S.No: 15	Exp. Name: ***Write a Python program to perform multiplication of two matrices***	Date:2025-04-23

ID: 24070521230

Aim:

Write a Python program to perform **multiplication** of two matrices.

Sample Input and Output-1:

```
Enter values for matrix - A
Number of rows, m = 2
Number of columns, n = 2
Entry in row: 1 column: 1
Entry in row: 1 column: 2
Entry in row: 2 column: 1
Entry in row: 2 column: 2
Enter values for matrix - B
Number of rows, m = 2
Number of columns, n = 2
Entry in row: 1 column: 1
Entry in row: 1 column: 2
Entry in row: 2 column: 1
Entry in row: 2 column: 2
Matrix - A = [[1, 2], [3, 4]]
Matrix - B = [[1, 2], [3, 4]]
Matrix - A * Matrix- B = [[7, 10], [15, 22]]
```

Sample Input and Output-2:

```
Enter values for matrix - A
Number of rows, m = 2
Number of columns, n = 3
Entry in row: 1 column: 1
Entry in row: 1 column: 2
Entry in row: 1 column: 3
Entry in row: 2 column: 1
Entry in row: 2 column: 2
Entry in row: 2 column: 3
Enter values for matrix - B
Number of rows, m = 2
Number of columns, n = 3
Entry in row: 1 column: 1
Entry in row: 1 column: 2
Entry in row: 1 column: 3
Entry in row: 2 column: 1
Entry in row: 2 column: 2
Entry in row: 2 column: 3
Matrix - A = [[1, 2, 3], [4, 5, 6]]
Matrix - B = [[1, 2, 3], [4, 5, 6]]
Cannot multiply the two matrices. Incorrect dimensions.
Matrix - A * Matrix- B = None
```

Source Code:

Lab11c.py

```
def matmult(A, B):
   rows_A = len(A)
   cols_A = len(A[0])

   rows_B = len(B)
   cols_B = len(B[0])

   if cols_A != rows_B :
      print("Cannot multiply the two matrices. Incorrect dimensions.")
      return None

   result = []
   for i in range(rows_A):
      row=[]
      for j in range(cols_B):
         row.append(0)
      result.append(row)

   for i in range(rows_A):
      for j in range(cols_B):
         for k in range(cols_A):
            result[i][j]+=A[i][k]*B[k][j]
   return result

def readmatrix(name=''):
   print(f"Enter values for {name}")
   rows=int(input("Number of rows, m = "))
   cols=int(input("Number of columns, n = "))

   matrix = []

   for i in range(rows):
      row=[]
      for j in range(cols):
         print(f"Entry in row: {i+1} column: {j+1}")
         value= int(input())
         row.append(value)
      matrix.append(row)

   return matrix

matrixa=readmatrix('matrix - A')
matrixb=readmatrix('matrix - B')
print("Matrix - A =",matrixa)
print("Matrix - B =",matrixb)
print("Matrix - A * Matrix- B =",matmult(matrixa,matrixb))
```

Execution Results - All test cases have succeeded!

Test Case - 1
User Output
Enter values for matrix - A 2
Number of rows, m = 2
Number of columns, n = 2

```
Entry in row: 1 column: 1 1
Entry in row: 1 column: 2 2
Entry in row: 2 column: 1 3
Entry in row: 2 column: 2 4
Enter values for matrix - B 2
Number of rows, m =  2
Number of columns, n =  2
Entry in row: 1 column: 1 1
Entry in row: 1 column: 2 2
Entry in row: 2 column: 1 3
Entry in row: 2 column: 2 4
Matrix - A = [[1, 2], [3, 4]]
Matrix - B = [[1, 2], [3, 4]]
Matrix - A * Matrix- B = [[7, 10], [15, 22]]
```

Test Case - 2

User Output

```
Enter values for matrix - A 2
Number of rows, m =  2
Number of columns, n =  3
Entry in row: 1 column: 1 1
Entry in row: 1 column: 2 2
Entry in row: 1 column: 3 3
Entry in row: 2 column: 1 4
Entry in row: 2 column: 2 5
Entry in row: 2 column: 3 6
Enter values for matrix - B 3
Number of rows, m =  3
Number of columns, n =  2
Entry in row: 1 column: 1 1
Entry in row: 1 column: 2 2
Entry in row: 2 column: 1 3
Entry in row: 2 column: 2 4
Entry in row: 3 column: 1 5
Entry in row: 3 column: 2 6
Matrix - A = [[1, 2, 3], [4, 5, 6]]
Matrix - B = [[1, 2], [3, 4], [5, 6]]
Matrix - A * Matrix- B = [[22, 28], [49, 64]]
```

Test Case - 3

User Output

```
Enter values for matrix - A 3
Number of rows, m =  3
Number of columns, n =  2
Entry in row: 1 column: 1 1
Entry in row: 1 column: 2 2
Entry in row: 2 column: 1 3
Entry in row: 2 column: 2 3
Entry in row: 3 column: 1 2
Entry in row: 3 column: 2 1
Enter values for matrix - B 2
```

```
Number of rows, m =  2
Number of columns, n =  1
Entry in row: 1 column: 1 1
Entry in row: 2 column: 1 2
Matrix - A = [[1, 2], [3, 3], [2, 1]]
Matrix - B = [[1], [2]]
Matrix - A * Matrix- B = [[5], [9], [4]]
```