Total score: 500

Question 1

Max. score 100.00

Covid Vaccine Distribution

A leading Biotech company in India has finally created a vaccine for the Covid19 virus! The company has nominated you to handle the transportation of the vaccine boxes to the covid center in Delhi. They have given you N reefer vans. Each of the i^{th} van contains W_i boxes of vaccine and has a total storage capacity for C_i boxes.

The total no of vaccine boxes that you must transport to Delhi is the sum of the no of boxes in all the vans. Sadly, given the environmental restrictions, you need to find the **minimum number of vans** that can do the job. To achieve this you are allowed move vaccine boxes between the vans. Note that you can also transfer any no. of boxes from one van to another, any number of times.

Input format

- The first line contains N i.e. the total number of vans.
- The next line contains N space separated integers, where the i^{th} integer denotes C_i, the total capacity of i^{th} van.
- The next line also contains N space separated integers, where the i^{th} integer denotes W_i, the no of vaccine boxes present in the i^{th} van.

Output format

Print one line denoting the minimum number of vans needed.

Total score: 500

- The next line contains N space separated integers, where the i^{th} integer denotes C_i, the total capacity of i^{th} van.
- The next line also contains N space separated integers, where the i^{th} integer denotes W_i, the no of vaccine boxes present in the i^{th} van.

Output format

Print one line denoting the minimum number of vans needed.

Constraints

$1 \leq N \leq 10^5$

$1 \leq C_i \leq 10^5$

$0 \leq W_i \leq C_i$

Sample input 1 Copy

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

Sample output 1 Copy

```
2
```

Total score: 500

Question 2

Max. score 100.00

Maximum vaccine stock

A disease has spread in your country that does not have any vaccines. The Health Department of your country is working to create its vaccine. The limitation to create vaccines is the cost that is required to create an effective vaccine.

The scientists of the department have created **9** samples that are numbered from **1** to **9**. Each vaccine is associated with a cost. The cost is denoted by an array X where X_i denotes the cost of the i^{th} sample. The Health Department has been assigned N units of money to spend. This amount of money must be used to create stocks of vaccines that can be distributed among different hospitals that are situated at different locations in your country.

You are required to find the largest number of stocks possible that can be formed by using the N units of money. If it is not possible to form such a stock of vaccines, then print -1.

Input format

- First line: T denoting the number of test cases
- For each test case:
  - First line: N denoting the amount of money
  - Second line: Nine space-separated integers $X_1, X_2, X_3, \ldots, X_9$, denoting the cost of each vaccine

Output format

Print the largest value of stocks that can be bought by using the N units of money. If it is not possible to form such a stock, then print -1. For each test case, print the answer in a new line.

estions Total score: 500

gramming questions

Covid Vaccine Distribution - 100.0

Maximum vaccine stock - 100.0

Rose garden - 100.0

The Apple in Eden - 100.0

Happy Belated Diwali - 100.0

stock of vaccines, then print -1.

Input format

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- For each test case:
  - First line: N denoting the amount of money
  - Second line: Nine space-separated integers $X_1, X_2, X_3, \ldots, X_9$, denoting the cost of each vaccine

Output format

Print the largest value of stocks that can be bought by using the N units of money. If it is not possible to form such a stock, then print -1. For each test case, print the answer in a new line.

Constraints

$1 \leq T \leq 10^3$

$1 \leq N \leq 10^4$

$1 \leq X_i \leq 10^3$

Sample input 1 Copy

```
2
5
9 4 2 2 6 3 2 2 1
2
5 11 2 2 5 8 9 10 19
```

Sample output 1 Copy

```
24
4
```

Total score: 500

gramming questions

Covid Vaccine Distribution - 100.0

Maximum vaccine stock - 100.0

Rose garden - 100.0

The Apple in Eden - 100.0

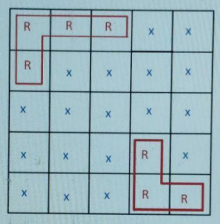
Happy Belated Diwali - 100.0

Question 3

Max. score 100.00

Rose garden

Figure 1



Aman is fond of roses. This season he has started planting them in his own garden.

