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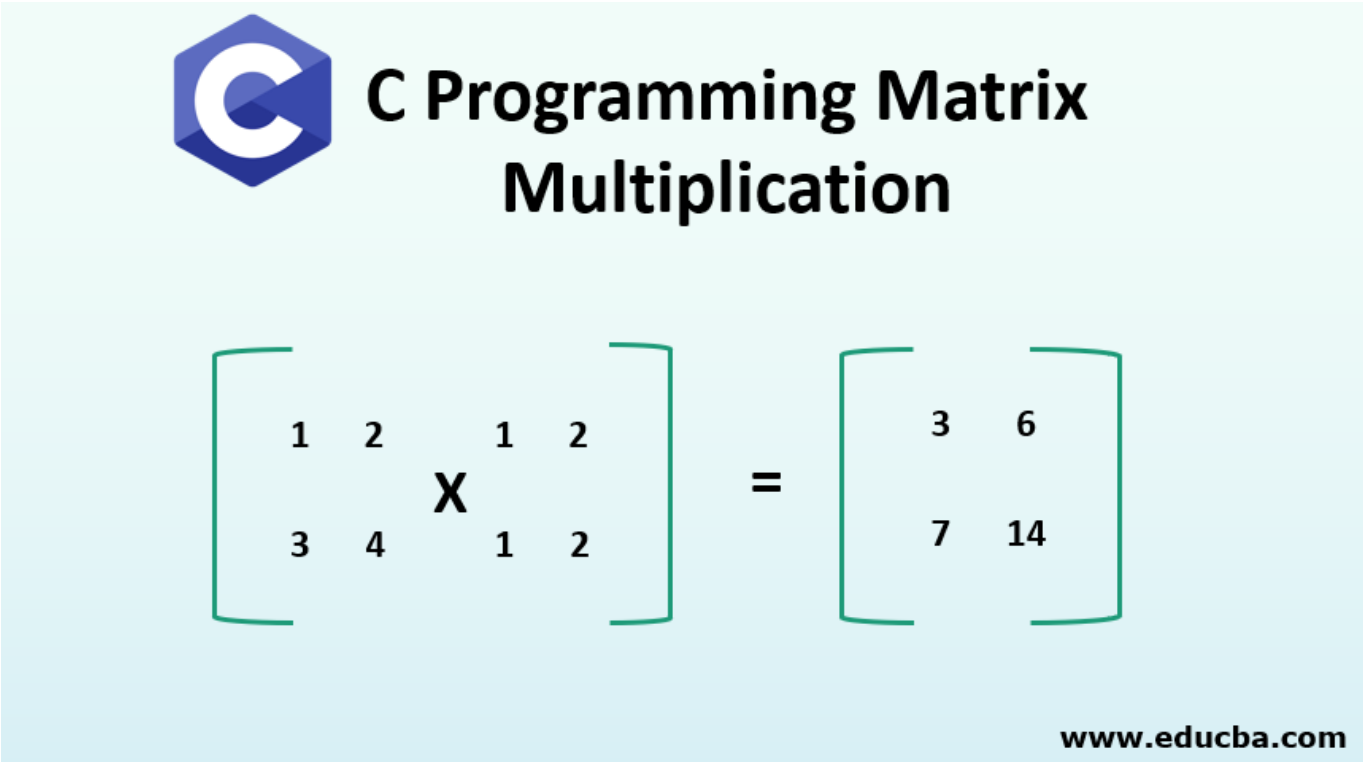

Introduction to Matrix Multiplication in C Programming

QUIZ

In article C Programming Matrix Multiplication a matrix is a grid that is used to store data in a

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divide two matrices, then the order of the matrix should be declared first. Once the order of the matrix is declared for the first and second matrix, then the elements (input) for the matrices are needed to be entered by the user. If the order of the matrix is not proportionate to each other, then the error message will be displayed which is implanted by a programmer in the condition statement. If a matrix contains only one row then it is called a row vector, and if it contains only one column then it is called a column vector (https://www.educba.com/column-vector-matlab/).

A matrix that contains the same number of rows and columns then it is called a square matrix. Matrix is used to store a group of related data. Some of the programming languages are used to support matrices as a data type that offers more flexibility than a static array. Instead of storing the values in a matrix, it can be stored as an individual variable, a program can access and perform operations on the data more efficiently. In C programming matrix multiplications are done by using arrays, functions, pointers. Therefore we are going to discuss an algorithm for Matrix multiplication (https://www.educba.com/matrix-multiplication-in-java/) along with the flowchart, which can be used to write programming code for 3×3 matrix multiplication in a high-level language. This detailed explanation will help you to analyze the working mechanism of matrix multiplication and will help to understand how to write code.

Algorithm of C Programming Matrix Multiplication

Step 1: Start the Program.

Step 2: Enter the row and column of the first (a) matrix.

Step 5: Enter the elements of the second (b) matrix.

Step 6: Print the elements of the first (a) matrix in matrix form.

Step 7: Print the elements of the second (b) matrix in matrix form.

Step 8: Set a loop up to row.

