

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 matrixes
- iii) Multiplication of two matrixes
- ix] Transpose of matrix

Objective:-

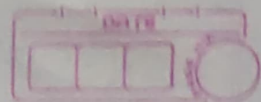
- i] To understand Concept of 2 dimensional array
- ii] To understand primitive operation on 2D Array
- iii] To understand matrix operation.

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 $m \times n$ (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.mul()
10 elif choice == 4:
11     m.trans()
12 else
13     break;
14 end

```

* Add(1)

```

1 Start
2 row no of rows
3 column 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 C
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-1
7      for j=0 to c-1
8          A[i][j] += B[i][j]
9  return A
10 end

```

* mult()

```

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

```


Trans (6el)

Start

 $r \leftarrow \text{no of rows}$ $c \leftarrow \text{no of Column}$ $A \leftarrow \text{matrix A}$ 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.	$\begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$	$\begin{bmatrix} 2 & 4 \\ 6 & 8 \end{bmatrix}$	$\begin{bmatrix} 2 & 4 \\ 6 & 8 \end{bmatrix}$	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