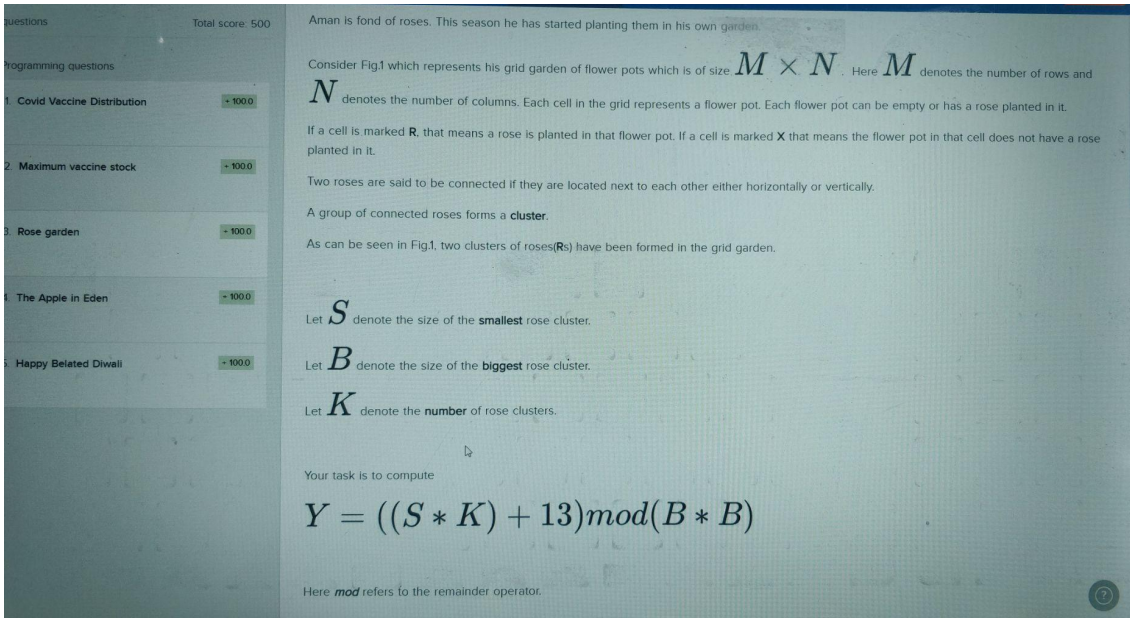
Consider Fig.1 which represents his grid garden of flower pots which is of size $M \times N$. Here M denotes the number of rows and N denotes the number of columns. Each cell in the grid represents a flower pot. Each flower pot can be empty or has a rose planted in it.

If a cell is marked **R**, that means a rose is planted in that flower pot. If a cell is marked **X** that means the flower pot in that cell does not have a rose planted in it.

Two roses are said to be connected if they are located next to each other either horizontally or vertically.

A group of connected roses forms a **cluster**.

As can be seen in Fig.1, two clusters of roses(**R**s) have been formed in the grid garden.


