

hannnnah_j's Biological Test [HDU - 5894](#)

hannnnah_j is a teacher in WL High school who teaches biology.

One day, she wants to test m students, thus she arranges n different seats around a round table.

In order to prevent cheating, she thinks that there should be at least k empty seats between every two students.

hannnnah_j is poor at math, and she wants to know the sum of the solutions. So she turns to you for help. Can you help her? The answer maybe large, and you need to mod $1e9+7$.

Input

First line is an integer T ($T \leq 1000$).

The next T lines were given n, m, k , respectively.

$0 < m < n < 1e6, 0 < k < 1000$

Output

For each test case the output is only one integer number ans in a line.

Sample

Input	copy	Output	copy
2 4 2 6 5 2 1		0 5	

Sponsor

Problem F. Color

Description

Recently, Mr. Big received n flowers from his fans. He wants to recolor those flowers with m colors. The flowers are put in a line. It is not allowed to color any adjacent flowers with the same color. Flowers i and $i + 1$ are said to be adjacent for every i , $1 \leq i < n$. Mr. Big also wants the total number of different colors of the n flowers being exactly k .

Two ways are considered different if and only if there is at least one flower being colored with different colors.

Input

The first line of the input gives the number of test cases, T . T test cases follow. T is about 300 and in most cases k is relatively small.

For each test case, there will be one line, which contains three integers n, m, k ($1 \leq n, m \leq 10^9, 1 \leq k \leq 10^6, k \leq n, m$).

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 number of ways of different coloring methods modulo $10^9 + 7$.

Samples

Sample Input	Sample Output
2	Case #1: 2
3 2 2	Case #2: 0
3 2 1	



<h1>G</h1>	<h1>Binary Strings</h1>	
	Input	Standard Input
	Output	Standard Output

A young boy got really curious about binary strings. This string contains only 1s and 0s hence the name binary. His particular interest was about those strings for which no two ones are side by side. Specifically he wanted to know the number of strings of a certain length that consisted of only ones and zeroes and there are no two consecutive ones.

After solving this problem, the young boy got even more curious. Now he wants to know the number of binary strings which satisfies the following properties:

- The length of the string is between **L** and **R**, inclusive ($1 \leq L \leq R \leq 10^{18}$)
- The length of string is divisible by an integer **K**. ($3 \leq K \leq 10^9$)
- It is a binary string with no two consecutive ones.

Now can you help him to find out the number of strings that satisfies the above conditions? Since the number can be huge, you need to print it modulo 1 000 000 007.

Input

The first line is an integer **T** ($1 \leq T \leq 10\,000$), the number of tests. In the next **T** lines there are three integers **L**, **R** and **K**.

Output

Print **T** lines, in each line print the case id and the result modulo 1 000 000 007. See the samples for more details.

Example

Input	Output
2 1 10 3 1 10 5	Case 1: 115 Case 2: 157

Explanation:

For the first case some example strings are "101", "000", "010" "101001", "000010000" etc.