

## Fop Lab Home Task 9

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**(NOTE: Codes are attached in main.cpp file.)**

### HOME TASK

```
#include <bits/stdc++.h>
using namespace std;

void adjoint3x3(float arr[][3], float adjoint[][3]) {
    float ad, bc;
    for (int i=0; i<3; i++) {
        for (int j=0; j<3; j++) {
            ad = arr[(i+1)%3][(j+1)%3]*arr[(i+2)%3][(j+2)%3];
            bc = arr[(i+1)%3][(j+2)%3]*arr[(i+2)%3][(j+1)%3];
            adjoint[j][i] = (ad-bc);
        }
    }
}

float determinant3x3(float arr[][3]) {
    float determinant=0, x, ad, bc;

    for (int i=0; i<3; i++) {
        x = arr[0][i];
        ad = arr[1][(i+1)%3]*arr[2][(i+2)%3];
        bc = arr[1][(i+2)%3]*arr[2][(i+1)%3];
        determinant += x*(ad-bc);
    }

    return determinant;
}

void inverse3x3(float arr[][3], float adjoint[][3], float inverse[][3], float determinant) {
    adjoint3x3(arr, adjoint);

    for (int i=0; i<3; i++) {
        for (int j=0; j<3; j++) {
            inverse[i][j] = adjoint[i][j]/determinant;
        }
    }
}
```

```

int main()
{
    float arr[3][3], adjoint[3][3], inverse[3][3], determinant;

    // Getting matrix
    for (int i=0; i<3; i++) {
        for (int j=0; j<3; j++) {
            cout<<"Enter element at position "<<i<<","<<j<<": ";
            cin>>arr[i][j];
        }
    }

    // Calculating Determinant
    determinant = determinant3x3(arr);
    if (determinant == 0) {
        cout<<"Inverse does not exists (Determinant = 0)";
        return 1;
    }

    // Calculating Inverse
    inverse3x3(arr, adjoint, inverse, determinant);

    // Printing Inversed Matrix
    cout<<endl<<"Inversed Matrix"<<endl;
    for (int i=0; i<3; i++) {
        for (int j=0; j<3; j++) {
            cout<<inverse[i][j]<<" ";
        }
        cout<<endl;
    }
    return 0;
}

```

## Output 1

```

Enter element at position 0,0: 2
Enter element at position 0,1: 4
Enter element at position 0,2: 6
Enter element at position 1,0: 1
Enter element at position 1,1: 8
Enter element at position 1,2: 4
Enter element at position 2,0: 3
Enter element at position 2,1: 5
Enter element at position 2,2: 9

Inversed Matrix
26  -3  -16
1.5  0   -1
-9.5 1    6

Process returned 0 (0x0)   execution time : 10.365 s
Press any key to continue.

```

## Output 2

```
Enter element at position 0,0: 2
Enter element at position 0,1: 4
Enter element at position 0,2: 6
Enter element at position 1,0: 4
Enter element at position 1,1: 6
Enter element at position 1,2: 8
Enter element at position 2,0: 1
Enter element at position 2,1: 2
Enter element at position 2,2: 3
Inverse does not exists (Determinant = 0)
Process returned 1 (0x1)   execution time : 16.173 s
Press any key to continue.
```