#To calculate salary of an employee given his basic pay (take as input from user). Calculate gross salary of employee.

#Let HRA be 10 % of basic pay and TA be 5% of

#basic pay. Let employee pay professional tax as 2% of total salary. Calculate net salary payable after deductions.

basicpay = float(input("\nEnter the total salary"))

hra = 0.10\* basicpay

print("The HRA is: ",hra)

ta = 0.05\* basicpay

print("\nThe TA is: ",ta)

gross\_salary = hra + ta + basicpay

print("\nThe gross salary is: ",gross\_salary)

proffesional\_tax = 0.02\* gross\_salary

print("\nThe proffesional tax is: ",proffesional\_tax)

net\_salary = gross\_salary - proffesional\_tax

print("\nThe net salary of the employee is: ", net\_salary)

#To accept an object mass in kilograms and velocity in meters per second and display its

#momentum. Momentum is calculated as e=mc2 where m is the mass of the object and c is its velocity.

mass = float(input("Enter the mass: "))

velocity = float(input("\nEnter the velocity of the object: "))

momentum  = mass \* velocity

print("the value of enery is: ",momentum)

#To accept N numbers from user. Compute and display maximum in list, minimum in list, sum and average of number.

max\_list = [2,4,3,5,7,6,9,8,10,23,42,64,53,87,61,32,48]

min\_list = [2,4,8,9,6,1,3,5,7]

print(len(max\_list))

print(len(min\_list))

sum\_list = len(max\_list) + len(min\_list)

average =  (len(max\_list) + len(min\_list))/2

print("the sum of lists is: ", sum\_list)

print("The average sum of lists is: ", average)

#To accept student’s five courses marks and compute his/her result. Student is passing if he/she scores marks equal to and above 40 in

#each course. If student scores aggregate greater than 75%, then the grade is distinction. If aggregate is 60>= and <75 then the

#grade if first division. If aggregate is 50>= and <60, then the grade is second division. If aggregate is 40>= and <50,

#then the grade is third division.

marks = float(input("Enter the marks of the student: "))

total\_marks = int(input("Enter the total marks: "))

aggregate\_marks = (marks/total\_marks)\*100

print("\nThe marks percentage obtained by the student is: ", aggregate\_marks,"%")

if (aggregate\_marks > 75):

    print("The student is passed with distinction")

elif(aggregate\_marks >= 60):

    print("The student is passed with first division")

elif(aggregate\_marks >= 50):

    print("The student is passed with second division")

elif(aggregate\_marks >= 40):

    print("The student is passed with third division")

else:

    print("congratulations you failed")

#To check whether input number is Armstrong number or not. An Armstrong number is an integer with three digits

#such that the sum of the cubes of its digits is equal to the number itself. Ex. 371.

#im fucking genius

#To simulate simple calculator that performs basic tasks such as addition, subtraction, multiplication and division with special operations

#like computing xy and x!.

num1 = float(input("Enter the number"))

num2 = float(input("enter the number"))

cal = input("how do you want to calculate?")

if cal == "+":

    print(num1 + num2)

elif cal == "-":

    print(num1-num2)

elif cal == "\*":

    print(num1\*num2)

elif cal == "/":

    print(num1/num2)

else:

    print("sorry im not that of a good coder and also fuck you")

#To accept the number and Compute

#a) square root of number, b) Square of number, c) Cube of number d) check for prime, d) factorial of number e) prime factors

import math

num = float(input("enter the number1: "))

squareroot = math.sqrt(num)

print(squareroot)

#another way to write the code for the same

num = float(input("enter the number1: "))

squareroot = num\*\*0.5

print(squareroot)

#square of the num

num = float(input("enter the number1: "))

square = num\*\*2

print(square)

#cube of the number

num = float(input("enter the number1: "))

cube = num\*\*3

print(cube)

#check for prime

num = int(input("Enter the number: "))

if num > 1:

    # Check if number has any factor other than 1 and itself

    for i in range(2, num):

        if (num % i) == 0:

            print(f"{num} is not a prime number")

            break

    else:

        print(f"{num} is a prime number")

else:

    print(f"{num} is not a prime number")

#factorial of the number

num = int(input("Enter the number: "))

fact = 1

for i in range( 1, num + 1):

    fact = fact \* i

print("factorial of the num is: ",fact)

#another method for factorial

import math

num = int(input("enter the number: "))

fact = math.factorial(num)

print("The factorial of the number is : ",fact)

#prime factors

num = num = int(input("enter the number: "))

i = 2

while i <= num:

    if num % i == 0:

        print(i, end=" ")

        num = num // i

    else:

        i += 1

print(" are the prime factors of the number ", i)

#To accept two numbers from user and compute smallest divisor and Greatest Common

#Divisor of these two numbers.

#smallest divisor

num = int(input("Enter the number1: "))

for i in range (2, num +1):

    if num % i == 0:

        print("the smallest divisor is: ",i)

        break

#for greatest comman factor

num1 = int(input("Enter the number1: "))

num2 = int(input("Enter the number2: "))

while num2 != 0:

    num1, num2 = num2, num1 % num2

    print("The gcd is: ",num1)

    break

#using math import

import math

num1 = int(input("Enter the number1: "))

num2 = int(input("Enter the number2: "))

ans = math.gcd(num1,num2)

print(ans)

#reverse the number

num = list(map(int, input("Enter elements separated by space: ").split()))

num.sort(reverse=True)

print(num)

#convert the binary into decimal

binary = input("enter the binary number: ")

decimal = int(binary,2)

print("the decimal of the binary number is: ", decimal)

#generate pseudo random numbers

import random

num = random.randit(1,100)

print(num)

#To accept list of N integers and partition list into two sub lists even and odd numbers.

