* Assignment No. 3 *

AIM:-

to perform different operation on matrix.

Objectives:-

- compute the transpose of matrix.
- peyorm addition, substraction and multiplication of two matrices.

Problem Statements:-

write a python program to compute following operation on matyx.

1. addition of two matrix
2. substraction of two matrix
3. multiplication of two matyx
4. transpose of matrix

Input:-

1. Number of rows & coloums of two matrix.
2. Element of both Matrixs.

outpomes:-

1. transpose of matrix
2. Result of addition, substraction and multiplicad-ion of the matrix.

Theory:-

2 Dimension array (2D Array):

2D array can be defined as an array of array. the 2D is organised as matrices when/which can be represented as collection of row and column. Howeve,

Algorithm:-

1) Start
2. Take any array as input.
3. Define functions for selection sort & Bubble sort.

Algorithm:-

1. Start.
2. Input number of rows, column of first Matrix.
3. Input element of find matrix.
4. Input number of rows & column of second Matrix
5. Input element of second matrix
6. function to transpose find matrix
7. function to add, substract & multiply two matrices.
8. Display result.
9. stop.

* Pseudo Code:-

1) Addition:
- Retieve the position of the elements taken as input.
- Add the element of same position of both matrices.

2) Substraction:-
- As like addition, we can easily perform substraction in the same way.

3) Multiplication:
- for multiplication, each element of rows in first matrix should be multiplied with each element of column in second matrix.

1) Transpose of matrix
- changing column into row.

implement a relational database looks alike data structure.

Matrix :-

A matrix refers to a collection of number such that their arrangement is not a fixed number of row and columns or, it deals with real number.

Matrix operation :-

(1) Addition -

It simply add sum up the element situated at same places or order in matrix.

$$\begin{bmatrix} 1 & 3 \\ 2 & 4 \end{bmatrix} + \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix} = \begin{bmatrix} 2 & 5 \\ 5 & 8 \end{bmatrix}$$

(2) Substraction -

It also deals with the element at same place.

$$\begin{bmatrix} 1 & 3 \\ 2 & 4 \end{bmatrix} - \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix} = \begin{bmatrix} 0 & 1 \\ -1 & 0 \end{bmatrix}$$

(3) Multiplication :-

Row of first matrix are multipled with the colum of second matrix.

$$\begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix} \times \begin{bmatrix} 1 & 3 \\ 2 & 4 \end{bmatrix} = \begin{bmatrix} 1+2\times2 & 3+2\times4 \\ 3+4\times2 & 3\times3+4\times4 \end{bmatrix} = \begin{bmatrix} 5 & 11 \\ 11 & 21 \end{bmatrix}$$

(4) transpose of Matrix -

It is formed by interchanging it row into column or column into row.

$$A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix} \quad A^{-1} = \begin{bmatrix} 1 & 3 \\ 2 & 4 \end{bmatrix}$$

* Theory -

Introduction to array:-

- It is a data structure that can be store fixed size seq collection of element of same type
- It is used for string a collection of data
- It is more useful to think of an array as a collection of variable of some type
- Instead of declaring individual you declare an array variable and use num[0]
- All arrays consist of contiguous memory location, the lower address corresponds to fill element, higher address to last element.

num[0]	num[1]	- - etc.
first element	second Element.	

* Single - dimentional array:

- The one dimensional array in python is smaller form of array that contains only row has single [] brackets.

eg):-

```
food = [fat, protein]
print (food);-
```

* Two dimenstional array.

- An array of multiple pieces of information in linear order is 1D array.
- It is more than an array of array.

eg):- 2D array with 4 rows & 4 colum

```
arr = [ (1,5), [2,3], (4,5)]
priint [arr];
```

* Multidimension array:-
Array having more than subscript variable is a multidimensional array.

- Array with more than 2 square bracket is called as matrix.
eg:-
a= [[2,4,6,8,10] [2,6,9,12,15] [4,8,12,16,20]]
for i in a
print(i).

* Algorithm Addition of matrix
step1: Stat
step 2: read the size of matrix: AB-m,n
step3: read the elements of matrix A
step 4: read the element of matrix B.
step5: Perform the addition program
step 6: print sum matrix A and B
step7: stop.

* Algorithm for substraction.
Step 1: Start
Step2: Declare matrix A[r][c], B[r][c], C[r][c]
where r= no. of row, c= no of colourns.
Step3: Read r, c A[][] and B[][]
Step4: Declare variable i=0, j=0
step5: Repeat unit i<r.
repeat unit j<r.
C[i][j] = A[i][j] - B[i][j]
Set j=5+1, i=i+1.

step 6 = C is the required matrix of the substraction

step 7 - Stop.

* Calculation transpose of a matrix.

step 1 : start

step 2 : Read the size matrix A .

step 3 : Read the element of matrix A

step 4 : perform the transpose operation by interchanging the row & column values in order of resultant matrix.

step 5 : No. of row in transpose matrix & no. of column in given matrix.

step 6 : Transpose is obtained through

a[i] [j] = a[j] [j] :

step 7 : print the resultant transpose matrix.

step 8 : stop.

* Matrix multiplication by checking compatibilty.

step 1 : start.

step 2 : read the size of matrix A, B

step 3 : check compatibility of matrices for multiplication i.e. number of column in first matrix should be equal to no. of row in second matrix.

step 4 : Read the element of matrix A

step 5 : Read the element of matrix B

step 6 : perform the multiplication operation by sorting

step 7 : stop.

Pseudo Code

(1) Addition -
Retrieve the position of the element taken as input
Add the element of same position of the matrix.

(2) Substraction:
An like addition, we can easily perform substraction in the same way.

(3) multiplication.
- for multiplication, each element of row in fast matrix should be multiped with each element of column in second Matrix.

(4) transpose of matrix
- changing calum into row.

- Conclusion:
By this way, we can perform various operation on matrix successfully.