School Of Mechanical & Manufacturing Engineering, NUST

Department of Mechanical Engineering

Fundamental of Programing

Lab Manual # 09

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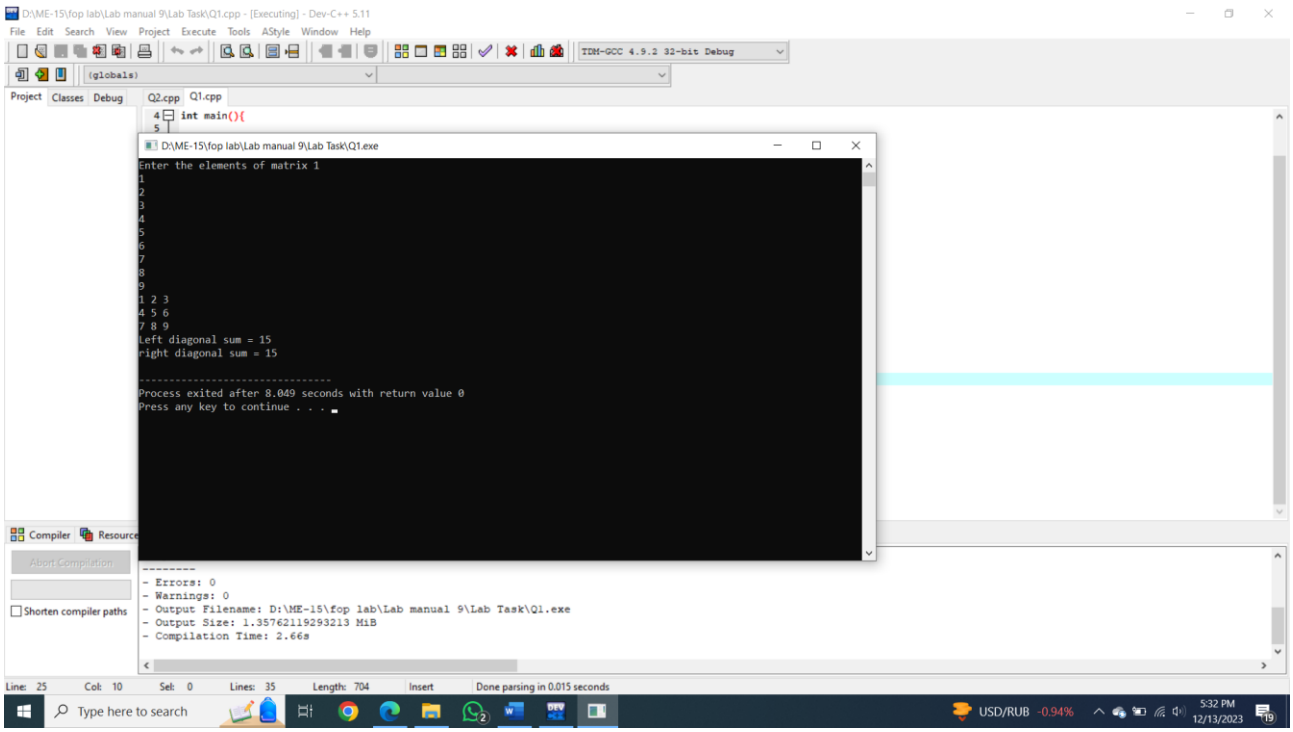
Section: C

Q1:

