

FUNDAMENTALS OF PROGRAMMING

LAB MANUAL 9

HOME TASK

ABDUL MOIZ 464834 SECTION B

```
#include <iostream>

using namespace std;

float determinant(float a[][3]);

int main() {

    float A[3][3];

    int n;

    cout << "Please enter numbers for a 3 by 3 matrix." << endl;

    for (int i = 0; i < 3; i++) {
        for (int j = 0; j < 3; j++) {
            cout << "Enter element A" << i + 1 << j + 1 << ": ";
            cin >> A[i][j];
        }
    }

    cout << "\nThe original 3 by 3 matrix is the following:" << endl;

    for (int k = 0; k < 3; k++) {
        for (int m = 0; m < 3; m++) {
            cout << " " << A[k][m] << " ";
        }
        cout << endl;
    }
```

```
}
```

```
float determinant_1 = determinant(A);
```

```
float A11 = 1 * (A[1][1] * A[2][2] - A[1][2] * A[2][1]);
```

```
float A12 = -1 * (A[1][0] * A[2][2] - A[1][2] * A[2][0]);
```

```
float A13 = 1 * (A[1][0] * A[2][1] - A[1][1] * A[2][0]);
```

```
float A21 = -1 * (A[0][1] * A[2][2] - A[0][2] * A[2][1]);
```

```
float A22 = 1 * (A[0][0] * A[2][2] - A[0][2] * A[2][0]);
```

```
float A23 = -1 * (A[0][0] * A[2][1] - A[0][1] * A[2][0]);
```

```
float A31 = 1 * (A[0][1] * A[1][2] - A[0][2] * A[1][1]);
```

```
float A32 = -1 * (A[0][0] * A[1][2] - A[0][2] * A[1][0]);
```

```
float A33 = 1 * (A[0][0] * A[1][1] - A[0][1] * A[1][0]);
```

```
A[0][0] = A11;
```

```
A[0][1] = A12;
```

```
A[0][2] = A13;
```

```
A[1][0] = A21;
```

```
A[1][1] = A22;
```

```
A[1][2] = A23;
```

```
A[2][0] = A31;
```

```
A[2][1] = A32;
```

```
A[2][2] = A33;
```

```
cout << "\nThe inverse of the 3 by 3 matrix is the following:" << endl;
```

```
for (n = 0; n < 3; n++) {
```

```
    for (int p = 0; p < 3; p++) {
```

```
        cout << " " << A[p][n] / determinant_1 << " ";
```

```

    }

    cout << endl;

}

return 0;

}

float determinant(float a[][3]) {

    float determinant_2 = (a[0][0] * (a[1][1] * a[2][2] - a[1][2] * a[2][1])) -

        (a[0][1] * (a[1][0] * a[2][2] - a[1][2] * a[2][0])) +

        (a[0][2] * (a[1][0] * a[2][1] - a[1][1] * a[2][0]));

    return determinant_2;

}

```

```

Enter the elements of the 3x3 matrix:
Enter element at position 1,1: 1
Enter element at position 1,2: 2
Enter element at position 1,3: 3
Enter element at position 2,1: 4
Enter element at position 2,2: 5
Enter element at position 2,3: 6
Enter element at position 3,1: 7
Enter element at position 3,2: 8
Enter element at position 3,3: 9

```

```

The entered matrix is:

```

```

1 2 3
4 5 6
7 8 9

```

```

The sum of the left diagonal is: 15
The sum of the right diagonal is: 15

```