1.Create a function to perform basic arithmetic operations that includes addition, subtraction, multiplication and division on a string number (e.g. "12 + 24" or "23 - 21" or "12 // 12" or "12 \* 21").

Here, we have 1 followed by a space, operator followed by another space and 2. For the challenge, we are going to have only two numbers between 1 valid operator. The return value should be a number.

eval() is not allowed. In case of division, whenever the second number equals "0" return -1.

For example: "15 // 0" ➞ -1

Examples:

arithmetic\_operation("12 + 12") ➞ 24 // 12 + 12 = 24

arithmetic\_operation("12 - 12") ➞ 24 // 12 - 12 = 0

arithmetic\_operation("12 \* 12") ➞ 144 // 12 \* 12 = 144

arithmetic\_operation("12 // 0") ➞ -1 // 12 / 0 = -1

import operator

ops = {'+':operator.add,'-':operator.sub,'\*':operator.mul,'//':operator.floordiv}

def arithmetic\_operation(in\_string):

in\_list = in\_string.split(" ")

output = ops[in\_list[1]](int(in\_list[0]),int(in\_list[2])) if int(in\_list[2]) != 0 else -1

print(f'arithmetic\_operation({in\_list[0]} {in\_list[1]} {in\_list[2]}) ➞ {output}')

arithmetic\_operation("12 + 12")

arithmetic\_operation("12 - 12")

arithmetic\_operation("12 \* 12")

arithmetic\_operation("12 // 0")

arithmetic\_operation(12 + 12) ➞ 24

arithmetic\_operation(12 - 12) ➞ 0

arithmetic\_operation(12 \* 12) ➞ 144

arithmetic\_operation(12 // 0) ➞ -1

2.Write a function that takes the coordinates of three points in the form of a 2d array and returns the perimeter of the triangle. The given points are the vertices of a triangle on a two-dimensional plane.

Examples:

perimeter( [ [15, 7], [5, 22], [11, 1] ] ) ➞ 47.08

perimeter( [ [0, 0], [0, 1], [1, 0] ] ) ➞ 3.42

perimeter( [ [-10, -10], [10, 10 ], [-10, 10] ] ) ➞ 68.28

import math

def distance(a,b):

return math.sqrt(pow((b[1]-a[1]),2)+pow((b[0]-a[0]),2))

def perimeter(in\_array):

perimeter = []

for ele in range(len(in\_array)):

if ele == len(in\_array)-1:

perimeter.append(distance(in\_array[ele],in\_array[0]))

else:

perimeter.append(distance(in\_array[ele],in\_array[ele+1]))

print(f'perimeter({in\_array}) ➞ {sum(perimeter):.2f}')

perimeter([[15,7],[5,22],[11,1]])

perimeter([[0,0],[0,1],[1,0]])

perimeter([[-10,-10],[10,10],[-10,10]])

perimeter([[15, 7], [5, 22], [11, 1]]) ➞ 47.08

perimeter([[0, 0], [0, 1], [1, 0]]) ➞ 3.41

perimeter([[-10, -10], [10, 10], [-10, 10]]) ➞ 68.28

3.A city skyline can be represented as a 2-D list with 1s representing buildings. In the example below, the height of the tallest building is 4 (second-most right column).

[[0, 0, 0, 0, 0, 0],

[0, 0, 0, 0, 1, 0],

[0, 0, 1, 0, 1, 0],

[0, 1, 1, 1, 1, 0],

[1, 1, 1, 1, 1, 1]]

Create a function that takes a skyline (2-D list of 0's and 1's) and returns the height of the tallest skyscraper.