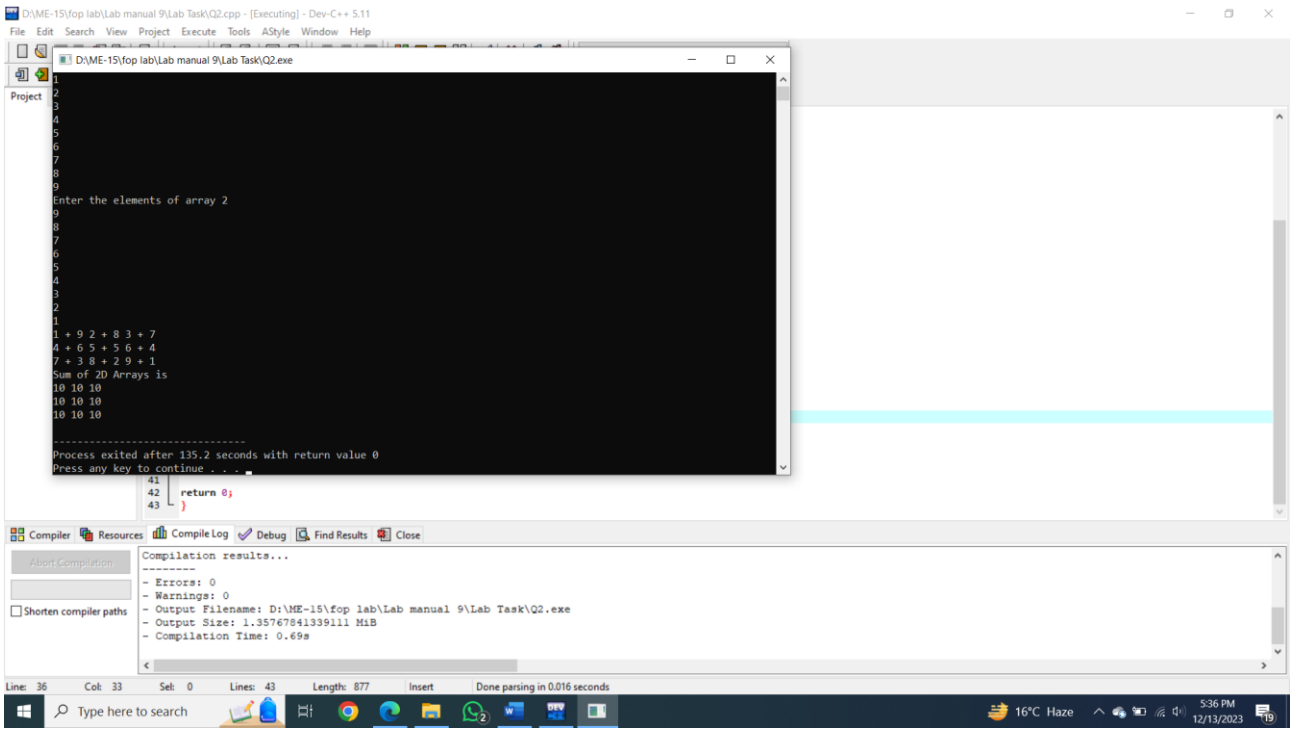
```
#include<iostream>
using namespace std;

int main(){

int arr[3][3];
cout<<"Enter the elements of matrix 1 "<<endl;
for(int i=0; i<3;i++){
for(int j=0; j<3; j++){
cin>>arr[i][j];
}
}
for(int i=0; i<3;i++){
for(int j=0; j<3; j++){
cout<<arr[i][j]<<" ";
}
cout<<endl;
}
int Lsum=0;
for(int i=0; i<3;i++){
for(int j=0; j<3; j++){
if(i == j){
Lsum = Lsum+arr[i][j];
}
}
}
cout<<"Left diagonal sum = "<<Lsum<<endl;
int Rsum=0;
for(int i=0; i<3;i++){

Rsum = Rsum+arr[i][2-i];
}
cout<<"right diagonal sum = "<<Rsum<<endl;
return 0;
}
```



Q2:

```
#include<iostream>
using namespace std;

void sumarray(int arr[3][3], int brr[3][3], int crr[3][3]) {

for(int i=0; i<3;i++){
for(int j=0; j<3; j++){
crr[i][j] = arr[i][j] + brr[i][j];
}
}
}
int main(){
int  arr[3][3],brr[3][3],crr[3][3];

cout<<"Enter the elements of array 1 "<<endl;
for(int i=0; i<3;i++){
for(int j=0; j<3; j++){
cin>>arr[i][j];
}
}
cout<<"Enter the elements of array 2 "<<endl;
for(int i=0; i<3;i++){
for(int j=0; j<3; j++){
cin>>brr[i][j];
}
}
```