questions
Total score: 500
Programming questions
1. Covid Vaccine Distribution
- 100.0
2. Maximum vaccine stock
- 100.0
3. Rose garden
- 100.0
4. The Apple in Eden
- 100.0
5. Happy Belated Diwali
- 100.0
Aman is fond of roses. This season he has started planting them in his own garden.
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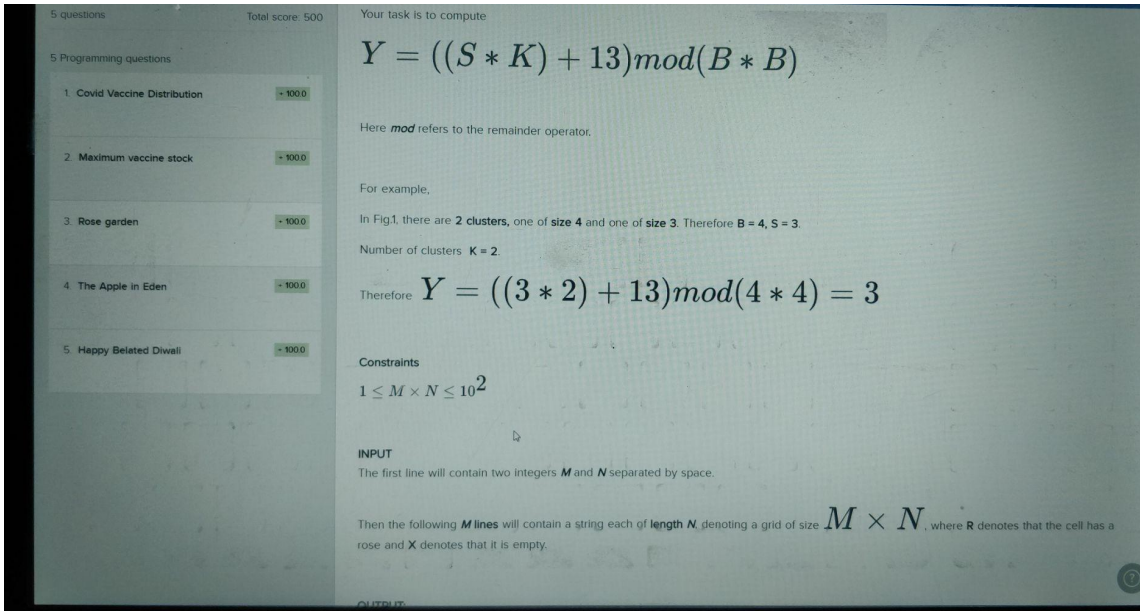
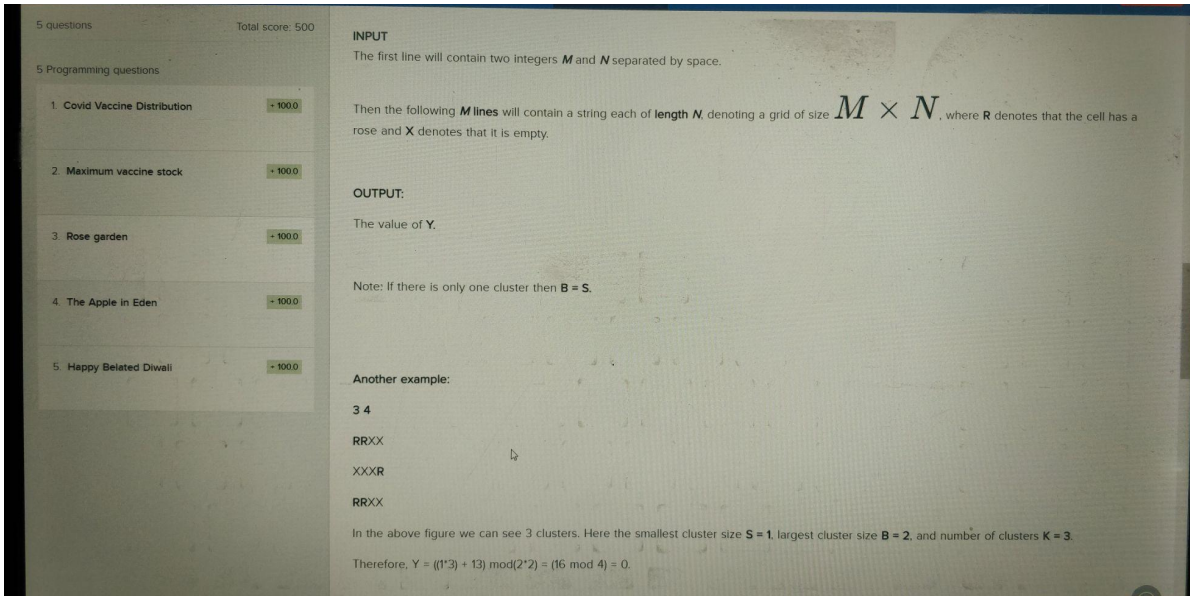
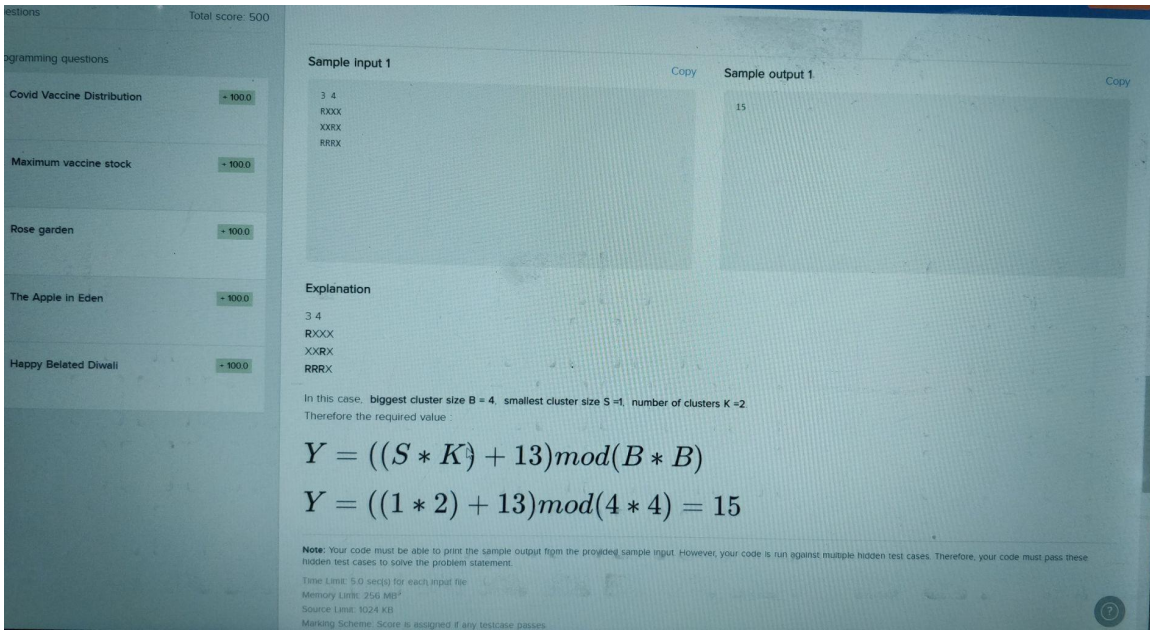
If a cell is marked R, that means a rose is planted in that flower pot. If a cell is marked X that means the flower pot in that cell does not have a rose planted in it.
Two roses are said to be connected if they are located next to each other either horizontally or vertically.
A group of connected roses forms a cluster.
As can be seen in Fig.1, two clusters of roses(Rs) have been formed in the grid garden.
Let S denote the size of the smallest rose cluster.
Let B denote the size of the biggest rose cluster.
Let K denote the number of rose clusters.
Your task is to compute
$$Y = ((S * K) + 13) mod (B * B)$$
Here mod refers to the remainder operator.


