write a C/C++ Program to do the following pass the matrices as parameters in all programs.

1) Matrix addition/Sub
2) Matrix Multiplication
3) Sum of Principal diagonal/Non Principle diagonal
4) Sum of rows & Columns
5) transpose of a given matrix
6) Check if the given matrix is Symmetric or not

Soln

```
#include<stdio.h>
#define MAX_Size 100
void Input Matrix(int matrix[MAX_Size][MAX_Size], int rows, int col)
{
  Printf("Enter the elements of the Matrix:\n");
  for(int i=0; i<rows; i++){
    for(int j=0; j<cols; j++){
      Scanf("%d", &Matrix[i][j]);
    }
  }
}
void PrintMatrix(int matrix[MAX_Size][MAX_Size], int rows,
                 int cols){
  Printf("Matrix:\n");
  for(int i=0; i<rows; i++){
   for(int j=0; j<cols; j++){
       Printf("%d", matrix[i][j]);
   }
    Printf("\n");
  }
}
```

```
Void addMatrices (int Matrix1 [MAX SIZE][MAX-SIZE], int Matrix2
        [MAX-SIZE][MAX-SIZE], int rows, int Cols] {
     int result [MAX SIZE][MAX-SIZE];
      for (int i =0; i< rows; i++) {
       for (int j =0 ; j< cols; j++ ) (
         result [i][j]=matrix [i][j]+ matrix [i][j];
     }
   } Printf (Addition of Matrices : \n" ),
     Print matrix (result, rows, Cols);

void Substractmatrices (int matrix1 [MAX-SIZE] [MAX-SIZE]
                              int Matrix 2 [MAX-SIZE] [MAX-SIZE], int ro
                                  int Cols) {
  int result [MAX-SIZE][MAX-SIZE];
    for (int i=0 ; i< rows ; i++) {
       for (int j =0; j<cols ; j++){
       result [i][j] = Matrix [i][j] + Matrix2 [i][j];
     }
   }
              Addition
   Printf ("~~Substraction~~ of matrices :\n");
   Print Matrix (result, rows , cols );
}
void Substractmatrices (int matrix1 , int rows ,int cols){
   int result [MAX_SIZE] [MAX_SIZE];
   for (int i=0; i< rows ; i++ ) {
    for (int j =0 ; j <cols ; j++){
       result [i][j] = Matrix [i][j] - Matrix2 [i][j] ;
    }
  }
  Printf (" Sub of matrices :\n");
  Print Matrix (result , rows, cols);
}
```

```
void MultiplyMatrices (int matri
       if (cols1 !=rows2){
Printf(" Error: matrices cannot be multiplied.\n");
    return;
 }
int result[MAX-SIZE][MAX-SIZE];
 for (int i =0; i<rows1, i++){
   for (int j =0;  j< cols2; j++){
        result[i][j] =0;
      for (int k =0; k < cols1 ; k++){
    result[i][j] += matrix[i][k] * matrix2[k][j];
    }
   }
  }
 Printf(" Multiplication of matrices :\n");
Print matrix (result, rows1, cols2);
 }
void SumDiagnolNonDiagnol (int matrix, int rows int cols, char choice)
 {
 int sum =0;
 if (choice =='D'||choice ='d'){
    for (int i =0; i< rows; i++){
     Sum += matrix[i][i];
    }
 Printf(" Sum of diagnol elements: %d \n", Sum);
 }else if (choice =='N'||choice =='n'){
    for (int i=0; i<rows; i++){
     for (int j =0; j<cols; j++) {
          if (i!=j){
          Sum += matrix[i][j];
       }
  }
```

```
Printf("Sum of non diagnol elements : %d(n", Sum);
else{
Printf("Invalid Choice. Please enter 0 or N. \n");
   }
 }.
void SumRowsColumns (int matrix[MAX-SIZE][MAX-SIZE], int rows,
                                   int cols){
 int dowSum [MAX-SIZE]={0};
 int colSum [MAX-SIZE]={0};
    for (int i=0 ; i<rows ; i++){
     for (int j=0; j<cols; j++){
         rowSum [i] += matrix [i] [j];
         ColSum [j] += matrix [i][j] ,
    }
 } Printf ("Sum of Rows:\n"),
    for (int i=0; i <rows ; i++){
        Print f ("Row %d : %d\n", i+1 , rowSum[i]),
  }
 Printf ("Sum of Columns:\n");
   for (int j =0;j<cols; j++)(
       Printf("Column %d : %d\n", j +1, ColSum [j]),
   }
 } Void transposeMatrix (int Matrix , rows , Cols){
 int transposed [MAX-SIZE][MAX-SIZE],
for (int i = 0; i<rows ;i++ ){
   for (int j=0; j<cols ; j++ ){
             transposed [j] [i] = Matrix [i][j];
 }
Printf(" Transposed matrix :\n");
Print Matrix (transposed, cols, rows)
```

```
int isSymmetric
      if (rows !=
         return
     }
   }
 } return 1;
}
int main (){
int choice;
Printf (" Matrix
Printf ("1. Add
Printf ("2. Sub
Printf ("3. Mul
Printf ("4. Su
Printf ("5. Su
 Printf ("6.
 Printf ("7 .
 Printf (" En
 Scanf ("

  int rows,
  Printf ("
  Scanf (
  Print ~~f~~
   Scan
    }
int isSymmetric~~Elem~~Matrix (int ma
        if (rows != cols ) {
            return0;

        }
      }
    }
    return 1;

}
int main (){
int choice;
Printf(" Matrix operations :\n");
Printf("1. Addition\n");
Print f("2. Sub\n")
Printf("3. Multiplication\n");
Printf("4. Sum of diagnol or non diagnol elements\n");
Printf("5. Sum of rows & columns \n");
Printf("6. Transpose of matrix \n");
Printf("7. Check if matrix is Symmetric\n");
Printf(" Enter your choice:");
Scanf ("%d", & choice); .

int rows, Cols;
Printf ("Enter the no of rows in the matrix:");
Scanf ("%d", &rows);
Print f(" Enter the no of columns in the Matrix :");
 Scanf ("%d", & cols);
 }
```

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