**Name:**

**Programming I**

**Lab Exercise 1.4.2024**

1. Steve and Maurice have racing snails. They each have 3, a slow (s), medium (m) and fast (f) one. Although Steve's snails are all a bit stronger than Maurice's, Maurice has a trick up his sleeve. His plan is:

Round 1: [s, f] Sacrifice his slowest snail against Steve's fastest.

Round 2: [m, s] Use his middle snail against Steve's slowest.

Round 3: [f, m] Use his fastest snail against Steve's middle.

Create a function that determines whether Maurice's plan will work by outputting true if Maurice wins 2/3 games.

The function inputs:

List 1: [s, m, f] for Maurice.

List 2: [s, m, f] for Steve.

Examples

maurice\_wins([3, 5, 10], [4, 7, 11]) ➞ True

# Since the matches are (3, 11), (5, 4) and (10, 7), Maurice wins 2 out of 3.

maurice\_wins([6, 8, 9], [7, 12, 14]) ➞ False

# Since the matches are (6, 14), (8, 7) and (9, 12), Steve wins 2 out of 3.

maurice\_wins([1, 8, 20], [2, 9, 100]) ➞ True

Notes

Maurice wins if his competing snail's speed strictly exceeds Steve's competing snail's speed.

Steve will always play in this order: [f, s, m].

2. ATM machines allow 4 or 6 digit PIN codes and PIN codes cannot contain anything but exactly 4 digits or exactly 6 digits. Your task is to create a function that takes a string and returns True if the PIN is valid and False if it's not.

**Examples**

is\_valid\_PIN("1234") ➞ True

is\_valid\_PIN("12345") ➞ False

is\_valid\_PIN("a234") ➞ False

is\_valid\_PIN("") ➞ False

**Notes**

Some test cases contain special characters.

Empty strings must return False.

3. Given a list of boxes, create a function that returns the total volume of all those boxes combined together. A box is represented by a list 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.

4. Create a function that takes a list of positive and negative numbers. Return a list where the first element is the count of positive numbers and the second element is the sum of negative numbers.

Examples

sum\_neg([1, 2, 3, 4, 5, 6, 7, 8, 9, 10, -11, -12, -13, -14, -15]) ➞ [10, -65]

# There are a total of 10 positive numbers.

# The sum of all negative numbers equals -65.

sum\_neg([92, 6, 73, -77, 81, -90, 99, 8, -85, 34]) ➞ [7, -252]

sum\_neg([91, -4, 80, -73, -28]) ➞ [2, -105]

sum\_neg([]) ➞ []

Notes

If given an empty list, return an empty list: []