

Dehesapila

The major of Dehesapila is said to have been bribed when building the train station. The result has been a station with the shape of a *cul-de-sac* in which there is only one entrance track and one exit track.

All the trains arrive from *A* and go towards *B*, rearranging their wagons in a different order. Can you help to decide if the train that enters with the wagons numbered as 1, 2, ..., *n* can rearrange them to exit with the wagons in a given order, attaching and detaching wagons?

For example, a train with the wagons numbered as 1, 2, 3, 4 and 5, can exit with the wagons arranged in the same order (making them go in and out one by one), in reverse order (making them all go in, and then making them all go out), but it is not possible to make them go out as 5, 4, 1, 2, 3.

Code an algorithm that reads an integer number that indicates the number of wagons that enter the station (*n*) and the order in which they must go out from the station (*n* integer numbers). The function must decide if the wagons can be rearranged in that order or not¹. The function must write the movements that must be done in order to achieve it (Wagon *i* in / Wagon *j* out).

Input

The input has several test cases in separate lines. Each test case contains the number of wagons of the train ($1 \leq n \leq 100.000$), followed by the order in which they must exit. The input ends when a 0 is read, for which no output must be written.

Output

For each test case, the output must be the list of movements followed by POSSIBLE, if the wagons can be rearranged, or the list of movements until we discover that they cannot be rearranged followed by IMPOSSIBLE.

Sample input

```
3 3 1 2
3 3 2 1
0
```

Sample output

```
Wagon 1 in
Wagon 2 in
Wagon 3 in
Wagon 3 out
IMPOSSIBLE
Wagon 1 in
Wagon 2 in
Wagon 3 in
Wagon 3 out
Wagon 2 out
Wagon 1 out
POSSIBLE
```

Notes

This exercise must be understood in the context of the *Data Structures and Algorithms* course, FDI-UCM 2016/2017 (prof. Gonzalo Méndez). Therefore, the only valid solutions are those that use the concepts studied in this course. Additional remarks may be provided in class.

¹This exercise has been extracted from http://uva.onlinejudge.org/index.php?option=onlinejudge&page=show_problem&problem=455