

**CS-114 - Fundamental of Programing**

**Lab Manual # 9**

**Home Task**

Submitted To: Engr Muhammad Affan

Submitted By: Shahzaib Murtaza (466034)

Section: B

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

#include <iostream>

#include <iomanip>

using namespace std;

int main(){

double a[3][3], adj[3][3], det, inv[3][3], t=0;

cout<<"Input Numbers:";

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

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

cin>>a[x][y];

}

}

cout<<"Numbers in matrix are";

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

cout<<"| ";

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

cout<<a[x][y]<<" ";

}

cout<<"|"<<endl;

}

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

-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]);

cout<<"The determinant of the matrix is: "<<det<<endl;

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

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

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

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

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

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

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

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

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

cout<<"The cofactor of the matrix is: \n";

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

cout<<"| ";

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

cout<<adj[x][y]<<" ";

}

cout<<"|"<<endl;

}

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

for(int y=x+1; y<3; y++){

t=adj[x][y];

adj[x][y]=adj[y][x];

adj[y][x]=t;

}

}

cout<<"The adjoint of the matrix is: \n";

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

cout<<"| ";

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

cout<<adj[x][y]<<" ";

}

cout<<"|"<<endl;

}

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

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

inv[x][y]=adj[x][y]/det;

}

}

cout<<"The inverse of the matrix is: \n";

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

cout<<"| ";

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

cout<<setprecision (3)<<inv[x][y]<<" ";

}

cout<<"|"<<endl;

}

return 0;

}

