**Lab 1**

**08/07/2024**

**Brief Summary:**

This script performs various mathematical operations based on user input. It includes functions for:

1. **Basic Arithmetic Operations**: Addition, subtraction, multiplication, and division.
2. **LCM (Lowest Common Multiple)**: Calculating the LCM of two numbers.
3. **HCF (Highest Common Factor)**: Calculating the HCF of two numbers.
4. **Factorial**: Calculating the factorial of a number.

**Problem Areas**

1. **Division by Zero**: The division function handles division by zero.
2. **Non-integer Factorials**: The HCF and factorial functions check if the numbers are integers and handle errors for non-integer inputs.
3. **User Input Handling**: The script includes error handling for non-numeric user inputs.

**Operations**

1. **Arithmetic Operations**:
   * Addition, subtraction, multiplication, and division results of the two numbers are printed.
2. **LCM and HCF**:
   * The LCM and HCF of the two numbers are calculated and printed.
3. **Factorials**:
   * Factorials of both numbers are calculated and printed.

**Code:**

import math

# Print Hello World

print("Hello World")

# Functions

def addition(*x*, *y*):

    return *x* + *y*

def subtraction(*x*, *y*):

    return *x* - *y*

def multiplication(*x*, *y*):

    return *x* \* *y*

def division(*x*, *y*):

    if *y* == 0:

        return "Error: Division by zero"

    return *x* / *y*

def calculate\_lcm(*x*, *y*):

    if *x* > *y*:

        greater = *x*

    else:

        greater = *y*

    while True:

        if (greater % *x* == 0) and (greater % *y* == 0):

            lcm = greater

            break

        greater += 1

    return lcm

def calcuate\_hcf(*x*, *y*):

    if *x* > *y*:

        smaller = *y*

    else:

        smaller = *x*

    if not float(smaller).is\_integer():

        return "Error: Factorial of non-integer"

    smaller = int(smaller)

    for i in range(1, smaller + 1):

        if (*x* % i == 0) and (*y* % i == 0):

            hcf = i

    return hcf

def factorial(*num*):

    if *num* < 0:

        return "Error: Factorial of negative number"

    if not *num*.is\_integer():

        return "Error: Factorial of non-integer"

*num* = int(*num*)

    fact = 1

    for i in range(1, *num* + 1):

        fact \*= i

    return fact

# User Input

try:

    x = float(input("Enter first number: "))

    y = float(input("Enter second number: "))

except ValueError:

    print("Invalid input! Please enter numeric values.")

    exit(1)

# Operations

addition\_result = addition(x, y)

subtraction\_result = subtraction(x, y)

multiplication\_result = multiplication(x, y)

division\_result = division(x, y)

print(f"The addition of {x} and {y} is {addition\_result}")

print(f"The subtraction of {x} and {y} is {subtraction\_result}")

print(f"The multiplication of {x} and {y} is {multiplication\_result}")

print(f"The division of {x} and {y} is {division\_result}")

# Display the largest number

print(f"The largest number is {max(x, y)}")

# LCM & HCF

lcm\_result = calculate\_lcm(x, y)

hcf\_result = calcuate\_hcf(x, y)

print(f"The Lowest Common Multiple of {x} and {y} is {lcm\_result}")

print(f"The Highest Common Factor of {x} and {y} is {hcf\_result}")

# Factorial

try:

    factorial\_result1 = factorial(x)

    factorial\_result2 = factorial(y)

    print(f"The factorial of {x} is {factorial\_result1}")

    print(f"The factorial of {y} is {factorial\_result2}")

except ValueError as e:

    print(e)

**Output:**

