Problem B

Our country is an $n \times n$ grid of squares, each owned by one of the citizens. The distance between the squares is measured in the Manhattan metric, i.e., the distance between squares with coordinates (r_1, c_1) and (r_2, c_2) is $|r_1 - r_2| + |c_1 - c_2|$. We need to answer a number of queries of form "What is the minimum distance from the given square to one owned by the given citizen"?

Input and output

The first line contains integers $n \leq 300$ and $m \leq 100\,000$, the size of the square grid and the number of queries. Each of the next n lines contans n integers, giving the id's of the citizens owning the squares. Each id is between 1 and 10^9. The r-th line gives the owners of squares with coordinates $(r, 1)$, $(r, 2)$, ..., (r, n), in order.

Each of the following m lines contains three integers r, c, and i ($1 \leq r, c \leq n$, $1 \leq i \leq 10^9$. For each such line, output a line containing a single integer, the minimum distance from the square (r, c) to one owned by citizen i. It is guaranteed the citizen owns at least one of the squares.

Example

Input:

```
4 3
1 2 1 5
5 7 9 5
2 2 2 5
5 5 5 5
3 2 1
3 3 1
3 3 2
```

Output:

```
3
2
0
```