Paul Lu, Nov. 17, 2020

CMPUT 274 - Tangible Computing
Morning Problem: Obscured

Description

n people have lined up in a straight line. There is some commotion at the front of the line and everyone wants to see what the big deal is.

The i'th person in the line can see the front if every person ahead of i in the line is strictly shorter than i. Determine, for each person, if they can see past the front of the line. If they cannot, then print the largest index j such that j appears before i in the line but j is at least as tall as i. This is the person who directly obscures i's view. Here, the front person in the line has index 0 and the last person has index $n - 1$.

Input

The only line will some number (say n) of space-separated integers $h_0, \ldots, h_{n-1}$. Here, h_i is the height of the person at index i.

$1 \leq n \leq 100,000$
$0 \leq h_i \leq 100,000$ for each $0 \leq i \leq n - 1$

Output

For each input, output a single line containing n space-separated integers or characters.

The i'th entry on this line should be the character `X` if person i can see past the front of the line. Otherwise, print the largest index j such that $0 \leq j < i$ and the height of j is at least the height of i. This is person who directly obscures i's view.

Sample Input 1

```
1 2 4 2
```

Sample Output 1

```
X X X 2
```

Explanation: In every input, the person at index 0 can see past the front of the line. In this example, the person at index 1 has height 2 and they can see over the person at index 0, who has height 1.

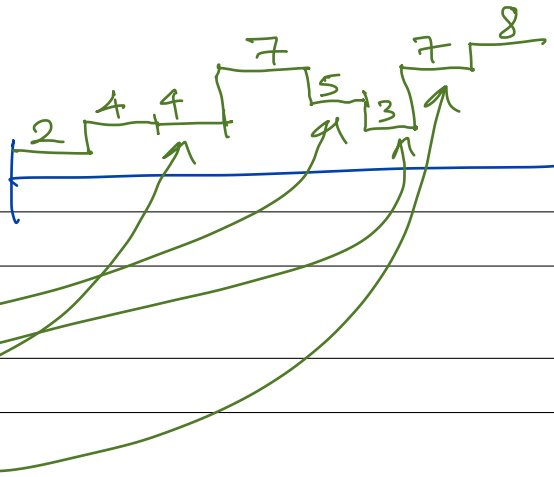
The person at index 2 has height4 and they can see over the two people ahead of them in the line. The last person (at index 3) has height 2 and the person who obscures their height of the line is at index 2 (height 4).

Sample Input 2

```
2 4 4 7 5 3 7 8
```

Sample Output 2

```
X X 1 X 3 4 3 X
```



Sample Input 3

```
1 7 2 8 9 14
```

Sample Output 3

```
X X 1 X X X
```