Chicken Farm

Input file:	`standard input`
Output file:	`standard output`
Time limit:	1 second
Memory limit:	512 megabytes

Askhat is a young businessman. He realized that programming is not a very profitable business. Therefore, he decided to start a chicken farm.

On his farm, there are n chickens that stand in a row. The i-th chicken can eat no more than a_i grains. There are m feeders, each one is described by the numbers l_j, r_j and c_j. Chicken i can eat from feeder j, if $l_j \le i \le r_j$, and all chickens in total can eat no more than c_j grains from the j-th feeder.

As in any business, problems arise from nowhere. This time the government inspector came to his farm. He said that by current regulations, there should be at least two chickens that can eat from all feeders. In other words, there should be an integer i such that $1 \le i \le n-1$, and for all feeders $l_j \le i$ and $i+1 \le r_j$. All feeders that don't satisfy this property will be destroyed. Askhat asks you to find for each i what the maximum number of grains can be fed to chickens if you leave only feeders, from which chickens i and $i+1$ can eat.

Input

The first line contains a single integer t — the number of tests in the input ($1 \le t \le 2\,000$).

The following lines describe the given tests. The first line of each test contains two integers n and m — the number of chickens and the number of feeders, respectively ($1 \le n \le 2\,000$, $1 \le m \le 100\,000$). The following line contains n integers a_i — the maximum number of grains that the i-th chicken can eat ($0 \le a_i \le 10^9$). The following m lines contain three integers each l_j, r_j, and c_j describing the j-th feeder ($1 \le l_j \le r_j \le n$, $0 \le c_j \le 10^9$).

The total sum of all n in the input doesn't exceed $2\,000$.

The total sum of all m in the input doesn't exceed $100\,000$.

The total sum of all $n \cdot m$ in the input doesn't exceed 10^7.

Output

For each test print $n-1$ integers: the i-th of these integers should equal to the maximum number of grains that can be fed to chickens if you leave only feeders with $l_j \le i$ and $r_j \ge i+1$.

Scoring

Subtask	Points	$\sum n$	$\sum m$	Additional constraints
1	5	$\sum n \le 100$	$\sum m \le 100$	—
2	10	$\sum n \le 500$	$\sum m \le 500$	—
3	25	$\sum n \le 1\,000$	$\sum m \le 1\,000$	—
4	10	$\sum n \le 2\,000$	$\sum m \le 100\,000$	$l_i \le l_{i+1}$, $r_i \le r_{i+1}$
5	20	$\sum n \le 500$	$\sum m \le 100\,000$	—
6	30	$\sum n \le 2\,000$	$\sum m \le 100\,000$	—

Example

standard input	standard output
1 5 3 5 2 2 3 1 1 4 4 3 5 4 3 4 1	4 4 9 4

Explanations

If you leave the feeders, from which chickens 1 and 2 can eat, then only the first feeder will remain. In this case, you can feed the first chicken all the grains from it, and four grains will be fed.

Similarly, if you leave the feeders, from which the second and third chickens can eat.

If you leave the feeders, from which chickens 3 and 4 can eat, then all the feeders will remain. Then you can feed the first chicken grains from the first feeder, and the third and fourth chickens grains from the remaining feeders. Thus, nine grains will be fed.

In the last case, you leave the feeders, from which chickens 4 and 5 can eat. Only the second feeder will remain. You can feed all grains from it.