

[Exam1] Game

Jeff loves playing games, Gluttonous snake(an old game in NOKIA era) is one of his favourites. However, after playing gluttonous snake so many times, he finally got bored with the original rules.

In order to bring new challenge to this old game, Jeff introduced new rules :

1. The ground is a grid, with n rows and m columns($1 \leq n, m \leq 500$).
2. Each cell contains a value v ($-1 \leq v \leq 99999$), if v is -1, then this cell is blocked, and the snake can not go through, otherwise, after the snake visited this cell, you can get v point.
3. The snake can start from any cell along the left border of this ground and travel until it finally stops at one cell in the right border.
4. During this trip, the snake can only go up/down/right, and can visit each cell only once.

Special cases :

- a. Even in the left border and right border, the snake can go up and down.
- b. When the snake is at the top cell of one column, it can still go up, which demands the player to pay all current points , then the snake will be **teleported** to the bottom cell of this column and vice versa.

After creating such a new game, Jeff is confused how to get the highest score. Please help him to write a program to solve this problem.

Input

The first line contains two integers n (rows) and m (columns), ($1 \leq n, m \leq 500$), separated by a single space.

Next n lines describe the grid. Each line contains m integers v_i ($-1 \leq v_i \leq 99999$)

$v_i = -1$ means the cell is blocked.

Output

Output the highest score you can get. If the snake can not reach the right side, output **-1**.

Limits

- Memory limit per test : 256 megabytes
- Time limit per test : The faster the better

Compile & Environment

C++

```
g++ Main.cc -o Main -fno-asm -Wall -lm --static -std=c++0x -DONLINE_JUDGE
```

Java

Java 7

Maximum stack size is 50m

Skeleton Code

Java

```
public class Main {  
    public static void main(String[] args) {  
        // TODO: Implement your program  
    }  
}
```

C++

```
int main(){  
    // TODO: Implement your program  
}
```

Sample Test

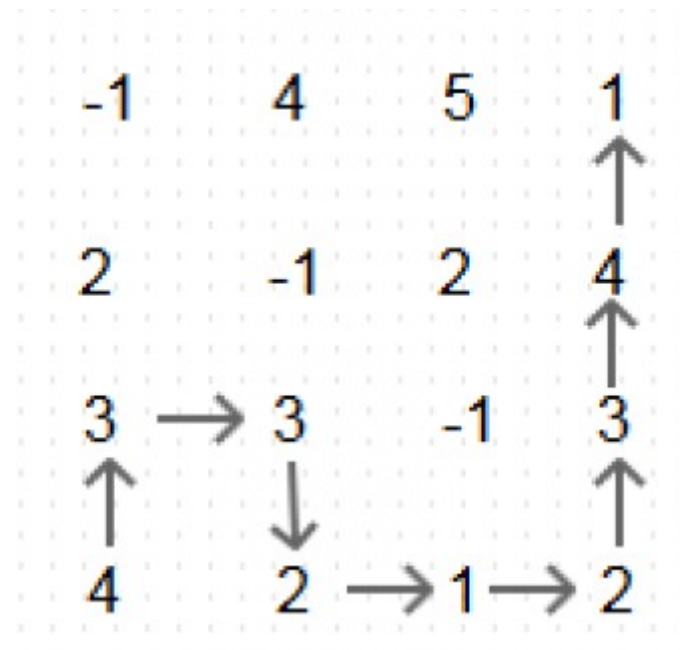
Input

```
4 4  
-1 4 5 1  
2 -1 2 4  
3 3 -1 3  
4 2 1 2
```

output

```
23
```

Path is as shown below



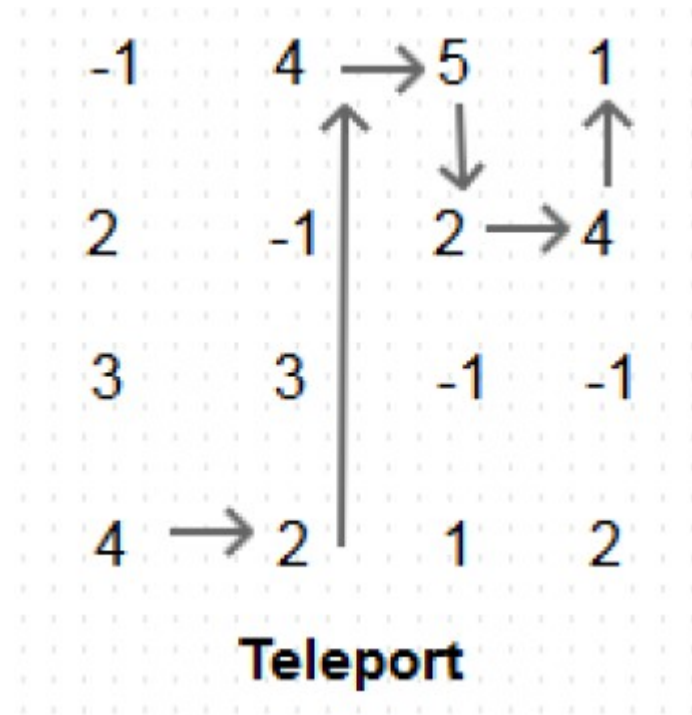
Input

```
4 4
-1 4 5 1
2 -1 2 4
3 3 -1 -1
4 2 1 2
```

output

```
16
```

Path is as shown below



[Exam2] Travel Information Center

Aps Island has many cities. In the summer, many travellers will come to the island and attend festive events in different cities. The festive events in Aps Island are crazy. Once it starts, it will never end. In the following sentences, the cities which have festive events are called festive cities.

At the beginning, only city No. 1 is festive city. If a new city becomes festive city, the government will tell the information center about this news.

Everyday, the information center will receive many inquiries from travellers from different cities of this land. They want to know the closest festive city, and calculate the distance (If current city has festive event, the distance is 0).

Due to the growing number of the travellers, the information center is overloaded. The government wants to fix the problem by developing a system to handle the inquiries automatically.

As a fact, cities in Aps Island are connected with highways (bidirectional, length of every highway is 1). Any two cities are connected directly or indirectly, and there is ONLY one path between any 2 cities.

Input

There are two integers in the first line, n ($2 \leq n \leq 10^5$) and m ($1 \leq m \leq 10^5$), n is the number of cities in the Aps Island and m is the number of queries. The coming $n-1$ lines are the highways which connect two cities. In the line, there are two integers a_i and b_i ($1 \leq a_i, b_i \leq n$, $a_i \neq b_i$), representing two cities. Each line means the highway connecting the two cities.

Next m lines are inquiries from travellers or news from government. Each line has two integers q_i and c_i ($1 \leq q_i \leq 2$, $1 \leq c_i \leq n$). If $q_i = 1$, the government announces a new festive city c_i . If $q_i = 2$, you have to find and print the shortest distance from the city c_i to the closest festive city.

Output

Results from each ($q_i = 2$) Questions. Print every result with a new line.

Limits

- Memory limit per test: 256 megabytes
- Time limit per test: The faster the better

Compile & Environment

C++

```
g++ Main.cc -o Main -fno-asm -Wall -lm --static -std=c++0x -DONLINE_JUDGE
```

Java

Java 7

Maximum stack size is 50m

Skeleton Code

Java

```
public class Main {  
    public static void main(String[] args) {  
        // TODO: Implement your program  
    }  
}
```

C++

```
int main(){  
    // TODO: Implement your program  
}
```

Sample Test

input

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

output

```
2  
1  
0  
1
```

