

**03** Hr **20** Min  
**14** Sec**Guidelines**

Coding Area

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# Coding Area

**A****B****C****D****E****F****ONLINE EDITOR (B)**

## Count Bits

### + Problem Description

Given a sequence of distinct numbers  $a_1, a_2, \dots, a_n$ , an inversion occurs if there are indices  $i < j$  such that  $a_i > a_j$ .

For example, in the sequence 2 1 4 3 there are 2 inversions (2 1) and (4 3).

The input will be a main sequence of  $N$  positive integers. From this sequence, a Derived derived sequence will be obtained using the following rule. The output is the number of inversions in the derived sequence.

#### **Rule for forming derived sequence**

The derived sequence is formed by counting the number of 1s bits in the binary representation of the corresponding number in the input sequence.

Thus, if the input is 3,4,8, the binary representation of the numbers are 11,100 and 1000. The derived sequence is the number of 1s in the binary representation of the numbers in the input sequence, and is 2,1,1

### + Constraints

$N \leq 50$

Integers in sequence  $\leq 10^7$

### + Input Format

The first line of the input will have a single integer, which will give  $N$ .

The next line will consist of a comma separated string of  $N$  integers, which is the main sequence

### + Output

The number of inversions in the derived sequence formed from the main sequence.

### +

### + Explanation

#### **Example 1**

Input

5

55, 53, 88, 27, 33

Output

8

Explanation

The number of integers is 5, as specified in the first line. The given sequence is 55, 53, 88, 27, 33.

The binary representation is 110111, 110101, 1011000, 11011, 100001 and 100001. The derived sequence is 5,4,3,4,2, 4,3,4,2 (corresponding to the number of 1s bits). The number of inversions in this is 8, namely (5,4), (5,3), (5,4), (5,2), (4,3), (4,2), (3,2), (4,2). Hence the output is 8.

**Example 2**

Input

8

120,21,47,64,72,35,18,98

Output

15

Explanation

The number of integers is 8. The given sequence is 120,21,47,64,72,35,18,98. The corresponding binary sequence is 1111000,10101,101111,1000000,1001000,100011, 10010,1100010. The derived sequence (number of 1s) is 4,3,5,1,2,3,2,3. The number of inversions is 15, namely (4,3), (4,1), (4,2), (4,3), (4,2), (4,3), (3,1), (3,2), (3,2), (5,1), (5,2), (5,3), (5,2), (5,3), (3,2). Hence the output is 15.

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