

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(
    "\nOutput: [3, 0, 24, 18]"
)

```

```
[84, 69, 54]
[138, 114, 90]
```

2. 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

1.0 + 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

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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_pro  
duct(list1)  
print(  
c)
```

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ut:

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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]
```