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The TCS Global Coding Contest

Coding Area

05 Hr **55** Min
45 Sec

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Binary Equivalent

➕ Problem Description

Mr. Binary is lost and wants to be found but the problem is he understands only binary. His house is located at a maximum binary equivalence possible, from the given set of numbers. A set is a binary equivalence if the number of 0 zeros and ones from a set of number are equal.

➕ Constraints

$1 <= N <= 20$

$1 <= Arr[i] <= 10^5$, where $Arr[i]$ is the ith element in the set of N numbers in second line of input

$Arr[i]$ will be unique

➕ Input

First line contains N denoting the number of decimal numbers

Next line contains N space separated decimal numbers

➕ Output

Single line output printing possible binary equivalence where number of digits in this number is equal to number of bits present in the largest element in second line of input. If there is no set which has binary equivalence then return 0 padded to number of bits present in the largest element in second line of input.

➕ Time Limit

1

➕ Examples

Example 1

Input

3

2 7 10

Output

0011

Explanation

2 -> 0010 - 1's = 1, 0's = 3

7 -> 0111 - 1's = 3, 0's = 1

10 -> 1010 - 1's = 2, 0's = 2

Here we have taken up to 4 bits because the maximum number is 10 which needs 4 bits to be represented in binary. The number of zeroes and ones across the set is, 6 each. Hence, the set of [2,7,10] has binary equivalence. Similarly, if you consider set[2,7], it also has binary equivalence, 4 each. But set [7,10] does not have binary equivalence. Likewise, set[10] has binary equivalence of 2 each.

Total number of unique sets where binary equivalence is possible from all combinations are 3 viz. Sets are [2,7,10], [2,7] and [10] which is the final answer. But as Mr. Binary only understands zeroes and ones, return the binary of 3.

Since 10 is the largest element in the input on line 2, the number of bits required to represent 10 in binary is 4. Hence output needs to be padded upto 4 digits. Since binary of 3 represented as a 4-digit number is 0011, the answer is 0011

Note

Do not consider empty subset

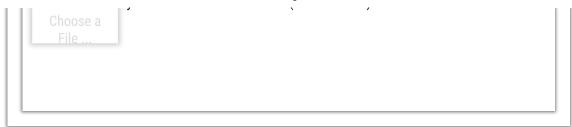Example 2

Input

1

7

Output

000

Explanation

7 -> 111 - 1's = 3, 0's = 1

Since there is only one element in the set and it also does not have binary equivalence, the answer is 0. However, keeping output specifications in mind, the answer should be printed as 000 since the highest element in second line of input viz. 7 has 3 bits when represented in binary format.

Upload Solution [Question : B]

☐ I, **prasath m** confirm that the answer submitted is my own.   ☐ Took help from online sources (attributions)

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