Fundamentals of Programing

Lab Manual # 09

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**Home Task:**

1. Write a C++ program to take inverse of a 3x3 matrix using its determinant and adjoint.

#include <iostream>

using namespace std;

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

float det = 0;

det = matrix[0][0] \* (matrix[1][1] \* matrix[2][2] - matrix[1][2] \* matrix[2][1]) -

matrix[0][1] \* (matrix[1][0] \* matrix[2][2] - matrix[1][2] \* matrix[2][0]) +

matrix[0][2] \* (matrix[1][0] \* matrix[2][1] - matrix[1][1] \* matrix[2][0]);

return det;

}

void adjoint(float matrix[3][3], float adj[3][3]) {

adj[0][0] = matrix[1][1] \* matrix[2][2] - matrix[1][2] \* matrix[2][1];

adj[0][1] = -(matrix[1][0] \* matrix[2][2] - matrix[1][2] \* matrix[2][0]);

adj[0][2] = matrix[1][0] \* matrix[2][1] - matrix[1][1] \* matrix[2][0];

adj[1][0] = -(matrix[0][1] \* matrix[2][2] - matrix[0][2] \* matrix[2][1]);

adj[1][1] = matrix[0][0] \* matrix[2][2] - matrix[0][2] \* matrix[2][0];

adj[1][2] = -(matrix[0][0] \* matrix[2][1] - matrix[0][1] \* matrix[2][0]);

adj[2][0] = matrix[0][1] \* matrix[1][2] - matrix[0][2] \* matrix[1][1];

adj[2][1] = -(matrix[0][0] \* matrix[1][2] - matrix[0][2] \* matrix[1][0]);

adj[2][2] = matrix[0][0] \* matrix[1][1] - matrix[0][1] \* matrix[1][0];

}

bool det\_check(float matrix[3][3]){

if (determinant(matrix) == 0) {

cout << "Inverse does not exist." << endl;

return false ;

}

else{

return true;

}

}

void inverse(float matrix[3][3], float inverse[3][3]) {

float det = determinant(matrix);

float adj[3][3];

adjoint(matrix, adj);

for (int i = 0; i < 3; i++) {

for (int j = 0; j < 3; j++) {

inverse[i][j] = adj[i][j] / det;

}

}

}

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 inverseMatrix[3][3];

if(det\_check(matrix)){

inverse(matrix, inverseMatrix);

cout << "Inverse of the matrix:" << endl;

for(int i=0;i<3;++i){

for(int j=0;j<3;++j){

if(i==j){

break;

}

else{

int temp=inverseMatrix[i][j];

inverseMatrix[i][j]=inverseMatrix[j][i];

inverseMatrix[j][i]=temp;

}

}

}

for (int i = 0; i < 3; i++) {

for (int j = 0; j < 3; j++) {

cout << inverseMatrix[i][j] << "\t";

}

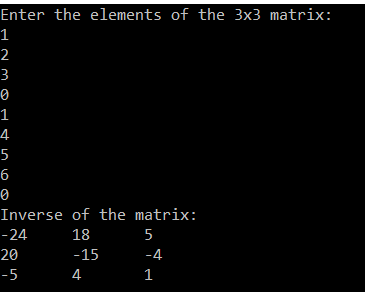
cout << endl;

}

}

return 0;

}

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