5 questions
Total score: 500
5 Programming questions
1. Covid Vaccine Distribution
- 100.0
2. Maximum vaccine stock
- 100.0
3. Rose garden
- 100.0
4. The Apple in Eden
- 100.0
5. Happy Belated Diwali
- 100.0
Your task is to compute
$$Y = ((S * K) + 13) mod (B * B)$$
Here mod refers to the remainder operator.
For example,
In Fig.1, there are 2 clusters, one of size 4 and one of size 3. Therefore B = 4, S = 3.
Number of clusters K = 2.
Therefore $Y = ((3 * 2) + 13) mod (4 * 4) = 3$
Constraints
$1 \leq M \times N \leq 10^2$
INPUT
The first line will contain two integers M and N separated by space.
Then the following M lines will contain a string each of length N, denoting a grid of size $M \times N$, where R denotes that the cell has a rose and X denotes that it is empty.


5 questions
Total score: 500
5 Programming questions
1. Covid Vaccine Distribution + 100.0
2. Maximum vaccine stock + 100.0
3. Rose garden + 100.0
4. The Apple in Eden + 100.0
5. Happy Belated Diwali + 100.0
INPUT
The first line will contain two integers M and N separated by space.
Then the following M lines will contain a string each of length N, denoting a grid of size $M \times N$, where R denotes that the cell has a rose and X denotes that it is empty.
OUTPUT:
The value of Y.
Note: If there is only one cluster then B = S.
Another example:
3 4
RRXX
XXXR
RRXX
In the above figure we can see 3 clusters. Here the smallest cluster size S = 1, largest cluster size B = 2, and number of clusters K = 3.
Therefore, Y = ((1*3) + 13) mod(2*2) = (16 mod 4) = 0.


Total score: 500
Covid Vaccine Distribution + 100.0
Maximum vaccine stock + 100.0
Rose garden + 100.0
The Apple in Eden + 100.0
Happy Belated Diwali + 100.0
Sample input 1
Copy
3 4
RXXX
XXRX
RRRX
Sample output 1
Copy
15
Explanation
3 4
RXXX
XXRX
RRRX
In this case, biggest cluster size B = 4, smallest cluster size S =1, number of clusters K =2
Therefore the required value :
$Y = ((S * K) + 13) mod (B * B)$
$Y = ((1 * 2) + 13) mod (4 * 4) = 15$
Note: Your code must be able to print the sample output from the provided sample input. However, your code is run against multiple hidden test cases. Therefore, your code must pass these hidden test cases to solve the problem statement.
Time Limit: 5.0 sec(s) for each input file
Memory Limit: 256 MB
Source Limit: 1024 KB
Marking Scheme: Score is assigned if any testcase passes.