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Step 11: Multiply the first (a) and second (b) matrix and store the element in the third matrix (c)

Step 12: Print the final matrix.

Step 13: Stop the Program.

Flow Chart of Matrix Multiplication

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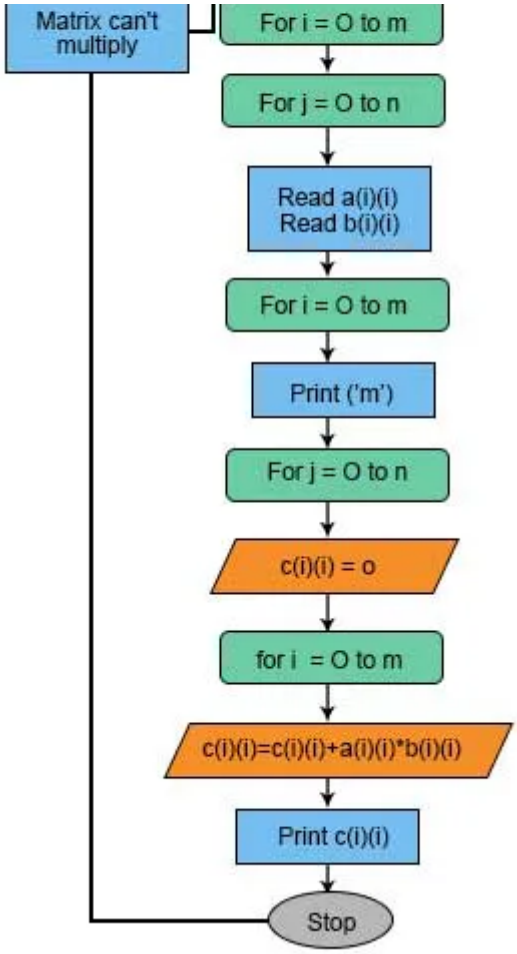

Example of C Programming Matrix Multiplication

C program performs matrix multiplication, let us look at a few examples.

Code:

```
#include <stdio.h>
void main()
{
int a[25][25],b[25][25],c[25][25],i,j,k,r,s;
int m,n;
```

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```
if(m!=r)
printf("\n The matrix cannot multiplied");
else
{
printf("\n Enter the elements of first matrix ");
for(i= 0;i<m;i++)
{
for(j=0;j<n;j++)
scanf("\t%d",&a[i][j]);
}
printf("\n Enetr the elements of second matrix ");
for(i=0;i<m;i++)
{
for(j=0;j<n;j++)
scanf("\t%d",&b[i][j]);
}
printf("\n The element of first matrix is");
for(i=0;i<m;i++)
{
printf("\n");
for(j=0;j<n;j++)
printf("\t%d",a[i][j]);
}
printf("\n The element of second matrix is");
for(i=0;i<m;i++)
{
```

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```
for(i=0;i<m;i++)
{
printf("\n");
for(j=0;j<n;j++)
{
c[i][j]=0;
for(k=0;k<m;k++)
c[i][j]=c[i][j]+a[i][k]*b[k][j];
}
}
}
printf("\n Multiplication of two matrix is");
for(i=0;i<m;i++)
{
printf("\n");
for(j=0;j<n;j++)
printf("\t%d",c[i][j]);
}
}
```

Output:


```
Enter the first matrix
```

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```
        0       1
```

```
Enter the first matrix
2 2
Enter the second matrix
2 2

 Enter the elements of first matrix 1 2
 3 4

 Enetr the elements of second matrix  1 2 1 2

 The element of first matrix is
        1       2
        3       4
 The element of second matrix is
        1       2
        1       2


 Multiplication of two matrix is
        3       6
        7       14
```

Working of C Programming Matrix Multiplication

- In the above program, we have initialized the variables and arrays inside the main method in integer (int) data type.
- After the initialization part, we are getting the order of the matrix from the user for the first matrix, then simultaneously the user has to declare the order of the second matrix.
- Once the order of matrices is declared then the condition part will execute, the pro will continue to run only if the order satisfies the condition or else the program wi terminated or stopped at that part itself.

- Once the condition is satisfied, the user has to enter the matrix elements as inputs during

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edit in the array to the required numbers.

Advantages of C Programming Matrix Multiplication

- C programming language supports matrix as a data type and offers more flexibility. And also it consumes less memory while processing.
- By storing values in a matrix rather than as individual variables, C program can access and perform operations on the data more efficiently.
- It is easier to extract information about object rotation, and also easy to manipulate in the C program.

Conclusion

Matrix multiplication is repeatedly used in programs to represents a graphical data structure, which is used to store multiple vectors and also it is used in many applications like solving linear equations and more. Lots of research has been done on multiplying matrices using a minimum number of operations.

Recommended Article

This is a guide to C programming matrix multiplication. Here we discuss working of matrix manipulation, algorithm, flow chart and examples along with different advantages in c programming. You can also go through our other suggested articles to learn more –

1. Matrix Multiplication in NumPy (https://www.educba.com/matrix-multiplication-in-numpy/)
2. Matrix Multiplication in Matlab (https://www.educba.com/matrix-multiplication-in-matlab/)

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