Aim:

Write a C program to perform multiplication of two matrices.

Algorithm:

1. Start the program.
2. Input the number of rows and columns for the first matrix (Matrix A).
3. Input the elements of Matrix A.
4. Input the number of rows and columns for the second matrix (Matrix B).
5. Input the elements of Matrix B.
6. Check if the number of columns of Matrix A is equal to the number of rows of Matrix B. If not, display an error and stop.
7. Initialize a result matrix with dimensions (rows of Matrix A) x (columns of Matrix B).
8. Multiply Matrix A and Matrix B using the matrix multiplication formula:
    - For each row i in Matrix A,
    - For each column j in Matrix B,
    - Calculate the sum of the product of elements of the i-th row of Matrix A and the j-th column of Matrix B.
9. Store the result in the result matrix.
10. Display the result matrix.
11. End the program.

C Program:

```
#include <stdio.h>


int main() {

    int rowA, colA, rowB, colB;

    int i, j, k;


    printf("Enter the number of rows and columns for Matrix A: ");

    scanf("%d %d", &rowA, &colA);
```

```
printf("Enter the number of rows and columns for Matrix B: ");

scanf("%d %d", &rowB, &colB);


if (colA != rowB) {

printf("Matrix multiplication not possible! Number of columns of A must be equal to number of rows of B.\n");

return 1;

}


int matrixA[rowA][colA];

int matrixB[rowB][colB];

int result[rowA][colB];


printf("Enter elements of Matrix A:\n");

for (i = 0; i < rowA; i++) {

for (j = 0; j < colA; j++) {

scanf("%d", &matrixA[i][j]);

}

}


printf("Enter elements of Matrix B:\n");

for (i = 0; i < rowB; i++) {

for (j = 0; j < colB; j++) {

scanf("%d", &matrixB[i][j]);

}
```

```
}

// Initialize result matrix with 0
for (i = 0; i < rowA; i++) {
for (j = 0; j < colB; j++) {
result[i][j] = 0;
}
}

// Matrix multiplication
for (i = 0; i < rowA; i++) {
for (j = 0; j < colB; j++) {
for (k = 0; k < colA; k++) {
    result[i][j] += matrixA[i][k] * matrixB[k][j];
}
}
}

// Display the result matrix
printf("Resultant Matrix after multiplication:\n");
for (i = 0; i < rowA; i++) {
for (j = 0; j < colB; j++) {
printf("%d ", result[i][j]);
}
```

```
        printf("\n");
        }

        return 0;
}
```

Sample Output:

```
Enter the number of rows and columns for Matrix A: 2
2
Enter the number of rows and columns for Matrix B: 2
2
Enter elements of Matrix A:
1
2
3
4
Enter elements of Matrix B:
5
6
7
8
Resultant Matrix after multiplication:
19 22
43 50


=== Code Execution Successful ===
```

RESULT:

The program is successfully executed