

# Counting in a DAG

You are given a weighted DAG. For each vertex, calculate the sum of the weights of the vertices within its reach (including itself).

## Input

The first line contains an integer  $T$ , denoting the number of test cases.

For each test case, the first line contains two positive integers  $n$  and  $m$ , denoting the number of vertices and the number of edges in the DAG.

The second line contains  $n$  positive integers  $w_1..w_n$ , denoting the weights of vertices.

The next  $m$  lines contain two positive integers  $u,v$ , denoting an edge from  $u$  to  $v$ .

## Output

For each test case, print a line consisting of  $n$  numbers, denoting the sum for each vertex.

## Example

### Input:

```
2
4 3
510 713 383 990
4 1
4 2
2 1
4 4
450 379 230 520
3 4
2 4
2 3
2 4
```

### Output:

```
510 1223 383 2213
450 1129 750 520
```

## Constraints

Input Set 1: numberOfTestCases  $\leq$  40,  $n \leq$  100,  $m \leq$  10000

Input Set 2: numberOfTestCases  $\leq$  2,  $n \leq$  1000,  $m \leq$  500000

Input Set 3: numberOfTestCases  $\leq$  2,  $n \leq$  20000,  $m \leq$  500000

The weights are no more than 1000