D. Magic Breeding

time limit per test: 4 seconds
memory limit per test: 1024 megabytes
input: standard input
output: standard output

Nikita and Sasha play a computer game where you have to breed some magical creatures. Initially, they have k creatures numbered from 1 to k. Creatures have n different characteristics.

Sasha has a spell that allows to create a new creature from two given creatures. Each of its characteristics will be equal to the maximum of the corresponding characteristics of used creatures. Nikita has a similar spell, but in his spell, each characteristic of the new creature is equal to the minimum of the corresponding characteristics of used creatures. A new creature gets the smallest unused number.

They use their spells and are interested in some characteristics of their new creatures. Help them find out these characteristics.

Input

The first line contains integers n, k and q ($1 \le n \le 10^5$, $1 \le k \le 12$, $1 \le q \le 10^5$) — number of characteristics, creatures and queries.

Next k lines describe original creatures. The line i contains n numbers $a_{i1}, a_{i2}, ..., a_{in}$ ($1 \le a_{ij} \le 10^9$) — characteristics of the i-th creature.

Each of the next q lines contains a query. The i-th of these lines contains numbers t_i, x_i and y_i ($1 \le t_i \le 3$). They denote a query:

- $t_i = 1$ means that Sasha used his spell to the creatures x_i and y_i.
- $t_i = 2$ means that Nikita used his spell to the creatures x_i and y_i.
- $t_i = 3$ means that they want to know the y_i-th characteristic of the x_i-th creature. In this case $1 \le y_i \le n$.

It's guaranteed that all creatures' numbers are valid, that means that they are created before any of the queries involving them.

Output

For each query with $t_i = 3$ output the corresponding characteristic.

Examples

input

```
2 2 4
1 2
2 1
1 1 2
2 1 2
3 3 1
3 4 2
```

output

```
2
1
```

input

```
5 3 8
1 2 3 4 5
5 1 2 3 4
4 5 1 2 3
1 1 2
```

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

output

```
5
2
2
3
4
```

Note

In the first sample, Sasha makes a creature with number 3 and characteristics $(2, 2)$. Nikita makes a creature with number 4 and characteristics $(1, 1)$. After that they find out the first characteristic for the creature 3 and the second characteristic for the creature 4.