**Week - 5: Functions and Multi-D**

1. **i) Write a python program that defines a matrix and prints**

**program:**matrix = [

[1, 2, 3],

[4, 5, 6],

[7, 8, 9]

]

for row in matrix:

print(row)

**output:**

[1, 2, 3]

[4, 5, 6]

[7, 8, 9]

**ii) Write a python program to perform addition of two square matrices**

**program:**  
def add\_matrices(matrix1, matrix2):

rows = len(matrix1)

columns = len(matrix1[0])

result = []

for i in range(rows):

row = []

for j in range(columns):

row.append(matrix1[i][j] + matrix2[i][j])

result.append(row)

return result

# Define two square matrices

matrix1 = [

[1, 2, 3],

[4, 5, 6],

[7, 8, 9]

]

matrix2 = [

[9, 8, 7],

[6, 5, 4],

[3, 2, 1]

]

# Perform matrix addition

result\_matrix = add\_matrices(matrix1, matrix2)

# Print the result

for row in result\_matrix:

print(row)

**Output:**

[10, 10, 10]

[10, 10, 10]

[10, 10, 10]

**iii) Write a python program to perform multiplication of two square matrices.**

**Program:**

def multiply\_matrices(matrix1, matrix2):

rows1 = len(matrix1)

columns1 = len(matrix1[0])

rows2 = len(matrix2)

columns2 = len(matrix2[0])

if columns1 != rows2:

raise ValueError("Matrices cannot be multiplied due to incompatible dimensions.")

result = []

for i in range(rows1):

row = []

for j in range(columns2):

value = 0

for k in range(columns1):

value += matrix1[i][k] \* matrix2[k][j]

row.append(value)

result.append(row)

return result

# Define two square matrices

matrix1 = [

[1, 2, 3],

[4, 5, 6],

[7, 8, 9]

]

matrix2 = [

[9, 8, 7],

[6, 5, 4],

[3, 2, 1]

]

# Perform matrix multiplication

result\_matrix = multiply\_matrices(matrix1, matrix2)

# Print the result

for row in result\_matrix:

print(row)

output:  
[30, 24, 18]

[84, 69, 54]

[138, 114, 90]

1. **Simple Calculator program by making use of functions**

Program:  
def add(x, y):

return x + y

def subtract(x, y):

return x - y

def multiply(x, y):

return x \* y

def divide(x, y):

if y == 0:

return "Cannot divide by zero"

return x / y

print("Select operation:")

print("1. Add")

print("2. Subtract")

print("3. Multiply")

print("4. Divide")

choice = input("Enter choice (1/2/3/4): ")

num1 = float(input("Enter first number: "))

num2 = float(input("Enter second number: "))

if choice == '1':

print(num1, "+", num2, "=", add(num1, num2))

elif choice == '2':

print(num1, "-", num2, "=", subtract(num1, num2))

elif choice == '3':

print(num1, "\*", num2, "=", multiply(num1, num2))

elif choice == '4':

print(num1, "/", num2, "=", divide(num1, num2))

else:

print("Invalid Input")

**output:**

Select operation:

1. Add

2. Subtract

3. Multiply

4. Divide

Enter choice (1/2/3/4): 1

Enter first number: 1

Enter second number: 2

* 1. + 2.0 = 3.0

**3.Find the factorial of a number using recursion**

Program:

def fact(a):

if(a==0 or a==1):

return 1

else:

return a\*fact(a-1)

num=int(input("enter a number "))

factnum=fact(num)

print(factnum)

**output:**

enter a number 5

120

**4. Write a function cumulative\_ product to compute cumulative product of a list of**

**numbers.**

**Program:**

def cumulative\_product(list1):

a=len(list1)

for i in range(0,a):

if list1[i]==0 or list1[i]==1 :

a=1

else:

a= a\*list1[i]

return a

list1=[1,2,3,4,5]

c=cumulative\_product(list1)

print(c)

**output:**

120

**5. Write a function reverse to print the given list in the reverse order.**

**Program:**

def reverse\_list(list1):

list2=[]

for i in range(len(list1) -1,-1,-1):

list2.append(list1[i])

return list2

list1=[1,2,3,4,5]

list2=reverse\_list(list1)

print(list2)

**output:**

[5, 4, 3, 2, 1]