#mylist = list(map(int, input("enter the seperated by space: ").split()))

n = int(input("Enter the number of elements: "))

numbers = []

for i in range(n):

    num = int(input("Enter the number: "))

    numbers.append(num)

evenlist = []

oddlist = []

for num in numbers:

    if num % 2 == 0:

        evenlist.append(num)

    else:

        oddlist.append(num)

print("Even numbers: ", evenlist)

print("Odd numbers: ", oddlist)

#To accept the number of terms a finds the sum of sine series.

import math

x = float(input("enter the angle in radians: "))

n = int(input("enter the number of terms: "))

sine\_sum = 0

sign = 1

power = 1

for i in range (n):

    term = sign \* (x \*\* power) / math.factorial(power)

    sine\_sum += term

    power += 2

    sign \*= -1

print("Sum of the sine series: ", sine\_sum)

#Write a python program that accepts a string from user and perform following string

#operations- i. Calculate length of string ii.  String reversal iii. Equality check of two

#strings iii. Check palindrome ii.  Check substring

string = input("Enter the string: ")

print("The length of the string is: ",len(string))

print("The reversed string is: ",(string[::-1]))

#equality of 2 strings

string1 = input("enter the string 1: ")

string2 = input("enter the string 2: ")

length1 = (len(string1))

length2 = (len(string2))

if (length1 == length2):

    print("The strings are equal.")

else:

    print("The strings are not equal.")

#copystring = string.copy()

rev = string[::-1]

if (string == rev):

    print("The string is palindrome.")

else:

    print("The string is not palindrome.")

#Control Structures

#1️⃣ Write a program to input a number and check if it is positive, negative, or zero.

#2️⃣ Write a program to check if a number is prime or not using a

#loop and decision-making structures.

#3️⃣ Write a program to find the largest and smallest number among three user-input values.

#1

num = int(input("enter the number: "))

if (num == 0):

    print("the number is zero.")

elif(num >= 0):

    print("the number is positive number.")

elif(num <= 0):

    print("the number is negetive number.")

else:

    print("ERROR!!!")

#2

num = int(input("enter the number: "))

if num > 1:

    for i in range(2, num):

        if(num % i == 0):

            print("the number is prime.")

            break

        else:

            print("the number is not prime.")

#3

a = float(input("enter the  number: "))

b = float(input("enter the  number: "))

c = float(input("enter the  number: "))

largest = a

if b > largest:

    largest = b

if c > largest:

    largest = c

smallest = a

if b < smallest:

    smallest = b

if c < smallest:

    smallest = c

print("the largest number:",largest)

print("the smallest number:",smallest)

#Data Structures (List, Dictionary, Tuple)

#4️⃣ Write a program to create a list of numbers and display the sum and average of the elements.

#5️⃣ Write a program to create a dictionary of 5 students with roll numbers as keys and marks as values.

#Display students who scored more than 70 marks.

#6️⃣ Write a program to create a tuple of even numbers between 1 and 50 and display it.

#7️⃣ Write a program to accept names in a list and display them in alphabetical order.

#1

mylist = list(map(int,input("enter the element seperated by space: ").split()))

sum\_elements = sum(mylist)

avg = sum(mylist) / len(mylist)

print(avg)

#2

students = {}

for i in range(5):

    roll\_no = input("Enter roll number of student : ")

    marks = int(input("Enter marks for roll number: "))

    students[roll\_no] = marks

print("\nStudents who scored more than 70 marks:")

for roll\_no, marks in students.items():

    if marks > 70:

        print(f"Roll No: {roll\_no}, Marks: {marks}")

#Functions, Scoping, Recursion, List Mutability

#8️⃣ Write a program to demonstrate the use of local and global variables in Python functions.

#9️⃣ Write a recursive program to find the nth term of a Fibonacci series.

#🔟 Write a program to pass a list to a function, modify it inside the function, and display the changes outside (demonstrating list mutability).

# Global variable

x = 10

def my\_function():

    # Local variable

    y = 5

    global x  # Telling Python we want to use the global x

    x = x + 5

    print("Inside function:")

    print("Local variable y =", y)

    print("Global variable x =", x)

my\_function()

print("\nOutside function:")

print("Global variable x =", x)

#2

def fibonacci(n):

    if n <= 0:

        return "Invalid input"

    elif n == 1:

        return 0

    elif n == 2:

        return 1

    else:

        return fibonacci(n-1) + fibonacci(n-2)

# Example

n = int(input("Enter the term number for Fibonacci series: "))

print(f"The {n}th term is:", fibonacci(n))

#3

def modify\_list(my\_list):

    my\_list.append(100)  # Modify the list by appending 100

    print("Inside function:", my\_list)

# Original list

numbers = [1, 2, 3]

print("Before function call:", numbers)

# Passing list to function

modify\_list(numbers)

print("After function call:", numbers)

try:

    age = int(input("Enter your age: "))

    assert age > 0

    print("Your age is:", age)

except AssertionError:

    print("Assertion Error: Age must be greater than 0!")