IOI Training Camp 2013 – Test 4, 4 May, 2013

Partial Series

A *local extrema* of a sequence of numbers is an element which is either stricly lesser than both its neighbours or strictly greater than both its neighbours. The first or last elements of a sequence cannot be local extrema.

You've are given a sequence of numbers, P, in which some of the numbers are missing. You are also given another list A and you are allowed to fill these missing slots with numbers from A. The list A may contain duplicates. You are allowed to use each element of A at most once (If say 5 appears 3 times in A, you can use it to fill 3 different holes with 5).

Your aim is to do this in such a way that the number of local extrema after filling all the holes in P is minimum and output the resulting P. There could be many ways of filling up P giving the optimal number of extrema. So, your program should output the lexicographically least such P.

Input format

- The first line of input contains two integers N and M, the lengths of P and A respectively.
- The next line contains N space separated integers, corresponding to the array P. Here, -1 indicates a missing number.
- The next line contains M space separated integers corresponding the sequence A.

Output format

Your output should be one line of N space separated integers, which corresponds to the lexicographically smallest filled-up P having the minimum number of local extrema.

Constraints

- The elements of $-1 \leq P[i] \leq 10$
- $0 \leq A[i] \leq 10$
- M is at least as big as the number of -1s in P.

Test data

- Subtask 1 (25 marks) : $M \leq 10$ $N \leq 50$
- Subtask 2 (75 marks) : $M \leq 15$, $N \leq 50$

Sample input 1

```
5 5
-1 -1 -1 -1 -1
1 1 3 4 5
```

Sample output 1

```
1 1 3 4 5
```

Sample input 2

```
5 1
1 2 -1 4 5
10
```

Sample output 2

```
1 2 10 4 5
```

Limits

- *Memory limit* : 128 MB
- *Time limit* : 4s