ACPC
AFRICA & ARAB
Collegiate Programming
Championship

International Collegiate Programming Contest
The 2021 ECPC Qualification Contest -
AAST, Egypt
August 2021

The International Collegiate Programming Contest
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ECPC
EGYPTIAN COLLEGIATE
PROGRAMMING CONTEST

The 2021 ECPC Qualification Contest

(Practice Contest Problems)

AAST, Egypt
August 2021

Problem A. Touta is hungry

Input file: eat.in
Balloon Color: Blue

Touta is a clever cat that can surprisingly solve a lot of difficult problems. Her partner likes to challenge her every now and then. Once he wanted to teach her which food plate she should eat from depending on 2 given numbers A and B. where Touta should eat from **Plate 1** if the sum of the numbers is strictly more than their product or eat from **Plate 2** otherwise.

Touta now learned to sum and multiply numbers so she can always eat from the correct plate, Help Touta to double check if the plate she choose is correct or not by telling her which plate she should eat from.

Input

The input consists of multiple test cases.
The number of test cases T is given in the first line of the input, following by T lines each of them represents a test case.
Each test case consists of a single line that contains two space-separated integers ($-10^9 \leq A, B \leq 10^9$).

Output

For each testcase print one line contains "Plate 1" if the sum of the numbers is strictly greater than the multiplication or "Plate 2" otherwise.

Example

eat.in	standard output
2 3 5 -6 2	Plate 2 Plate 1

-13 -4

if (A+B > A*B)
    Plate 1
else
    Plate 2

Problem B. Catch the Wave

Input file: `wave.in`
Balloon Color: `Yellow`

Touta likes to play with her toys. One specific toy is her favorite where a string that has letters printed on it is moving on the ground and she keeps catching each letter.

However, Touta's partner feels that she got bored of this game because he noticed that she started to catch only the letters that doesn't repeat consecutively (i.e. she doesn't catch the letters that are neighbors and are the same).

He knows that this type of strings is not a wave string where A *wave* in a string is defined as a sub-string where no two neighboring characters are the same.

Now he decided to cut the biggest wave in the string and let Touta play with more joy so he needs your help to determine the length of the biggest wave in Touta's string to cut it.

Input

The input will start with T, number of test cases.
Each test case consists of a single line, which contains the string ($1 \leq |S| \leq 10^6$).

Output

For each test case output a single integer, the length of the biggest wave.

Example

wave.in	standard output
2 abbabcdeef aabb	6 2

0

a a b c d f

ab

a b a b c d e f

Problem C. A Mission to eat

Input file: `mission.in`
Balloon Color: `Red`

Touta has her small kittens very dependent and spoiled. Every time they see her nearby, they stop her to play with them. So when she becomes too hungry, she tries to avoid them when she goes to eat.

Touta's room is a $N \times M$ grid. The cell $(1, 1)$ is located in the upper left corner and cell (N, M) is located in the bottom right corner.

Today, she entered the room in cell $(1, 1)$ and she knows that her food plate is in cell (N, M) where she can only move in two directions: right and down.

- If Touta is on cell (i, j) and she moves right, she will be on cell $(i, j + 1)$.
- If Touta is on cell (i, j) and she moves down, she will be on cell $(i + 1, j)$.

However; the kittens are sleeping now in the room, each in their favorite cells. But for Touta to eat, she should press **at least** one of the buttons existed in the room for the food dispenser to drop food in the plate (if there are no buttons to press then the food will be already in the plate).

Now, help Touta to know the number of possible distinct paths she could take to reach the food plate without being in the same cell with any kitten while pressing one of the buttons to turn on the food dispenser (if there are no buttons then no need to press anything)

Note that Touta interacts with a kitten or with a button if she becomes in the same cell with it.

Let's consider two paths $P_1 = a_1, \ldots, a_x$ and $P_2 = b_1, \ldots, b_x$, where a_i and b_i are cells in the grid, $a_1 = b_1 = (1, 1)$ and $a_x = b_x = (N, M)$. We say that P_1 and P_2 are different if there is i $(1 \le i \le x)$ such that $a_i \neq b_i$.

Input

The input may contain more than one test case.
The first line of the input is the number of test cases T, and for each test case:
The first line contains N, M, K, L $(2 \le N, M \le 2 \times 10^4, 0 \le K, L \le (N \times M - 2), 0 \le K + L \le (N \times M - 2))$.
Where N,M are the dimensions of the room, K is the number of kittens in the room and L is the number of the buttons in the room.

Each of the next K lines contains two integers i and j $(1 \le i \le N, 1 \le j \le M)$, each represents a cell that contains a kitten.
Each of the following L lines contains two integers i and j $(1 \le i \le N, 1 \le j \le M)$, each represents a cell that contains a dispenser button.
It is guaranteed that each cell can contains at most one kitten, cells (1, 1), (N, M) have no kittens and no kitten could be in a button cell.

Output

For each test case print one line containing the number of distinct possible paths for Touta to move from cell $(1, 1)$ to cell (N, M) passing no kitten cells and at least presses one button if exists.
Since the number may be very large, print the answer modulo $(10^9 + 7)$.

Example

mission.in	standard output
2 4 5 3 0 1 5 2 2 3 4 4 5 3 2 1 5 2 2 3 4 2 4 3 3	6 4