



Greetings From Globussoft

- ❖ Given below are 5 Programming questions, you have to solve any 3 out of 5 questions.
- ❖ These 5 questions you can attempt in any technology like C/C++, java, .Net, PHP
- ❖ To solve these 3 questions you've max. 3 hours.
- ❖ While Solving these questions you are not allowed to use any Search Engine like Google, Yahoo, Bing ...

All the best for your test

Globussoft

QUESTION - 1

On some special occasion Nadia's company provide very special lunch for all employees of the company. Before the food is served all of the employees must stand in a queue in front of the food counter. The company applied a rule for standing in the queue. For instance if Abul is the supervisor of Babul and Abul stands in k th position from the front of the queue, then Babul cannot stand at any position in between 1 and $k-1$ from front of the queue. The company has N employees and each of them has one supervisor except one who doesn't have any supervisor.

You need to calculate in how many ways the queue can be created. You can safely assume that in at least one way the queue can be created.

Input

The first line is the number of test cases.

Each test case:

- The first line contains 2 integers M and N .
- Line $2..N$: consist of one integer is supervisor of i -employees.

Output

For each test case: the result of this problem module M in one line.

Example

Input :

1
2 2
1

Output :

1

QUESTION – 2

Recently I made a new device. It contains a set of lightbulbs, each having two parts. The left part glows blue and the right part glows green. One cannot guess which parts of the bulbs will be glowing when the device is powered on. Consider any two adjacent bulbs at time t . If the left bulb is glowing green and the right bulb is glowing blue they swap their states to blue and green respectively at time $t + 1$. But now I am wondering, if I power it on when will the bulbs stop swapping. Can you help me with this ?

Input

The first line of the input contains t , the number of testcases. Each of the next t lines contains a single string containing characters 'B' and 'G' representing the bulbs when switched on i.e. at time $t = 0$. Here 'B' is for blue and 'G' is for green. The length of the string will be less than 100000.

Output

For each test output one line giving the time after which swapping stops.

Example

Input :

2

GBGBBB

BGBBGGGBBBGBGB

Output :

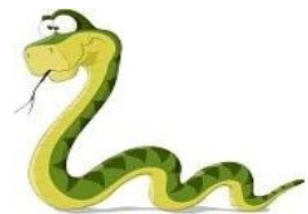
4

8

QUESTION – 3

Sanky is a school kid and is very fond of numbers. His teacher gave his class a home work, asking each of them to invent a new series of numbers, with a large collection of numbers in them. His friend Evan has already invented one, which starts from 0 and picks every alternate number : $\{0, 2, 4, \dots\}$ and he named them 'Evan' numbers :). Sanky is not happy because he couldn't invent that first and thinks picking every alternate number starting from 1 : $\{1, 3, 5, \dots\}$ would not be very odd ;).

After refreshing at home, he comes up with a new series of numbers in which the digits alternate between increasing and decreasing when compared with the digit before it, in a zig-zag fashion. To make it clear, if the number is abcde, either $a < b > c < d > e$ or $a > b < c > d < e$. He cleverly named them 'Snaky Numbers' :). Eg: 8, 90, 243516 and 31524 are Snaky while 44, 123 and 4235 are not. He is now wondering if his Snaky series is large enough. Particularly, he wants to know how many



'Snaky Numbers' are there of length *at most* N . Count only non-negative integers, without leading zeros.

The answer may get very big and not fit in Sanky's book, so please just tell him the (answer modulo M)

Input

First line contains T [number of test cases, around 50]. Each of the next T lines contains two integers N M .

$1 \leq N \leq 1,000,000,000$

$2 \leq M \leq 1,000,000,007$

Output

For each test case, output (Number of Snaky numbers of length at most N) % M , in a separate line

Example

Input:

```
3
1 101
2 107
3 1001
```

Output:

```
10
91
616
```

QUESTION – 4

Chakra is a young and dynamic entrepreneur, who is developing rapidly as a successful hotelier. He owns the Quickbyte chain of restaurants, 'M' of which are fully functional now. He divides each day into 'N' time slots. For each time slot 'j', in every restaurant 'i', there are A_{ij} waiters and B_{ij} customers. Being a quality conscious person, he wants each waiter to handle atmost one customer in a given time slot. Since he is really busy, in a day each restaurant is open only during one of the time slots. Since the hunger and demand for food varies during the day, the price which the customer is willing to pay varies, and is given by C_{ij} for a restaurant 'i' during a time slot 'j'.

Given the values of A_{ij} , B_{ij} and C_{ij} , find the maximum profit which Chakra can make in a day.

Input

The first line of input contains an integer 't', denoting the number of test cases.

For each testcase, the first line contains 2 space separated integers 'M' and 'N'.

Each of the next 'M' lines contains 'N' integers. The j^{th} integer on the i^{th} line denotes the value of A_{ij}

Each of the next 'M' lines contains 'N' integers. The j^{th} integer on the i^{th} line denotes the value of B_{ij}

Each of the next 'M' lines contains 'N' integers. The j^{th} integer on the i^{th} line denotes the value of C_{ij}

Output

For each test case output one value, denoting the maximum profit which Chakra can make in a day.

More than one restaurant can be open during a given time slot.

Example

Input :

```
1
2 3
1 2 3
3 2 1
3 2 1
1 2 3
4 5 2
3 1 6
```

Output :

```
16
```

QUESTION – 5

Nivash and Bhoopathi play a game of memory, which goes as follows: There is a tree containing 'N' nodes, all of which are initially uncoloured. In the game, Nivash has 2 moves:

- 1) Command: Color a particular node with a given color.
- 2) Query: Ask Bhoopathi if the path from node 'a' to node 'b' (both inclusive), is monochromatic or not.(i.e Whether all nodes on the path have the same color).

Nivash can do these steps in any order he wishes and he colors each node atmost once.

Whenever Nivash puts forth a 'Query' at Bhoopathi, Bhoopathi has to recollect the colouring of the tree and reply either "YES" or "NO". Can your help Bhoopathi answer these queries?

Input

The first line of input contains an integer 'N', denoting the number of nodes in the tree. The next 'N-1' lines contain 2 space separated integers 'u' and 'v', denoting an edge between vertex 'u' and vertex 'v'.

The next line contains an integer 'Q', denoting the number of inputs (commands and queries) which Nivash wants to give. The next 'Q' lines contain 3 space separated integers 'x', 'a', 'b'. If 'x' is 1, it denotes a command to color node 'a' with a color 'b'. If 'x' is 2, it denotes a query and Bhoopathi should answer if the path from node 'a' to node 'b' (both inclusive), is monochromatic or not.

All vertices of the tree are 0 based.

Output

For each query, output "YES" or "NO" (quotes for clarity), denoting whether the path from node 'a' to node 'b' (both inclusive), is monochromatic or not.

Output "NO", even if all nodes on the path from node 'a' to node 'b' (both inclusive) are uncolored.

Example

Input :

```
3
0 1
1 2
7
1 0 11
2 0 1
2 0 2
1 2 12
1 1 11
2 0 1
2 0 2
```

Output :

```
NO
NO
YES
NO
```