exactly 1 km.

There are also **K** buses in the city. The mayor has to plan the bus schedule and he would like to know in how many ways that can be done. This number can be very large. Luckily there are a few constraints:

- In the beginning of the day all the buses are in the first **K** bus stops (one bus per stop)
- Buses only move from the left to the right (1 is the leftmost bus stop)
- At the end of the day all the buses must be in the last **K** bus stops (one bus per stop)
- In each bus station exactly one bus has to stop
- For the same bus the distance between any two consecutive stops is at most **P** km

Help the mayor evaluate the number of schedules. However try not to give him very bad news (a lot of schedules) so just output the real number modulo 30031.

Input

The first line in the input file is the number of cases **T**.
Each of the next **T** lines contains 3 integers separated by one space: **N**, **K** and **P**.

Output

For each case output the number of ways to plan the bus schedules (modulo 30031) in the format "Case #**t**: [number of ways modulo 30031]" where **t** is the number of the test case, starting from 1.

Limits

$1 < \mathbf{T} \leq 30$
$1 < \mathbf{P} \leq 10$
$\mathbf{K} < \mathbf{N}$
$1 < \mathbf{K} \leq \mathbf{P}$

Small dataset

$1 < \mathbf{N} < 1000$

Large dataset

$1 < \mathbf{N} < 10^9$

Sample

Input	Output
3 10 3 3 5 2 3 40 4 8	Case #1: 1 Case #2: 3 Case #3: 7380

Let's name the buses: A, B, C...
For the first case there is only one possible way of planning the schedule: A → 1, 4, 7, 10. B → 2, 5, 8. C → 3, 6, 9.
For the second case the possible ways of planning are:
(A → 1,3,5. B → 2,4),
(A → 1,3,4. B → 2,5),
(A → 1,4. B → 2,3,5).

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