Total score: 500

tions

Distribution + 100.0

ine stock + 100.0

+ 100.0

iden + 100.0

i Diwali + 100.0

Question 4 Max. score 100.00

The Apple in Eden

Suppose the garden of Eden is a 2-D grid of size $M \times N$ (M rows and N columns). The top-left cell is indexed $(0, 0)$ and the bottom right cell is indexed $(M-1, N-1)$.

One particular cell (P, Q), the cell in the $(P+1)^{th}$ row and the $(Q+1)^{th}$ column, has an apple in it.
You have a robot named Eve that starts from the top-left cell and goes to the bottom-right cell where another robot Adam is waiting. Eve would collect the apple if she lands on the cell containing the apple while traveling to Adam. **Eve can only move one step right or one step down from the cell she is currently in**.
Can you find the number of possible paths Eve may take to go to Adam and collecting the apple along her way?

You need to complete the function solve() and return the number of possible paths. This number could be large, so return the answer modulo $10^9 + 7$ instead.

The input contains 4 integers M, N, P, and Q. Your program must output only the number of possible paths. You may assume that the apple could be in any cell except the top-left and the bottom-right cells.

Constraints:

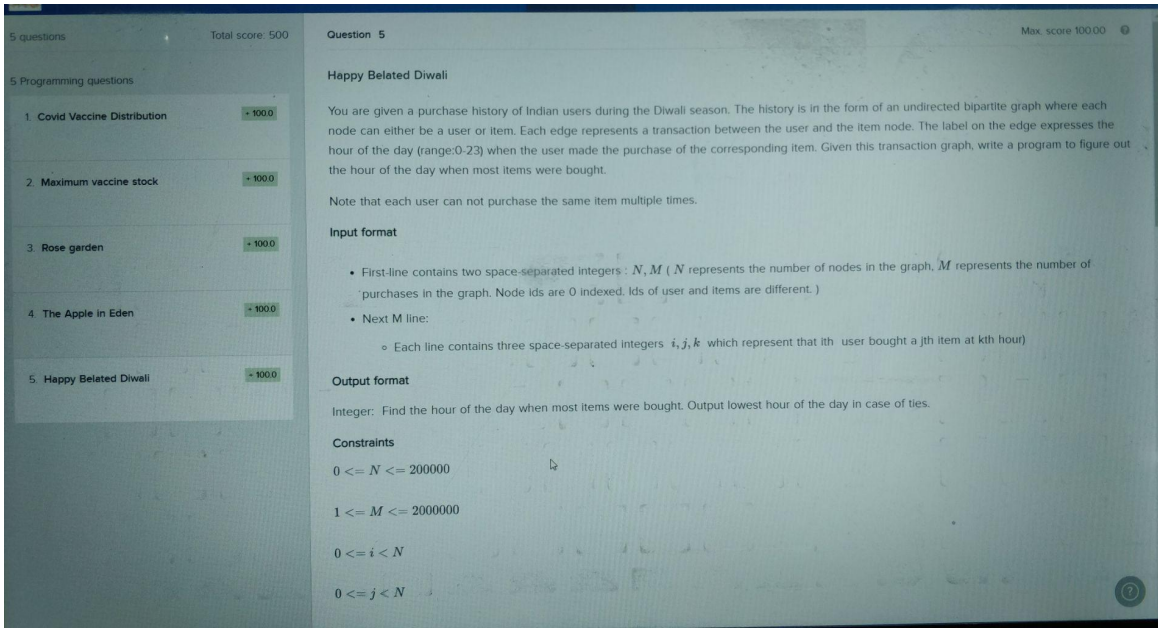
$2 \leq M, N \leq 10^5$
$(P, Q) \neq (0, 0)$
$(P, Q) \neq (M-1, N-1)$

