Problem C: Lighting Fuses

Filename: `fuses`

Time limit: `10 seconds`

Points: 15

As you may know, Justin is a straight shooter; hard working and always staying out of trouble, but did you know he was not always like this?

When he was younger, Justin was very mischievous. He loved causing trouble and chaos whenever he got the chance! His go-to item is to amplify chaos with fireworks of all sorts. Firecrackers, roman candles, and mortars were all acceptable, but the bigger the light show, the better.

Young Justin saved money over the course of several months with the goal of one day sneaking out to purchase his largest haul of fireworks yet! He eventually achieved this goal, but after doing so, he realized that all the fuses were somehow disconnected from all the fireworks. In fact, there seemed to potentially be an abundance of fuses.

To ensure the fireworks go off correctly, each firework must have a fuse connected to it. However, the fireworks and fuses have a couple interesting properties:

1. Each fuse reacts differently with each firework. In other words, the combined time it takes for a fuse + firework combination to finish is independent of the time it takes for the fuse and firework to go off individually. However, it is guaranteed that it will take at least as long as if the fuse were not connected to any part of the firework.
2. Both the fuses and fireworks will completely disintegrate upon completion, leaving no trace of ever having existed.

Justin's parents are now asleep, giving him the perfect opportunity to wreak havoc! He goes outside to assemble the fireworks but realizes how loud they will be. Even the fuses alone are loud enough to potentially wake up his parents. Thus, he wants to minimize the time it takes to use up all the fireworks and fuses when lighting all fuses simultaneously.

The Problem

Given the time it takes for each fuse to burn out by itself, as well as how long it takes for each fuse to burn out when connected to each firework, calculate the minimum amount of time it takes to light all fireworks and fuses, leaving no trace behind.

The Input

The first line of the input will contain an integer t ($1 \leq t \leq 25$), representing the number of input cases to process.

The first line of each input case will contain two positive integers, n ($1 \leq n \leq 100$) and m ($1 \leq m \leq n$), representing the number of fuses and fireworks, respectively.

The next line of input will contain n integers, the i^{th} of which is u_i ($1 \leq u_i \leq 10^9$), representing the amount of time it takes for the i^{th} fuse to burn out when not connected to any of the fireworks.

The next m lines of input will each contain n integers. On these lines, the j^{th} integer on the i^{th} line is v_{ij} ($1 \leq v_{ij} \leq 10^9$), representing the amount of time it takes to dissolve the i^{th} firework when connected to the j^{th} fuse.

The Output

For each test case, on a line by itself, output the minimum possible time it can take to light off all parts of the firework, leaving no trace.

Sample Input

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

Sample Output

```
4
4
```

Sample Explanation: In the first sample, there are 3 fuses and 2 fireworks. If we match fuse 3 to firework 1, this combination goes off in 4 seconds. In addition, if we match fuse 2 to firework 2, this combination goes off in 4 seconds. This leaves fuse 1 unmatched to a firework, and on its own it goes off in 2 seconds. Since we assume all 3 start at the same time, all 3 combinations will disintegrate in 4 seconds with this particular matching. None of the five other possible matchings leads to a faster completion time than 4 seconds.