UNSW ICPC Workshop T3W3
Easy Problem Set
Source: South Pacific Divisionals and ANZAC rounds (various years)

Discuss the problems in this document and try to solve them with your group. You can code them now if you want, but this is optional. Make sure everyone is comfortable with the solution before moving on.
Ask us if you need help, or want to check your solution.

We recommend doing the problems in the given order (roughly difficulty order), but if you don't like a problem feel free to skip it.

Both problems have links if you wish to code and submit to them

If you finish these, move onto the hard problem set

Problem C
Candy Sales
Time limit: 6 seconds

Source: By Tiia Monto, CC BY-SA 3.0

Cathy's favourite candy brand is releasing n new flavours of candy: one new flavour on each of the next n days. A pack of candy flavour i (the new flavour released on the i^{th} day) will cost w_i dollars on the day that it is released, but in order to encourage customers to try the new flavours, each candy flavour increases in price by one dollar on each day after it has been released. Precisely, on day $j \geq i$, a pack of the candy flavour released on day i costs

$$w_i + (j - i)$$

dollars.

Cathy wants to buy exactly one pack of candy on each one of the next n days and wants to get the most candy for her money. Calculate the price of the cheapest pack of candy available on each of the next n days. There is an unlimited number of packs of each flavour of candy and each flavour is available on the day of its release and all subsequent days.

Input

The input consists of two lines. The first line contains an integer n ($1 \leq n \leq 200\,000$), which is the number of flavours. The second line contains n integers $w_1, w_2, ..., w_n$ ($1 \leq w_i \leq 100\,000$), where w_i is the initial price of the i^{th} candy flavour in dollars.

Output

Display n integers, the i^{th} of which is the price of the cheapest pack of candy that Cathy can buy on day i.

Sample Input 1

```
4
3 6 7 4
```

Sample Output 1

```
3 4 5 4
```

Sample Input 2

```
4
22 22 28 24
```

Sample Output 2

```
22 22 23 24
```

Problem C
Conquest

Time Limit: 4 second

Nomads, Kingdoms, and Tribes are on the islands of the great seas. Bridges span between islands allowing travel between them. It is possible to get from every island to every other island through some sequence of bridges. The islands were at peace until everything changed when the Spanning Nation attacked!

Initially the Spanning Nation occupies island 1. From that point forward, the Spanning Nation can attack any island that is directly connected to some island already conquered by the Spanning Nation. Thankfully wars are resolved without any fighting. The Spanning Nation only attacks an island if the island's army is strictly smaller than the Spanning Nation's army. The smaller island army will simply concede and join the Spanning Nation's army.

As the tactical advisor of the Spanning Nation, determine the maximum possible army size the Spanning Nation can have after making a series of attacks.

Input

The first line contains the integer N ($1 \leq N \leq 200\,000$), which is the number of islands, and M ($0 \leq M \leq 200\,000$), the number of bridges.

The next M lines describe the bridges. Each of these lines contains two distinct integers u and v ($1 \leq u, v \leq N$), indicating that there is a bridge between the islands u and v. There is at most one bridge between any pair of islands.

The next N lines describe the islands' army size in order. Each of these lines contains a single integer s ($0 \leq s \leq 1\,000$), which is the army size of this island.

Output

Display the maximum possible army size of the Spanning Nation.

Sample Input 1	Sample Output 1
6 5 1 4 3 4 2 4 6 3 5 4 2 4 1 0 10 2	9

Sample Input 2	Sample Output 2
6 5 3 4 3 1 2 3 6 1 5 3 2 3 0 1 3 3	3