

The King's Game of Shadows

Difficulty: Hard

Tagline: Help Marcus to survive from King's wrath.

Problem Statement:

In the kingdom of Arcadia, ruled by King Thalos, a sinister game unfolded. The king, craving power, and entertainment, devised a chilling contest. **m number of teams of n members each** were formed and sent into the dreaded Cave of Shadows. Within its depths dwelled a fearsome demon known only as Xythrax, said to feast on human flesh.



Guided by trembling torchlight, the teams ventured forth, their hearts heavy with fear. They braved the darkness, knowing the peril that awaited. Each step echoed with uncertainty as they confronted the unknown horrors lurking in the shadows. But within the cave, there was a grim order. Xythrax, the demon, only consumed a **fixed number of humans (say x) each day**, adding a harrowing urgency to the teams' mission.

As the teams ventured deeper, King Thalos watched from his throne with a cruel smile. To him, the suffering of his subjects was mere amusement, a game to satisfy his desires.

Yet amidst the darkness and despair, a glimmer of rebellion stirred. In the heart of the cave, courage and hope rose against the tyranny of the king and the hunger of the demon, a small light in the midst of darkness.



Despite the king's malevolence, he still gave special gifts to the teams who **all the members made it out of the cave without any harm**. He wanted to show how much he appreciated their bravery. It was a way to say thank you for their courage in such a scary place.

However, as time passed, the king found himself unable to afford prizes for all the winning teams. Nonetheless, he was determined to continue the game for his own entertainment. Therefore, he devised a plan to estimate the number of winning teams before the game began and divide a fixed amount of money among them.

He entrusted the estimating task to a brilliant individual known as Marcus the Mathematician. In a twist of fate, Marcus, who wasn't particularly skilled at estimating, discovered a way to travel to the future and seek your assistance. Faced with the threat of the king's wrath, you have no choice but to aid him, knowing his life depended on your help. All he needs from you is the **expected value of the number of winning teams** of a particular day. Help Marcus with your programming skills to save his life.

Obviously, the expected value will be a rational number.

say p/q

Please note that p and q are the numerator and denominator of the fraction in its simplest form. For instance, if the fraction is $12/6$, $p = 2$, $q = 1$. (since $12/6 = 2/1$)

Input Format:

The input will be given in the following format.

- First line contains t - the number of test cases.



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- Next t lines contain three space separated integers n , m , and x for each test case.

Constraints:

- $n < 10^6$
- $m < 10^{20}$
- $x < 10^{20}$
- $x \leq nm$

Output Format:

- For each test case, print $p \bmod (10^9+7)$ and $q \bmod (10^9+7)$ as space separated integers

Sample Input 0

```
1
2 2 1
```

Sample Output 0

```
1 1
```



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Explanation: $n = 2$, $m = 2$ and $x = 1$. It means that there are 2 teams each having 2 members and the devil eats 1 random person. Since the devil eats one random person, one team will obviously survive with all its team members. Therefore the expected value of winning teams is 1 (as a fraction $1/1$). Thus, $p=1$, $q=1$

Sample Input 1:

```
2
1 2 1
1 1 1
```

Sample Output 1:

```
1 1
0 1
```

Explanation: For test case 0, $n = 1$, $m = 2$ and $x = 1$. It means that there are 2 teams each having 1 member and the devil eats 1 random person. Since the devil eats one random person, one team (in this case 1 person representing the team) will obviously survive with all its team members (in this case, 1 member). Therefore the expected value of winning teams is 1 (as a fraction $1/1$). Thus, $p=1$, $q=1$

For test case 1, $n = 1$, $m = 1$ and $x = 1$. It means that there is 1 team having 1 member (in other words, only one person goes into the cave) and the devil eats 1 random person. Since the devil eats one random person, the only person who goes into the cave will not be able to survive. Therefore the expected value of winning teams is 0 (as a fraction $0/1$). Thus, $p=0$, $q=1$



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