

## F: Flow Shop Black

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.

In particular,  $n$  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  $j$  and each stage  $i$ , it takes  $p_{j,i}$  units of time to complete stage  $i$  for swather  $j$ . 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  $i$  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  $n$ ). Determine the time each swather is completed.

### Input

Input may consist of multiple cases. A case begins with a single line containing  $n$  and  $m$  ( $1 \leq n, m \leq 1000$ ), representing the number of swathers and stages (respectively). Following this are  $n$  lines, each with  $m$  integers. The  $i$ th integer of the  $j$ th line is  $p_{j,i}$ , giving the amount of time it will take for the workers at stage  $i$  to complete swather  $j$  ( $1 \leq p_{j,i} \leq 10$ ). The last case is followed by a line containing 0 0 (zeroes). There may be blank lines for readability.

### Output

For each case, display the case number followed by a single line containing  $n$  integers  $c_1 c_2 \dots c_n$  with a single space between consecutive integers. These should be such that stage  $m$  for swather  $j$  is completed at time  $c_j$ . Format as in the sample.

### Sample Input

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2 3
1 2 3
3 2 1
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3 2
3 1
4 7
2 5
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0 0
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### Sample Output

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Case 1: 6 7
Case 2: 4 14 19
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