Practical - 2 (A)

Aim :- Sum of row element, column element and diagonal element.

Description :- ~~Alg~~ Write a algorithm. for row and column element.

1) Start
2) Declare a 2-D array i.e. an M*N matrix.
3) Initialize the array using two for loops.
4) Declare two variables that will store the row and column sum.
5) Now to calculate the row sum use a nested loop.
6) Keep the first index of the matrix constant and increment the second index to access each element of the row.
7) Keep on adding these elements and display the result after coming out of the inner loop.
8) Now to calculate the column sum again using the nested loop.
9) This time increment the first index of the matrix and keep the second index of the matrix constant to access each element of the column.
10) Keep on adding these elements and display the result after coming out of the nested loop.
11) Stop.

Write algorithm for sum of diagonal element.

1) Create a 2-D array.

2) Take inputs in the array.
3) Loop from i=0 to i< (size-1)
4) Add all left diagonal elements (i.e. elements satisfying i==j) to sum_left.
5) Add all right diagonal elements (i.e. elements satisfying i+j< size-1) to sum-right.
6) End loop.
7) Output the sum values.

Code:-

```
#A basic code for matrix input from user

R=int(input("Enter the number of rows:"))
C=int(input ("Enter the number of columns:"))

# Initialize matrix
matrix =[]
print ("Enter the entries rowwise:")

#For user input
for i in range(R)  #A for loop for row entries
  a=[]
  for i in range(c) #A for loop for column entries
    a.append(int(input()))
  matrix.append(a)

#For printing the matrix
```

```
for i in range (R):
  for j in range (C):
    print(matrix[i][j], end = " ")
  print()

#Function to calculate sum of each row
def row_sum(a):
  sum = 0
  print("\nFinding Sum of each row:\n")

#finding the row sum
for i in range (R):
  for j in range (C):

#Add the element
sum += matrix[i][j]

#Print the row sum
print("Sum of the row", i, "=", sum)

#Reset the sum
sum = 0

#Function to calculate sum of each column
def column_sum(a):
  sum = 0
  print("\nFinding Sum of each column:\n")
```

```
#finding the column sum
for i in range(R):
   for j in range(C):

#Add the element
sum+ = matrix[j][i]

#Print the column sum
print("Sum of the column",i,"=", sum)

#Reset the sum
sum=0
def printDiagonalSums(matrix, R):
   principal =0
   secondary = 0;
   for i in range(0,R):
     for j in range(0,R):

#Condition for principal diagonal
if(i==j):
  principal += matrix[i][j]

#Condition for secondary diagonal
if((i+j) == (R-1)):
  secondary += matrix[i][j]

print("Principal Diagonal:", principal)
print("Secondary Diagonal:", secondary)
```

row_sum(a)
column_sum(a)
printDiagonalSums (matrix, R)

OUTPUT :-
Enter the number of rows: 3
Enter the number of columns: 3
10
20
30
40
50
60
70
80
90
10 20 30
40 50 60
70 80 90
Finding sum of each row:
Sum of the row 0 = 60
Sum of the row 1 = 150
Sum of the row 2 = 240
Finding sum of each column:
Sum of the column 0 = 120
Sum of the column 1 = 150
Sum of the column 2 = 180
Principal Diagonal: 150
Secondary Diagonal: 150

(B)

Aim :- Sum of two matrices.

Description :- Write algorithm for sum of two matrices.

1) Input matrix 1 and matrix 2.
2) If the number of rows and number of columns of matrix 1 and matrix 2 is equal,
3) for i = 1 to rows [matrix 1]
4) for j = 1 to columns [matrix 1]
5) Input matrix 1 [i, j]
6) Input matrix 2 [i, j]
7) matrix 3 [i, j] = matrix 1 [i, j] + matrix 2 [i, j];
8) Display matrix 3 [i, j];

