

One can define matrices in C++ using 2-D arrays.

In this post I will assume, that you are familiar with the concepts of [arrays](#).

In this post I will show you how to write a C++ program that gives the product of two matrices.

The product of two matrices isn't always defined.

The product of matrices A and B :

$A \times B$ is defined only when the no. of columns of A is equal to the no. of rows in matrix B .

If A is an $m \times p$ matrix, and B is an $p \times n$ matrix, then the product matrix would be a $m \times n$ matrix,

$$(A \times B)_{ij} = \sum_{k=1}^p A_{ik} B_{kj}$$

With the above, information, we can proceed to write a simple program, to multiply two matrices of given sizes.

We would also need to check whether the matrix product is defined or not.

The program is pretty much self-explanatory.

PROGRAM:

```

//Matrix Multiply
#include<iostream>
#include<iomanip>
using namespace std;
int main()
{
    int m,n,p,q;
    a:cout<<"\nEnter the order of the matrix A:\n";
    cin>>m;
    cin>>n;
    cout<<"\nEnter the order of the matrix B:\n";
    cin>>q;
    cin>>p;
    if(n!=q){
        cout<<"\nCan't multiply!\nThe number of columns of A should be equal to
the number of rows in B.\n\nPlease enter again!\n\n";
        goto a;
    }
    double a[m][n];
    double b[n][p];
    double prod[m][p];
    cout<<"\nEnter the elements of the matrix A row-wise:\n";
    for (int i=0;i<m;i++)
        for (int j=0;j<n;j++)
            cin>>a[i][j];
    cout<<"\nEnter the elements of the matrix B row-wise:\n";
    for (int i=0;i<n;i++)
        for (int j=0;j<p;j++)
            cin>>b[i][j];
    for (int i=0;i<m;i++){
        for (int j=0;j<p;j++){
            prod[i][j]=0;
            for(int k=0;k<n;k++){
                prod[i][j]=prod[i][j]+a[i][k]*b[k][j];
            }
        }
    }
    cout<<"\nThe product AxB is:\n";
    for (int i=0;i<m;i++){
        for (int j=0;j<p;j++){
            cout<<prod[i][j]<<setw(16);
        }
        cout<<"\n";
    }
    return 0;
}

```

OUTPUT:

```
Enter the order of the matrix A:
3      2

Enter the order of the matrix B:
2      3

Enter the elements of the matrix A row-wise:
1      2
3      4
0      -1

Enter the elements of the matrix B row-wise:
1      2      0
-1     -5     1

The product AxB is:
-1      -8      2
-1     -14     4
1       5     -1
```

Sample output



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