

Problem A. Cârnați

Input file: *standard input*
Output file: *standard output*
Time limit: 1 second
Memory limit: 1024 mebibytes

Cârnați means sausage, so not much to explain here. Depending on the region and family tradition, in Romania we have a lot of different types of Cârnați based on the type of meat, the preparation method, the size, the place of origin, and so on. All of these add up to over 100 varieties, so you can imagine how hard it is to choose your favourite kind.



Christmas is coming, and cârnați are on their way! Your ogradă (Romanian for backyard) can be represented as a directed graph consisting of n vertices and m edges, and it is full of lengthy cârnați.

Each vertex i has a cârnat of length ℓ_i . Considering every vertex as the starting point, you want to find out what is the lengthiest cârnat you can reach following the direction of the edges.

Input

The first line of the input contains two integers, n and m ($2 \leq n \leq 10^5$, $1 \leq m \leq 2 \cdot 10^5$). The second line contains n integers $\ell_1, \ell_2, \dots, \ell_n$: the lengths of the cârnați ($1 \leq \ell_i \leq 10^9$).

Each of the next m lines contains two integers, a and b , indicating that there exists a directed edge from vertex a to vertex b ($1 \leq a, b \leq n$, $a \neq b$). There are no multiple edges.

Output

Print a line with n integers: the length of the lengthiest cârnat you can reach starting from vertices $1, 2, \dots, n$.

Example

<i>standard input</i>	<i>standard output</i>
5 5 7 4 4 5 2 1 2 3 2 3 4 4 3 5 2	7 4 5 5 4

Note

In the given example, from vertex 1, the longest Cârnat you can reach is the one with length 7 located in the same vertex. From vertex 5, you can go to vertex 2 that contains a Cârnat of length 4.