January 2023 CSE 106

Online on Divide and Conquer - C1 & C2

Total Marks: 10 **Time Duration: 30 mins**

Given an integer array where every element appears an even number of times, except one element which appears an odd number of times. If the identical elements appear in pairs in the array and there cannot be more than two consecutive occurrences of an element, find the odd occurring element in **logarithmic time**.

For instance, both these arrays are invalid – {1, 2, 1} and {1, 1, 2, 2, 2, 3, 3}. The first one doesn't have identical elements appear in pairs, and the second one contains three consecutive instances of an element. On the other hand, the array {2, 2, 3, 3, 2, 2, 4, 4, 3, 1, 1} is valid, and the odd occurring element present in it is 3.

Hint

Observe the indexing pattern of each pair before and after the odd-occurring element.

Input Format

- The first line of input contains an integer n, the size of the array.
- The second line of input contains n integers, representing the array elements.

Output Format

The program should output the integer that occurs an odd number of times in the array.

Important Note

1. **Your solution should have logarithmic time complexity (O(log n))**. Otherwise, you will get zero marks.
2. The input array will always contain exactly one element that occurs an odd number of times.

Sample IO

Input
13
2 2 1 1 3 3 2 2 4 4 3 1 1

Output
3