Assignment - 3

Matrix Operation

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Problem Statement :-

Write python program for Computing following Computation on matrix

i. Addition of two matrixes
ii. Subtraction of two matrices
iii) Multiplication of two matrices
ix] Transpose of matrix

Objective :-

i] To understand Concept of 2 Dimentional array
ii] To understand primitive operation on 2D Array
iii] To understand matrix operation.

Outcome :-

i] To impliment primitive operation in python
ii] To impliment function by passing 2D Array as argument
iii] To impliment Matrix operation using 2D with function in python

S/W Requirement :-

Programming language :- python
Operating System : 64 bit Fedora
programming tool : jupyter notebook

H/W Requirement:
Any Processor above pentium 4

Theory:-

1) If A and B are two matrices of same order m×n (to be read as m by n matrix then their addition is defined as A+B
eg:- If matrix : A is matrix of order 2×3 and B is matrix of same order 2×3 then addition is possible and resultant matrix will be of order 2×3.
and same procedure is followed in other operation like subtraction,
2) For multiplication of A & B is presented as AB if A having order 2×3 and B having order 3×2 then resultant matrix AB have order 2×2
3) In case of Transpose no of rows are converted into no of columns.
Transpose of matrix A having order 2×3 then resultant matrix must have order of 3×2

Algorithm :-

Input :- matrix
Output :- matrix

```
1  Start
2  Matrix m
3  read choice
4  if choice ==1:
5      m.add()
6  elif choice ==2:
7      m.sub()
8  elif choice ==3:
9      m.mult()
10 elif choice ==4
11     m.trans()
12 else
13     break;
14 end
```

* Add(1)

```
1  Start
2  row ← no of rows
3  clum ← no of column
4  A ← matrix 1
5  B ← matrix 2
6  C ← matrix 1
7  for i=0 to i=row
8      for j=0 to j=column
9          C[i][j] += B[i][j]
10 return B
11 end
```

* sub()

```
1  Start
2  r ← no of rows
3  c ← no of column
4  A ← Enter matrix A
5  B ← Enter matrix B
6  for i=0 to r
7      for j=0 to c
8          A[i][j] -= B[i][j]
9  return A.
10  end
```

* mult ()

```
1  Start
2  r1 ← no of rows (matrix1)
3  c1 ← no of columns (matrix2)
4  A ← Enter matrix A
5  B ← Enter matrix B
6  r2, c2 = c1, r1
7  for i=0 to r1:
8      for j=0 to c2:
9          result = 0
10         For k=0 to r2
11             result += A[i][k] * B[k][j]
12         print result
13     print (" ")
14 end
```

Trans(Sel)

```
Start
r ← no of rows
c ← no of Column
A ← matrix A.
For i=0  to i=c
    For j=0 to j=r
        print(A[j][i], end=" ")
    print(" ")
```

Test Case	Description	I/P	Exp O/P	Actual O/P	result
1	1. Add 2. Sub 3. mult 4. trans.	1 $\begin{bmatrix}1&2\\3&4\end{bmatrix}$. $\begin{bmatrix}1&2\\3&4\end{bmatrix}$	$\begin{bmatrix}2&4\\6&8\end{bmatrix}$	$\begin{bmatrix}2&4\\6&8\end{bmatrix}$	Pass
2		4 trans . $\begin{bmatrix}1&3\\2&4\end{bmatrix}$	$\begin{bmatrix}1&2\\3&4\end{bmatrix}$	$\begin{bmatrix}1&2\\3&4\end{bmatrix}$	Pass