Group A Python Program for Matrix Addition, Substraction, Multiplication and Transpose

PROBLEM STATEMENT:
WRITE A PYTHON PROGRAM TO COMPUTE FOLLOWING COMPUTATION ON MATRIX:
A) ADDITION OF TWO MATRICES
B) SUBTRACTION OF TWO MATRICES
C) MULTIPLICATION OF TWO MATRICES
D) TRANSPOSE OF A MATRIX

ANALYSIS OF A PROBLEM STATEMENT:
1. Given :
Matrices are given in a problem statement.
2. Entity:
Matrix is an entity or object with no of rows and no of columns attribute.
3. Input:
You have to accept n x n matrix values from the user to perform operations on it.
4. Data Structure:
To store/organize the matrix element in memory we required LIST as a data structure.
5. Output:
5.1 Addition of two Matrices
5.2 Subtraction of two Matrices
5.3 Multiplication of two Matrices
5.4 Transpose of a Matrix

SOURCE CODE:

```
# Online Python compiler (interpreter) to run Python online.
# Write Python 3 code in this online editor and run it.
# Author :: Mr. Nitin Mohan Shivale(Asst.Professor)
print("Basic Matrix Operation using Python")
m1 = []
m = []
m2 = []
res = [[0, 0, 0, 0, 0], [0, 0, 0, 0, 0], [0, 0, 0, 0, 0], [0, 0, 0, 0, 0], [0, 0, 0, 0, 0]]

print("Welcome all in assignment no:03 from Group A")
print("For Matrix operation we require some input from you Please.")
row1 = int(input("Enter no of rows in first matrix: "))
col1 = int(input("Enter no of cols in first matrix: "))
row2 = int(input("Enter no of rows in second matrix: "))
col2 = int(input("Enter no of cols in second matrix: "))

```

```
17
18  def main():
19      print("1. Accept two matrices from user:")
20      print("2. Show the matrices values:")
21      print("3. Addition of Two Matrices:")
22      print("4. Subtraction of Two Matrices:")
23      print("5. Multiplication of Two Matrices:")
24      print("6. Transpose of Matrix")
25      print("7. Exit")
26      ch = int(input("Enter your choice:"))
27      if ch == 1:
28          print("please enter the values for First Matrix:")
29          accept(m1, row1, col1)
30          print("please enter the values for Second Matrix:")
31          accept(m2, row2, col2)
32          main()
33      elif ch == 2:
34          print("The Value of First matrix is as follows:")
35          show(m1, row1, col1)
36          print("The Value of Second matrix is as follows:")
37          show(m2, row2, col2)
38          main()
```

```
39      elif ch == 3:
40          print("The addition of two matrices are as follows..")
41          if ((row1 == row2) and (col1 == col2)):
42              add_mat(m1, m2, row1, col1)
43              show(res, row1, col1)
44          else:
45              print("Sorry!!! Addition is not possible...")
46          main()
47      elif ch == 4:
48          print("The subtraction of two matrices are as follows..")
49          if ((row1 == row2) and (col1 == col2)):
50              sub_mat(m1, m2, row1, col1)
51              show(res, row1, col1)
52          else:
53              print("Sorry!!! Subtraction is not possible...")
54          main()
55      elif ch == 5:
56          print("The Multiplication of two matrices are as follows..")
57          if (col1 == row2):
58              mul_mat(m1, m2, row2, col1)
59              show(res, row2, col1)
60          else:
61              print("Sorry!!! Multiplication is not possible...")
62          main()
```

```
63      elif ch == 6:
64          print("Before Transpose of Matrix the elements in matrix are as follows:")
65          show(m1, row1, col1)
66          print("After applying Transpose on matrix elements are as follows:")
67          trans_mat(m1, row1, col1)
68          show(res, row1, col1)
69          main()
70      elif ch == 7:
71          exit
72      else:
73          print("Please enter valid choice...")
74
```

```
# Function Name: accept
# Use : To accept elements from user for matrices and store it in matrix
def accept(m, row, col):
    for i in range(row):
        c = []
        for j in range(col):
            no = int(input("Enter the value of matrix[" + str(i) + "][" + str(j) + "]:: "))
            c.append(no)
        print("---------------------------")
        m.append(c)

# Function Name: show
# Use : To display elements from the matrices
def show(m, row, col):
    for i in range(row):
        for j in range(col):
            print(m[i][j], end=" ")
        print()
```

```
# Function Name: add_mat
# Use : To perform addition of two matrices
def add_mat(m1, m2, row, col):
    for i in range(row):
        for j in range(col):
            res[i][j] = m1[i][j] + m2[i][j]



# Function Name: sub_mat
# Use : To perform substraction of two matrices
def sub_mat(m1, m2, row, col):
    for i in range(row):
        for j in range(col):
            res[i][j] = m1[i][j] - m2[i][j]

