DMOPC '18 Contest 1 P4 - Sorting

Time limit: 1.0s **Memory limit:** 256M
Java: 2.5s
Python: 2.5s

You have a sorted list A of numbers in increasing order from 1 to N. This list has M elements. Some numbers may appear multiple times, so you have recorded the number of occurrences of each number in this list, $f_1, f_2, \ldots, f_N$. However, you messed up when assigning the indices, so f_i is actually the number of occurrences of P_i, for some unknown permutation P of $1, 2, \ldots, N$. You recall that $A_K = X$ for some K and X. Find a permutation P that satisfies this. If no such permutation P exists, output `-1`.

You will be rewarded even if you can only determine the existence of such a P. Outputting any permutation of $1, 2, \ldots, N$ if there exists a permutation and `-1` otherwise for every test case of a subtask will earn you half of the subtask's points, assuming you do not already receive the full points (if one of the permutations outputted is wrong, but there does exist a permutation).

Constraints

$1 \leq X \leq N$
$1 \leq K \leq M \leq 2 \cdot 10^{11}$
$1 \leq f_i \leq 1\,000\,000$
$f_1 + f_2 + \cdots + f_N = M$

Subtask 1 [10%]

$1 \leq N \leq 8$

Subtask 2 [20%]

$1 \leq N \leq 20$

Subtask 3 [20%]

$1 \leq N \leq 400$

Subtask 4 [10%]

$1 \leq N \leq 2\,000$

Subtask 5 [40%]

$1 \leq N \leq 200\,000$

Input Specification

The first line will contain four space-separated integers N, M, K, and X.
The next line will contain N space-separated integers $f_1, f_2, \ldots, f_N$.

Output Specification

If there exists a permutation, output N space-separated integers $P_1, P_2, \ldots, P_N$. There may be many valid permutations. Any one of them will be accepted.
If there does not exist a permutation, output `-1`.

Sample Input 1

```
3 10 5 1
4 5 1
```

Sample Output 1

```
2 1 3
```

Explanation for Sample 1

There are six possible lists A:

```
1 1 1 1 2 2 2 2 2 3
1 1 1 1 2 3 3 3 3 3
1 1 1 1 1 2 2 2 2 3
1 1 1 1 1 2 3 3 3 3
1 2 2 2 2 3 3 3 3 3
1 2 2 2 2 2 3 3 3 3
```

The third list satisfies $A_K = X$. The corresponding P which gives this list is $2, 1, 3$.

Sample Input 2

```
6 9 4 4
2 2 2 1 1 1
```

Sample Output 2

```
4 5 6 1 2 3
```

Sample Input 3

```
6 9 3 4
2 2 2 1 1 1
```

Sample Output 3

```
-1
```