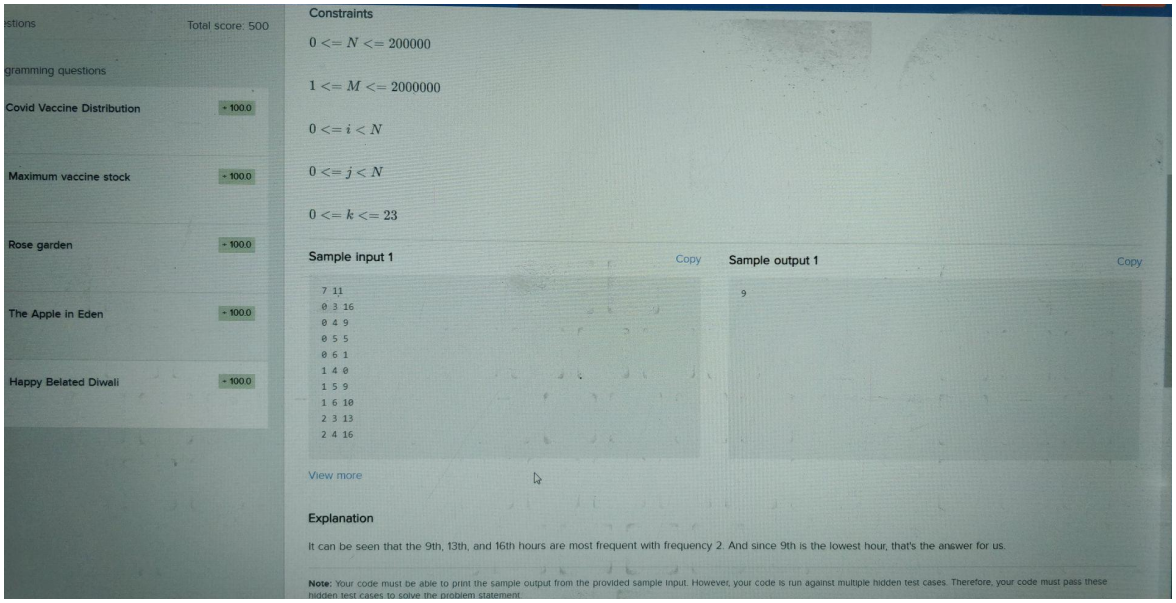
Sample input 1 Copy

```
3 3 1 2
```

Sample output 1 Copy

```
3
```


5 questions
Total score: 500
5 Programming questions
1. Covid Vaccine Distribution
- 100.0
2. Maximum vaccine stock
- 100.0
3. Rose garden
- 100.0
4. The Apple in Eden
- 100.0
5. Happy Belated Diwali
- 100.0
Question 5
Max. score 100.00
Happy Belated Diwali
You are given a purchase history of Indian users during the Diwali season. The history is in the form of an undirected bipartite graph where each node can either be a user or item. Each edge represents a transaction between the user and the item node. The label on the edge expresses the hour of the day (range:0-23) when the user made the purchase of the corresponding item. Given this transaction graph, write a program to figure out the hour of the day when most items were bought.
Note that each user can not purchase the same item multiple times.
Input format
First-line contains two space-separated integers : N, M (N represents the number of nodes in the graph, M represents the number of purchases in the graph. Node ids are 0 indexed. Ids of user and items are different.)
Next M line:
Each line contains three space-separated integers i, j, k which represent that ith user bought a jth item at kth hour)
Output format
Integer: Find the hour of the day when most items were bought. Output lowest hour of the day in case of ties.
Constraints
$0 <= N <= 200000$
$1 <= M <= 2000000$
$0 <= i < N$
$0 <= j < N$


stions
Total score: 500
gramming questions
Covid Vaccine Distribution
- 100.0
Maximum vaccine stock
- 100.0
Rose garden
- 100.0
The Apple in Eden
- 100.0
Happy Belated Diwali
- 100.0
Constraints
$0 <= N <= 200000$
$1 <= M <= 2000000$
$0 <= i < N$
$0 <= j < N$
$0 <= k <= 23$
Sample input 1
Copy
7 11
0 3 16
0 4 9
0 5 5
0 6 1
1 4 0
1 5 9
1 6 10
2 3 13
2 4 16
Sample output 1
Copy
9
View more
Explanation
It can be seen that the 9th, 13th, and 16th hours are most frequent with frequency 2. And since 9th is the lowest hour, that's the answer for us.
Note: Your code must be able to print the sample output from the provided sample input. However, your code is run against multiple hidden test cases. Therefore, your code must pass these hidden test cases to solve the problem statement.