DMPG '19 G1 - Camera Calibration Challenge

Time Limit: 5.0s **Memory Limit:** 128M

One of the recommendations made this year was for **Kirito** to make a pre-recorded opening speech for the DMPG that would be played at the satellite sites.

To achieve this, **Kirito** borrowed **AvaLovelace**'s camera and digital art expertise. While ~~fooling around with~~ learning about the camera's features, he realized that he accidentally messed up the camera's exposure correction! Panicking, he recalls what she taught him about exposure:

> A photo can be represented as a grid of N by M pixels, and the pixel in row i and column j has a brightness $b_{i,j}$, which can be any real number from 10^{-6} to 1 inclusive. If you average the brightnesses of all the pixels in a typical image, the result is called the **proper exposure**.
>
> Most digital cameras have an exposure correction feature. By choosing a correction constant C and multiplying all the pixel brightnesses in an image by C, a darker or brighter image can be obtained. **When applying a correction constant, if any pixel brightnesses become greater than 1, those values are "clipped" and reduced to 1.**

Armed with this knowledge, Kirito knows that to re-calibrate the camera, he has to answer Q queries:

> What is the correction constant necessary for the proper exposure of this image to be ε_i?

Since he would prefer not to work with floating-point numbers, for each query ε_i, he would like to know the **smallest integer C' such that applying the correction constant $C' \cdot 10^{-6}$ to the image results in a proper exposure greater than or equal to ε_i.**

Constraints

$1 \leq N, M \leq 1\,000$
$10^{-6} \leq b_{i,j} \leq 1.0$
$0 \leq \varepsilon \leq 1.0$

Subtask 1 [10%]

$Q = 1$

Subtask 2 [90%]

$1 \leq Q \leq 10^6$

Input Specification

The first line of input will contain 2 space separated integers, N and M.
The next N lines will each contain M space-separated integers, the pixel brightnesses **multiplied by** 10^6.
This will be followed by a single integer, Q.
The next Q integers will each contain a single integer, ε_i **multiplied by** 10^6.

Output Specification

Q lines, where the ith line contains the smallest possible C' that will result in a proper exposure greater than or equal to ε_i.

Sample Input 1

```
2 3
360000 304000 120000
408000 312000 960000
1
480000
```

Sample Output 1

```
1250000
```

Sample Input 2

```
2 3
480000 580000 560000
380000 400000 480000
3
120000
480000
360000
```

Sample Output 2

```
250000
1000000
750000
```