**Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Session: \_\_\_\_\_\_\_**

**Advanced Programming in Java**

**Lab Exercise 1.17.2024**

1. A museum wants to get rid of some exhibitions. Katya, the interior architect, comes up with a plan to remove the most boring exhibitions. She gives them a rating, and removes the one with the lowest rating. Just as she finishes rating the exhibitions, she's called off to an important meeting. She asks you to write a program that tells her the ratings of the items after the lowest one is removed.

Create a function that takes a list of integers and removes the smallest value.

Examples

remove\_smallest([1, 2, 3, 4, 5] ) ➞ [2, 3, 4, 5]

remove\_smallest([5, 3, 2, 1, 4]) ➞ [5, 3, 2, 4]

remove\_smallest([2, 2, 1, 2, 1]) ➞ [2, 2, 2, 1]

Notes

Don't change the order of the left over items.

If you get an empty list, return an empty list: [] ➞ [].

If there are multiple items with the same value, remove item with lower index (3rd example).

1. Given an array of boxes, create a function that returns the total volume of all those boxes combined together. A box is represented by a row in an array with three elements: length, width and height.

For instance, total\_volume([2, 3, 2], [6, 6, 7], [1, 2, 1]) should return 266 since (2 x 3 x 2) + (6 x 6 x 7) + (1 x 2 x 1) = 12 + 252 + 2 = 266.

Examples

total\_volume([[4, 2, 4], [3, 3, 3], [1, 1, 2], [2, 1, 1]]) ➞ 63

total\_volume([[2, 2, 2], [2, 1, 1]]) ➞ 10

total\_volume([[1, 1, 1]]) ➞ 1

Notes

You will be given at least one box.

Each box will always have three dimensions included.

1. Throughout the 12 days of Christmas, my true love gave me in total 364 items.

Create a function where given n days as an argument, return the total amount of items received throughout those days as an integer.

Examples

xmasItems(12) ➞ 364

xmasItems(3) ➞ 10

xmasItems(31) ➞ 5456

Notes

You will only be given valid inputs.

Remember to return as an integer.

0 as input should return 0.

1. A number is narcissistic when the sum of its digits, with each digit raised to the power of digits quantity, is equal to the number itself.

153 ➞ 3 digits ➞ 1³ + 5³ + 3³ = 1 + 125 + 27 = 153 ➞ Narcissistic

84 ➞ 2 digits ➞ 8² + 4² = 64 + 16 = 80 ➞ Not narcissistic

Given a positive integer n, implement a function that returns True if the number is narcissistic, and False if it's not.

Examples

is\_narcissistic(8208) ➞ True # 8⁴ + 2⁴ + 0⁴ + 8⁴ = 8208

is\_narcissistic(22) ➞ False #2² + 2² = 8

is\_narcissistic(9) ➞ True # 9¹ = 9

Notes

Trivially, any number in the 1-9 range is narcissistic and any two-digit number is not.

Curious fact: Only 88 numbers are narcissistic.

1. Create a function that takes a number a and finds the missing exponent x so that a when raised to the power of x is equal to b.

Examples

solve\_for\_exp(4, 1024) ➞ 5

solve\_for\_exp(2, 1024) ➞ 10

solve\_for\_exp(9, 3486784401) ➞ 10

Notes

a is raised to the power of what in order to equal b?

1. Create a function that takes a single word string and does the following:

* Concatenates inator to the end if the word ends with a consonant otherwise,
* concatenate -inator instead.

Adds the word length of the original word to the end, supplied with '000'.

The examples should make this clear.

Examples

inatorInator('Shrink') ➞ 'Shrinkinator 6000'

inatorInator('Doom') ➞ 'Doominator 4000'

inatorInator('EvilClone') ➞ 'EvilClone-inator 9000'

1. Create a function that takes a Present Value of Cash pv, an Investment Rate ir and the Number of Years years to be Invested and returns the Net Present Value.

In the world of finance, the time value of money must be taken into account. In simple terms, this is because $100 now would buy more than $100 a year from now. Therefore, if we receive $100 in one years time, it will not be worth as much to us today.

Assuming we received the Present Value of Cash at the end of each year over a period of time, this can be calculated by multiplying the Present Value of Cash by the cumulative present value interest rate.

The cumulative present value interest rate can be calculated by:



The result should always be rounded to the nearest whole dollar.

It is not possible to receive a negative amount of money, use a negative investment rate or invest for a negative number of years. These should return False.

Examples

net\_present\_value(100, 0.1, 1) ➞ "$91"

net\_present\_value(100, 0.2, 1) ➞ "$83"

net\_present\_value(100, 0.1, 20) ➞ "$851"