PROBLEMS   SUBMIT CODE   MY SUBMISSIONS   STATUS   HACKS   ROOM   STANDINGS   CUSTOM INVOCATION

D. Matrix game

time limit per test: 2 seconds

memory limit per test: 256 megabytes

Aryan and Harshith play a game. They both start with three integers a, b, and k. Aryan then gives Harshith two integers n and m. Harshith then gives Aryan a matrix X with n rows and m columns, such that each of the elements of X is between 1 and k(inclusive). After that, Aryan wins if he can find a submatrix* Y of X with a rows and b columns such that all elements of Y are equal.

For example, when $a = 2, b = 2, k = 6, n = 3$ and $m = 3$, if Harshith gives Aryan the matrix below, it is a win for Aryan as it has a submatrix of size 2×2 with all elements equal to 1 as shown below.

$$\begin{bmatrix} 1 & 2 & 1 \\ 3 & 4 & 5 \\ 1 & 6 & 1 \end{bmatrix} \xrightarrow{\text{removing 2nd row}} \begin{bmatrix} 1 & 2 & 1 \\ 1 & 6 & 1 \end{bmatrix} \xrightarrow{\text{removing 2nd column}} \begin{bmatrix} 1 & 1 \\ 1 & 1 \end{bmatrix}$$

Example of a matrix where Aryan wins

Aryan gives you the values of a, b, and k. He asks you to find the lexicographically minimum tuple (n, m) that he should give to Harshith such that Aryan always wins. Help Aryan win the game. Assume that Harshith plays optimally. The values of n and m can be large, so output them modulo $10^9 + 7$. A tuple (n_1, m_1) is said to be lexicographically smaller than (n_2, m_2) if either $n_1 < n_2$ or $n_1 = n_2$ and $m_1 < m_2$.

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* A submatrix of a matrix is obtained by removing some rows and/or columns from the original matrix.

Input

Each test contains multiple test cases. The first line contains the number of test cases t ($1 \le t \le 10^4$). The description of the test cases follows.

Each test case contains a single line with three space-separated integers a, b and k ($1 \le a, b, k \le 10^5$).

It is guaranteed that the sum of $\max(a, b, k)$ over all test cases does not exceed 10^5.

Output

For each test case, output a single line containing two space-separated integers n and m, denoting the answer to the problem. The values of n and m can be large, so output them modulo $10^9 + 7$.

Example

input
```
3
1 1 5
2 2 2
90000 80000 70000
```
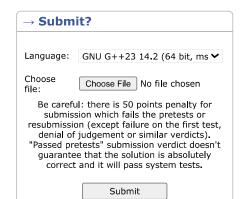
output
```

```

→ Last submissions

Submission	Time	Verdict
325444093	Jun/21/2025 18:19	**Pretests passed**

→ Score table

	Score
Problem A	412
Problem B	618
Problem C	1030
Problem D	1442
Problem E	2060
Problem F	2472
Problem G	3296
Successful hack	100
Unsuccessful hack	-50
Unsuccessful submission	-50
Resubmission	-50

* If you solve problem on 00:44 from the first attempt

```
1 1
3 7
299929959 603196135
```

Note

For the first test case, every $n \times m$ matrix contains a 1×1 submatrix with all elements equal. $(1, 1)$ is the lexicographically minimum tuple among all of them.

For the second test case, it can be verified that whatever 3×7 matrix Harshith gives to Aryan, Aryan can always win by finding a 2×2 submatrix with all elements equal. $(3, 7)$ is also the lexicographically minimum tuple among all possible tuples where Aryan always wins.