```

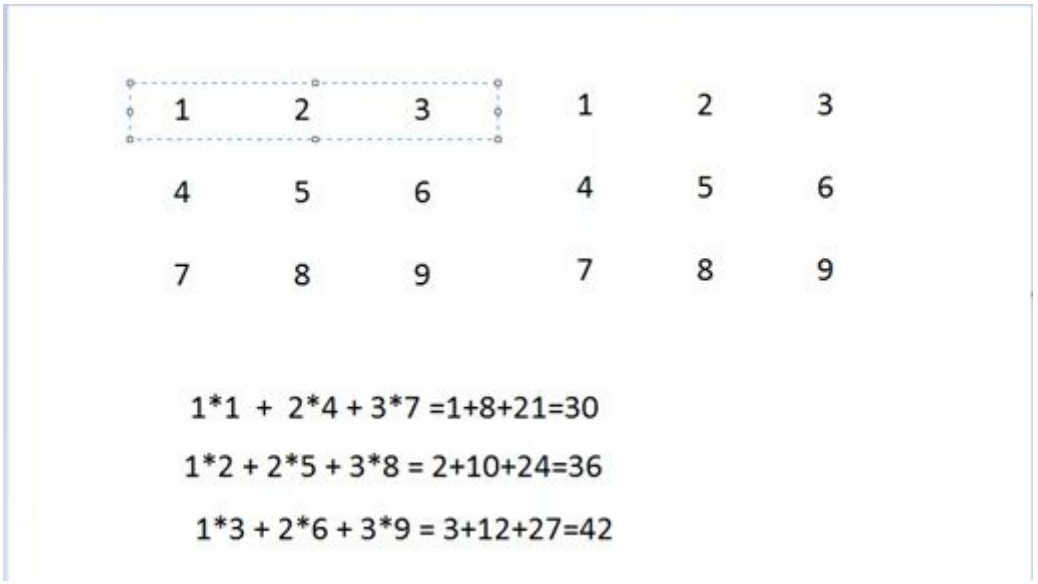
```
# Function Name: mul_mat
# Use : To perform multiplication of two matrices
def mul_mat(m1, m2, row, col):
    for i in range(row):
        for j in range(col):
            for k in range(col):
                res[i][j] = res[i][j] + m1[i][k] * m2[k][j]



# Function Name: trans_mat
# Use : To perform transpose of a matrix
def trans_mat(m, row, col):
    for i in range(row):
        for j in range(col):
            res[i][j] = m[j][i]


main()

```



OUTPUT:

```
Basic Matrix Operation using Python
Welcome all in assignment no:03 from Group A
For Matrix operation we require some input from you Please.
Enter no of rows in first matrix: 3
Enter no of cols in first matrix: 3
Enter no of rows in second matrix: 3
Enter no of cols in second matrix: 3
1. Accept two matrices from user:
2. Show the matrices values:
3. Addition of Two Matrices:
4. Subtraction of Two Matrices:
5. Multiplication of Two Matrices:
6. Transpose of Matrix
7. Exit
Enter your choice:1
please enter the values for First Matrix:
Enter the value of matrix[0][0]:: 1
Enter the value of matrix[0][1]:: 2
Enter the value of matrix[0][2]:: 3
---------------------------
Enter the value of matrix[1][0]:: 4
Enter the value of matrix[1][1]:: 5
Enter the value of matrix[1][2]:: 6
---------------------------
Enter the value of matrix[2][0]:: 7
Enter the value of matrix[2][1]:: 8
Enter the value of matrix[2][2]:: 9
---------------------------
```

```
please enter the values for Second Matrix:
Enter the value of matrix[0][0]:: 1
Enter the value of matrix[0][1]:: 2
Enter the value of matrix[0][2]:: 3
---------------------------
Enter the value of matrix[1][0]:: 4
Enter the value of matrix[1][1]:: 5
Enter the value of matrix[1][2]:: 6
---------------------------
Enter the value of matrix[2][0]:: 7
Enter the value of matrix[2][1]:: 8
Enter the value of matrix[2][2]:: 9
---------------------------
1. Accept two matrices from user:
2. Show the matrices values:
3. Addition of Two Matrices:
4. Subtraction of Two Matrices:
5. Multiplication of Two Matrices:
6. Transpose of Matrix
7. Exit
Enter your choice:2
The Value of First matrix is as follows:
1 2 3
4 5 6
7 8 9
The Value of Second matrix is as follows:
1 2 3
4 5 6
7 8 9
1. Accept two matrices from user:
2. Show the matrices values:
3. Addition of Two Matrices:
4. Subtraction of Two Matrices:
5. Multiplication of Two Matrices:
6. Transpose of Matrix
7. Exit
Enter your choice:3
The addition of two matrices are as follows..
2 4 6
8 10 12
14 16 18
1. Accept two matrices from user:
2. Show the matrices values:
3. Addition of Two Matrices:
4. Subtraction of Two Matrices:
5. Multiplication of Two Matrices:
```

6. Transpose of Matrix
7. Exit
Enter your choice:4
The subtraction of two matrices are as follows..
0 0 0
0 0 0
0 0 0
1. Accept two matrices from user:
2. Show the matrices values:
3. Addition of Two Matrices:
4. Subtraction of Two Matrices:
5. Multiplication of Two Matrices:
6. Transpose of Matrix
7. Exit
Enter your choice:5
The Multiplication of two matrices are as follows..
30 36 42
66 81 96
102 126 150
1. Accept two matrices from user:
2. Show the matrices values:
3. Addition of Two Matrices:
4. Subtraction of Two Matrices:
5. Multiplication of Two Matrices:
6. Transpose of Matrix
7. Exit
Enter your choice:6
Before Transpose of Matrix the elements in matrix are as follows:
1 2 3
4 5 6
7 8 9
After applying Transpose on matrix elements are as follows:
1 4 7
2 5 8
3 6 9
1. Accept two matrices from user:
2. Show the matrices values:
3. Addition of Two Matrices:
4. Subtraction of Two Matrices:
5. Multiplication of Two Matrices:
6. Transpose of Matrix
7. Exit
Enter your choice:7