Problem J: Which Permutation

Filename: `whichperm`
Time limit: `2 seconds`

Akiko's brother loves stealing her Pokemon cards and rearranging them. She would like to put them back in order quickly. Her cards are labeled 0, 1, 2, …, ***n*** - 1, in order. Being only partially helpful, her brother only provides the differences between successive cards in his rearranged ordering and shares that the cards are such that it's the first possible ordering in lexicographical order which satisfies the difference sequence he has provided.

Help Akiko figure out what order her brother has put the cards in! (If she can figure this out, she can put them back in order very quickly.)

Problem

Given the difference between successive terms in a permutation of the values 0, 1, 2, …***n*** - 1, determine the first permutation, in lexicographical ordering, which satisfies the given difference sequence.

Input

The first line of the input file will contain a single positive integer, ***c*** (***c*** ≤ 20*)*, representing the number of input cases. The input cases follow.

The first line of each input case contains a single positive integer, ***n*** (***n*** ≤ 50*)*, the number of Pokemon cards Akiko's collection has for the case.

The second line of each input case contains ***n*** - 1 space separated integers, $d_1, d_2, \ldots, d_{n-1}$ where d_i represents the absolute value of the difference between the i^{th} and $(i+1)^{th}$ terms of the permutation of cards.

Output

For each output case, if there is a permutation which satisfies the difference sequence, output the values of the first sequence in lexicographical order, separating the values with spaces, on a line by itself. **Do NOT put a space after the last item in the permutation on the line.** If there is no possible solution, output, "`impossible`", without the quotes on a line by itself.

Input Bounds and Corresponding Credit

60 Points	40 Points
• 1 ≤ **c** ≤ 20 • 2 ≤ ***n*** ≤ 10	• 1 ≤ **c** ≤ 20 • 2 ≤ ***n*** ≤ 50

Samples

Input	Output
2	impossible
3 2 2	0 3 2 1
4 3 1 1	