Examples:

tallest\_skyscraper([[0, 0, 0, 0],[0, 1, 0, 0],[0, 1, 1, 0],[1, 1, 1, 1]]) ➞ 3

tallest\_skyscraper([[0, 1, 0, 0],[0, 1, 0, 0],[0, 1, 1, 0],[1, 1, 1, 1]]) ➞ 4

tallest\_skyscraper([[0, 0, 0, 0],[0, 0, 0, 0],[1, 1, 1, 0],[1, 1, 1, 1]]) ➞ 2

def tallest\_skyscraper(in\_list):

out\_list = []

for num in range(len(in\_list)):

count = 0

for ele in range(len(in\_list[num])):

count += in\_list[ele][num]

out\_list.append(count)

print(f'tallest\_skyscraper({in\_list}) ➞ {max(out\_list)}')

tallest\_skyscraper([[0, 0, 0, 0],[0, 1, 0, 0],[0, 1, 1, 0],[1, 1, 1, 1]])

tallest\_skyscraper([[0, 1, 0, 0],[0, 1, 0, 0],[0, 1, 1, 0],[1, 1, 1, 1]])

tallest\_skyscraper([[0, 0, 0, 0],[0, 0, 0, 0],[1, 1, 1, 0],[1, 1, 1, 1]])

tallest\_skyscraper([[0, 0, 0, 0], [0, 1, 0, 0], [0, 1, 1, 0], [1, 1, 1, 1]]) ➞ 3

tallest\_skyscraper([[0, 1, 0, 0], [0, 1, 0, 0], [0, 1, 1, 0], [1, 1, 1, 1]]) ➞ 4

tallest\_skyscraper([[0, 0, 0, 0], [0, 0, 0, 0], [1, 1, 1, 0], [1, 1, 1, 1]]) ➞ 2

4.A financial institution provides professional services to banks and claims charges from the customers based on the number of man-days provided. Internally, it has set a scheme to motivate and reward staff to meet and exceed targeted billable utilization and revenues by paying a bonus for each day claimed from customers in excess of a threshold target.

This quarterly scheme is calculated with a threshold target of 32 days per quarter, and the incentive payment for each billable day in excess of such threshold target is shown as follows:

Days Bonus

0 to 32 days Zero

33 to 40 days SGD$325 per billable day

41 to 48 days SGD$550 per billable day

Greater than 48 days SGD$600 per billable day

Please note that incentive payment is calculated progressively. As an example, if an employee reached total billable days of 45 in a quarter, his/her incentive payment is computed as follows:

32\*0 + 8\*325 + 5\*550 = 5350

Write a function to read the billable days of an employee and return the bonus he/she has obtained in that quarter.

Examples:

bonus(15) ➞ 0

bonus(37) ➞ 1625

bonus(50) ➞ 8200

def bonus(int\_num):

if int\_num > 48:

output = 0+(8\*325)+(8\*550)+((int\_num-48)\*600)

elif int\_num < 48 and int\_num >= 41:

output = 0+(8\*325)+((int\_num-41+1)\*550)

elif int\_num >33 and int\_num <= 40:

output = 0+((int\_num-33+1)\*325)

else:

output = 0

print(f'bonus({int\_num}) ➞ {output}')

bonus(15)

bonus(44)

bonus(37)

bonus(50)

bonus(60)

bonus(15) ➞ 0

bonus(44) ➞ 4800

bonus(37) ➞ 1625

bonus(50) ➞ 8200

bonus(60) ➞ 14200

5.A number is said to be Disarium if the sum of its digits raised to their respective positions is the number itself.

Create a function that determines whether a number is a Disarium or not.

Examples:

is\_disarium(75) ➞ False

# 7^1 + 5^2 = 7 + 25 = 32

is\_disarium(135) ➞ True

# 1^1 + 3^2 + 5^3 = 1 + 9 + 125 = 135

is\_disarium(544) ➞ False

is\_disarium(518) ➞ True

is\_disarium(466) ➞ False

is\_disarium(8) ➞ True

def is\_disarium(in\_num):

sum = 0

output = False

for ele in range(len(str(in\_num))):

sum += int(str(in\_num)[ele])\*\*(ele+1)

if in\_num == sum:

output=True

print(f'is\_disarium({in\_num}) ➞ {output}')

is\_disarium(75)

is\_disarium(135)

is\_disarium(544)

is\_disarium(518)

is\_disarium(466)

is\_disarium(8)

is\_disarium(75) ➞ False

is\_disarium(135) ➞ True

is\_disarium(544) ➞ False

is\_disarium(518) ➞ True

is\_disarium(466) ➞ False

is\_disarium(8) ➞ True