

Zadanie: KRY Crystals

Etap ???, dzień ???, plik źródłowy kry.*, dostępna pamięć 32 MB

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Byteman is a scientist who investigates creation of crystals consisting of atoms of different elements. He has designed a special process for creating crystals and has discovered a formula specifying the amount of elements that can be used to create a crystal. Now, he wonders how many different crystals can be created in such process.

For non-negative integers x and y , by $x \oplus y$ we shall denote their bit-wise xor. The basic xor for single bits is defined by: $1 \oplus 1 = 0 \oplus 0 = 0$, $1 \oplus 0 = 0 \oplus 1 = 1$.

Byteman knows n different elements that can be used to create crystals — these are numbered from 1 to n . For each element i there is an upper bound m_i on number of atoms of this element that can be used to create a crystal. Byteman can create one unique crystal composed of a_i atoms of the element i (for $i = 1, \dots, n$), if and only if:

- $0 \leq a_i \leq m_i$, for $i = 1, 2, \dots, n$,
- $a_1 \oplus \dots \oplus a_n = 0$, and
- $a_1 + a_2 + \dots + a_n \geq 1$.

Note that the last condition is quite obvious and essentially states that every crystal is composed of at least one atom.

Task

Write a program that:

- reads form the standard input: the number of elements and the bounds on numbers of atoms of particular elements,
- computes the number of different crystals that can be created,
- writes the result to the standard output.

Input

The first line of the standard input contains the number of elements n , $2 \leq n \leq 50$. The second, last line of the standard input contains n positive integers m_1, \dots, m_n , separated by single spaces, $1 \leq m_i < 2^{32} - 1$.

Output

Your program should write one integer to the standard output — total number of different crystals, that can be created. You can assume, that this number is less than 2^{64} .

Example

For the following input data:

3

2 1 3

the correct outcome is:

5

And the following are every possible numbers of atoms of each particular element:

$(0, 1, 1)$, $(1, 0, 1)$, $(1, 1, 0)$, $(2, 0, 2)$, $(2, 1, 3)$.