DSA Lab 1 | Set 2 | **Arrays and minmax queries**

For a given array of integers and its capacity, implement the following operations on the array:

- **Insert:** Takes an index i (based on 0 indexing) and a value and inserts the value at that index. Assume i to be less than the current number of elements in the array. The insertion operation should display the number of elements in the array after insertion and the number of shift operations required to perform this insertion. **NOTE:** Assume the element specified to be inserted does not exist in the array already. The value should not be inserted if the array exceeds its capacity. In this case the number of shift operations would be 0 and the number of elements in array won't change.

- **DeleteMIN**: Deletes the minimum value element in the array. The deletion operation should display the number of elements in the array after deletion and the number of shift operations required to perform this deletion. Calling this operation on empty array would display 0 elements in array and 0 shift operations.

- **DeleteMAX**: Deletes the maximum value element in the array. The deletion operation should display the number of elements in the array after deletion and the number of shift operations required to perform this deletion. Calling this operation on empty array would display 0 elements in array and 0 shift operations.

- **Display**: Prints elements in the array, separated by single space. For an empty array, print a blank line.

NOTE: Assume elements in the array to be unique.

Input

The first line contains 3 integer values(single space separated) $MAXN$ $(1 \leq MAXN \leq 100)$, n $(1 \leq n \leq MAXN)$ and q $(1 \leq q \leq 1000)$, where $MAXN$ represents the capacity of the array, n represents the number of values in the array initially and q represents the number of query operations to be run on the array. For every element $a[i]$, $(1 \leq a[i] \leq 10000)$ The second line contains n space separated integer values, indicating the initial array. Next q lines contain queries of the form:

- `1 i v` : Inserts value v at index i in array
- `2` : Deletes minimum integer from array
- `3` : Deletes maximum integer from array
- `4` : Display current array

Output

- For every 'Insert' operation, display two integers(single space-separated) representing the number of elements in the array after insertion and the number of shift operations required to perform the insertion, respectively.
- For every 'DeleteMIN' or 'DeleteMAX' operation, display two integers(single space-separated) representing the number of elements in the array after deletion and the number of shift operations required to perform the deletion.
- For every 'Display' operation, print elements in the array, separated by single space. For an empty array, print a blank line.

Sample

Input:

8 4 6
23 11 32 9
1 1 33
4
2
4
3
4

Output:

5 3
23 33 11 32 9
4 0
23 33 11 32
3 2
23 11 32

Description:

Initially the array is 23,11,32,9.
On insertion of 33 at index 1, values 11,32 and 9 are required to be moved towards right by one position each, resulting in 3 shift operations.
On deletion of minimum value 9, as 9 was at last position no shifting is required on deletion.
On deletion of maximum value 33, value 11 and 32 needs to be shifted left by a position each, hence 2 shift operation required.