Code :-

```
#A basic code for matrix input from user
R=int(input("Enter the number of rows:"))
C=int(input("Enter the number of colums:"))

# Initialize matrix
matrix = []
print("Enter the entries rowwise:")

#For user input
for i in range(R): #A for loop for row entries
    a = []
```

```
    for j in range(C): #A for loop for column entries
      a.append(int(input())
      matrix.append(a)

#For printing the matrix
for i in range(R):
  for j in range(C):
    print(matrix[i][j], end = " ")
  print()
R1 =int(input("Enter the number of rows:"))
C1 = int(input("Enter the number of columns:"))

#Initialize matrix
matrix1 = []
print("Enter the entries rowwise:")

#For user input
for i in range(R1):  #A for loop for row entries
  a1 = []
  for j in range(C1): #A for loop for column entries
    a1.append(int(input()))
  matrix1.append(a1)

#For printing the matrix
for i in range(R1):
  for j in range(C1):
    print(matrix1[i][j], end = " ")
  print()
result=[[0 for i in range(C)] for i in range(R)]
```

```
#iterate through rows
for i in range(R):
#iterate through columns
  for j in range(C):
    result[i][j] = matrix[i][j] + matrix1[i][j]
print("Resultant Matrix is ::>")
for i in range(R):
  for j in range(C):
    print(result[i][j], end = " ")
  print()
```

OUTPUT :-

```
Enter the number of rows: 2
Enter the number of columns: 2
Enter the entries rowwise:
1
2
3
4
1 2
3 4
Enter the number of rows: 2
Enter the number of columns: 2
Enter the entries rowwise:
10
20
30
40
```

10 20
30 40
Resultant Matrix is ::>
11 22
33 44

(C)

Aim :- Multiplication of two matrices.

Description :- Algorithm for multiplication of two matrices.

1) Input matrix1 and matrix2.
2) If the number of rows and number of columns of matrix1 and matrix2 is equal,
3) for i=1 to rows[matrix1]
4) for j=1 to columns [matrix1]
5) Input matrix1 [i, j]
6) Input matrix2 [i, j]
7) matrix3 [i, j] = matrix1 [i, j] * matrix2 [i, j];
8) Display matrix3 [i, j];

Code :-
#A basic code for matrix input from user

```
R=int(input("Enter the number of rows:"))
C=int(input("Enter the number of columns:"))

#Initialize matrix
matrix =[]
print("Enter the entries rowwise:")

#For user input
for i in range(R):   #A loop for row entries
    a=[]
    for j in range(C): #A loop for column entries
        a.append(int(input()))
    matrix.append(a)

#For printing the matrix
for i in range(R):
    for j in range(C):
        print(matrix[i][j], end = " ")
    print()
R1=int(input("Enter the number of rows:"))
C1=int(input("Enter the number of columns:"))

#Initialize matrix
matrix1 =[]
print("Enter the entries rowwise:")

#For user input
for i in range(R1):  #A for loop for row entities
```

```
    a1=[]
    for j in range(C1):  #A for loop for column entries
        a1.append(int(input()))
    matrix1.append(a1)

# For printing the matrix
for i in range(R1):
    for j in range(C1):
        print(matrix1[i][j], end=" ")
    print()
def multiplyMatrix(R, C, matrix, R1, C1, matrix1):
#Matrix to store the result
result = [[0 for i in range(R)]
    for j in range(C1)]
#check if multiplication is Possible
if (R1 != C):
    print("Not Possible")
    return

#Multiply the two
for i in range(R):
    for j in range(C1):
        result[i][j] = 0
        for k in range(R1):
            result[i][j] += matrix[i][k] * matrix1[k][j];

#Print the result
print("Resultant Matrix:")
```

```
for i in range(R):
    for j in range(C1):
        print(result[i][j], end = " ")
    print()
multiplyMatrix(R, C, matrix, R1, C1, matrix1)
```

OUTPUT :-

```
Enter the number of rows: 2
Enter the number of columns: 2
Enter the entries rowwise:
1
2
3
4
1  2
3  4
Enter the number of rows: 2
Enter the number of columns: 2
Enter the entries rowwise:
10
20
30
40
10  20
30  40
Resultant Matrix:
10  40
90  160
```