

## LAB MANUAL 9

### HOMETASK

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#### HOMETASK 1:

```
#include <bits/stdc++.h>

using namespace std;

float calculateDeterminant2x2(float a, float b, float c, float d) {
    return (a * d - b * c);
}

float calculateDeterminant3x3(float matrix[3][3]) {
    float det = 0;

    for (int i = 0; i < 3; ++i) {
        det += matrix[0][i] * calculateDeterminant2x2(matrix[1][(i + 1) % 3], matrix[1][(i + 2) % 3],
            matrix[2][(i + 1) % 3], matrix[2][(i + 2) % 3]);
    }

    return det;
}

void calculateAdjoint(float matrix[3][3], float adjoint[3][3]) {
    for (int i = 0; i < 3; ++i) {
        for (int j = 0; j < 3; ++j) {
            float cofactor = calculateDeterminant2x2(matrix[(i + 1) % 3][(j + 1) % 3], matrix[(i + 1) % 3][(j + 2) % 3],
                matrix[(i + 2) % 3][(j + 1) % 3], matrix[(i + 2) % 3][(j + 2) % 3]);

            adjoint[j][i] = ((i + j) % 2 == 0 ? 1 : -1) * cofactor;
        }
    }
}
```

```

    }
}

void calculateInverse(float matrix[3][3], float inverse[3][3]) {
    float det = calculateDeterminant3x3(matrix);

    if (det == 0) {
        cout << "The matrix is singular, and its inverse does not exist." << endl;
        return;
    }

    float adjoint[3][3];
    calculateAdjoint(matrix, adjoint);

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

void displayMatrix(float matrix[3][3]) {
    for (int i = 0; i < 3; ++i) {
        for (int j = 0; j < 3; ++j) {
            cout << matrix[i][j] << " ";
        }
        cout << endl;
    }
}

```

```
int main() {  
    float matrix[3][3];  
  
    cout << "Enter the elements of the 3x3 matrix:" << endl;  
    for (int i = 0; i < 3; ++i) {  
        for (int j = 0; j < 3; ++j) {  
            cin >> matrix[i][j];  
        }  
    }  
  
    float inverse[3][3];  
    calculateInverse(matrix, inverse);  
  
    cout << "Original Matrix:" << endl;  
    displayMatrix(matrix);  
  
    cout << "\nInverse Matrix:" << endl;  
    displayMatrix(inverse);  
  
    return 0;  
}
```

"L:\lab manual#9\bin\Debug\lab manual#9.exe"

Enter the elements of the 3x3 matrix:

112

24

46

78

76

68

98

24

46

Original Matrix:

112 24 46

78 76 68

98 24 46

Inverse Matrix:

0.0714286 -0 -0.0714286

-0.117872 0.0246781 0.154353

-0.213673 0.0128755 0.254445