

Sum of Two Numbers

Given a list of numbers `nums` and a number `k`, return whether any two elements from the list add up to `k`. You may not use the same element twice.

Note: Numbers can be negative or 0.

Constraints

$n \leq 100,000$ where n is the length of `nums`

Example 1

Input

`nums = [35, 8, 18, 3, 22]`

`k = 11`

Output

`true`

Explanation

$8 + 3 = 11$

Example 2

Input

`nums = [10, 36, 22, 14]`

`k = 4`

Output

`false`

Explanation

No two numbers in this list add up to 4.

Example 3

Input

`nums = [24, 10, 11, 4]`

$k = 15$

Output

true

Explanation

$11 + 4 = 15$

Example 4

Input

nums = [-22, 22, -11, 11]

$k = 0$

Output

true

Explanation

$-11 + 11 = 0$

Example 5

Input

nums = [15, 0, 3, 2]

$k = 15$

Output

true

Explanation

$15 + 0 = 15$

Run-Length Encoding

Given a string s , return its run-length encoding. You can assume the string to be encoded have no digits and consists solely of alphabetic characters.

Constraints

$n \leq 100,000$ where n is the length of s

Example 1

Input

$s = \text{aaaabbbbccdaa}$

Output

$4a3b2c1d2a$

Example 2

Input

$s = \text{abcde}$

Output

$1a1b1c1d1e$

Example 3

Input

$s = \text{aabba}$

Output

$2a2b1a$

Example 4

Input

$s = \text{aaaaaaaaaa}$

Output

$10a$

High Frequency

Given a list of integers `nums`, find the most frequently occurring element and return the number of occurrences of that element.

Constraints

$0 \leq n \leq 100,000$ where n is the length of `nums`

Example 1

Input

`nums = [1, 4, 1, 7, 1, 7, 1, 1]`

Output

5

Example 2

Input

`nums = [5, 5, 5, 5, 5, 5, 5]`

Output

7

Example 3

Input

`nums = [1, 2, 3, 4, 5, 6, 7]`

Output

1

Number of Bits

Given an integer n, return the number of 1 bits in n.

Constraints

$$0 \leq n < 2^{31}$$

Example 1

Input

$$n = 0$$

Output

0

Example 2

Input

$$n = 1$$

Output

1

Example 3

Input

$$n = 2$$

Output

1

Explanation

2 is 10 in binary.

Example 4

Input

$$n = 3$$

Output

2

Explanation

3 is 11 in binary.

Example 5

Input

$n = 4$

Output

1

Explanation

4 is 100 in binary.