Flow Shop

Problem ID: flowshop

Sean's Swathers makes custom swathers (equipment used to harvest grain). All swathers go through the same basic stages in their construction: for example they all need to have a cutting bar, a grain belt, and a reel fitted. However, these components can be customized based on the buyer's needs, so these various stages may take different amounts of time between different swathers.

Photo by ken figlioli cc by-sa 2.0

N swathers have been ordered and there are M stages in the manufacturing process. The swathers will each go through the same sequence of stages.

In particular, the processing occurs as follows: For each swather i and each stage j, it takes $P_{i,j}$ units of time to complete stage j for swather i. The workers at each stage may only work on one swather at a time. At the start of the day all swather orders are ready to be processed by the first stage. At any point in the process, if the workers at stage j are idle and there are swathers waiting to be processed at this stage then the workers will pick the swather that has the lowest label (they are labelled from 1 to N). Note that the work on a stage j can only be started after the work on the stage $j-1$ is completed.

Determine the time each swather is completed.

Input

There is only one test case in each file. It begins with a single line containing N and M ($1 \leq N, M \leq 1000$), the number of swathers and stages (respectively). Following this are N lines, each with M integers. The j'th integer of the i'th line is $P_{i,j}$, giving the amount of time it will take for the workers at stage j to complete swather i ($1 \leq P_{i,j} \leq 10^6$).

Output

Output a single line containing N integers $T_1\ T_2\ \ldots\ T_n$ with a single space between consecutive integers. These should be such that stage M for swather i is completed at time T_i.

Sample Input 1

```
2 3
1 2 3
3 2 1
```

Sample Output 1

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6 7
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Sample Input 2

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3 2
3 1
4 7
2 5
```

Sample Output 2

```
4 14 19
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