

# 2954. Count the Number of Infection Sequences

## Description

You are given an integer `n` and a **0-indexed** integer array `sick` which is **sorted** in **increasing** order.

There are `n` children standing in a queue with positions `0` to `n - 1` assigned to them. The array `sick` contains the positions of the children who are infected with an infectious disease. An infected child at position `i` can spread the disease to either of its immediate neighboring children at positions `i - 1` and `i + 1` if they exist and are currently not infected. **At most one** child who was previously not infected can get infected with the disease in one second.

It can be shown that after a finite number of seconds, all the children in the queue will get infected with the disease. An **infection sequence** is the sequential order of positions in which **all** of the non-infected children get infected with the disease. Return *the total number of possible infection sequences*.

Since the answer may be large, return it modulo `109 + 7`.

**Note** that an infection sequence **does not** contain positions of children who were already infected with the disease in the beginning.

### Example 1:

**Input:** n = 5, sick = [0,4]

**Output:** 4

**Explanation:** Children at positions 1, 2, and 3 are not infected in the beginning. There are 4 possible infection sequences:  
– The children at positions 1 and 3 can get infected since their positions are adjacent to the infected children 0 and 4. The child at position 1 gets infected first.  
Now, the child at position 2 is adjacent to the child at position 1 who is infected and the child at position 3 is adjacent to the child at position 4 who is infected, hence either of them can get infected. The child at position 2 gets infected.  
Finally, the child at position 3 gets infected because it is adjacent to children at positions 2 and 4 who are infected. The infection sequence is [1,2,3].  
– The children at positions 1 and 3 can get infected because their positions are adjacent to the infected children 0 and 4. The child at position 1 gets infected first.  
Now, the child at position 2 is adjacent to the child at position 1 who is infected and the child at position 3 is adjacent to the child at position 4 who is infected, hence either of them can get infected. The child at position 3 gets infected.  
Finally, the child at position 2 gets infected because it is adjacent to children at positions 1 and 3 who are infected. The infection sequence is [1,3,2].  
– The infection sequence is [3,1,2]. The order of infection of disease in the children can be seen as: [0,1,2,3,4] => [0,1,2,3,4] => [0,1,2,3,4] => [0,1,2,3,4].  
– The infection sequence is [3,2,1]. The order of infection of disease in the children can be seen as: [0,1,2,3,4] => [0,1,2,3,4] => [0,1,2,3,4] => [0,1,2,3,4].

### Example 2:

**Input:** n = 4, sick = [1]

**Output:** 3

**Explanation:** Children at positions 0, 2, and 3 are not infected in the beginning. There are 3 possible infection sequences:  
– The infection sequence is [0,2,3]. The order of infection of disease in the children can be seen as: [0,1,2,3] => [0,1,2,3] => [0,1,2,3] => [0,1,2,3].  
– The infection sequence is [2,0,3]. The order of infection of disease in the children can be seen as: [0,1,2,3] => [0,1,2,3] => [0,1,2,3] => [0,1,2,3].  
– The infection sequence is [2,3,0]. The order of infection of disease in the children can be seen as: [0,1,2,3] => [0,1,2,3] => [0,1,2,3] => [0,1,2,3].

### Constraints:

- `2 <= n <= 105`
- `1 <= sick.length <= n - 1`
- `0 <= sick[i] <= n - 1`
- `sick` is sorted in increasing order.