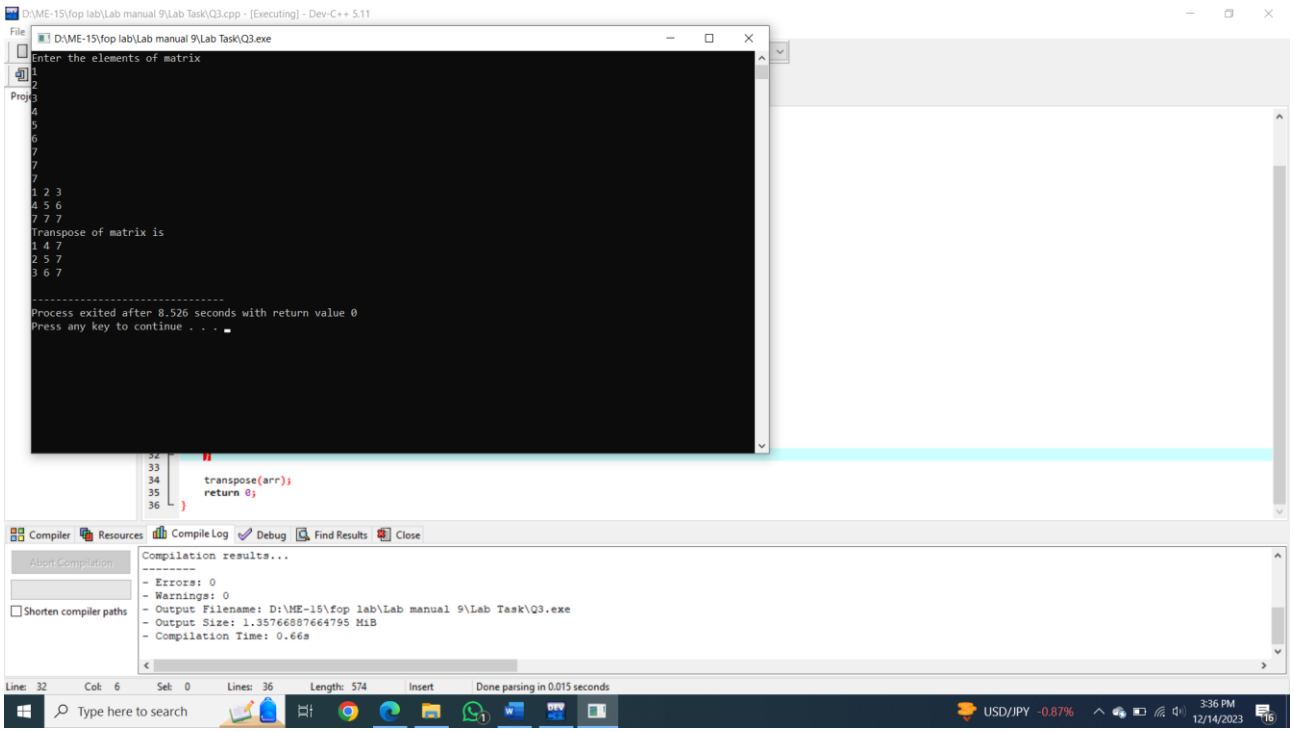
```
for(int i=0; i<3;i++){
for(int j=0; j<3; j++){
cout<<arr[i][j]<<" + "<<brr[i][j]<<" ";
}
cout<<endl;
}
sumarray(arr, brr, crr);
cout<<"Sum of 2D Arrays is "<<endl;
for(int i=0; i<3;i++){
for(int j=0; j<3; j++){
cout<<crr[i][j]<<" ";
}
cout<<endl;
}
return 0;
}
```



Q3:

```
#include<iostream>
using namespace std;
void transpose(int arr[3][3]){

cout<<"Transpose of matrix is "<<endl;
for(int i=0; i<3;i++){
for(int j=0; j<3; j++){
```

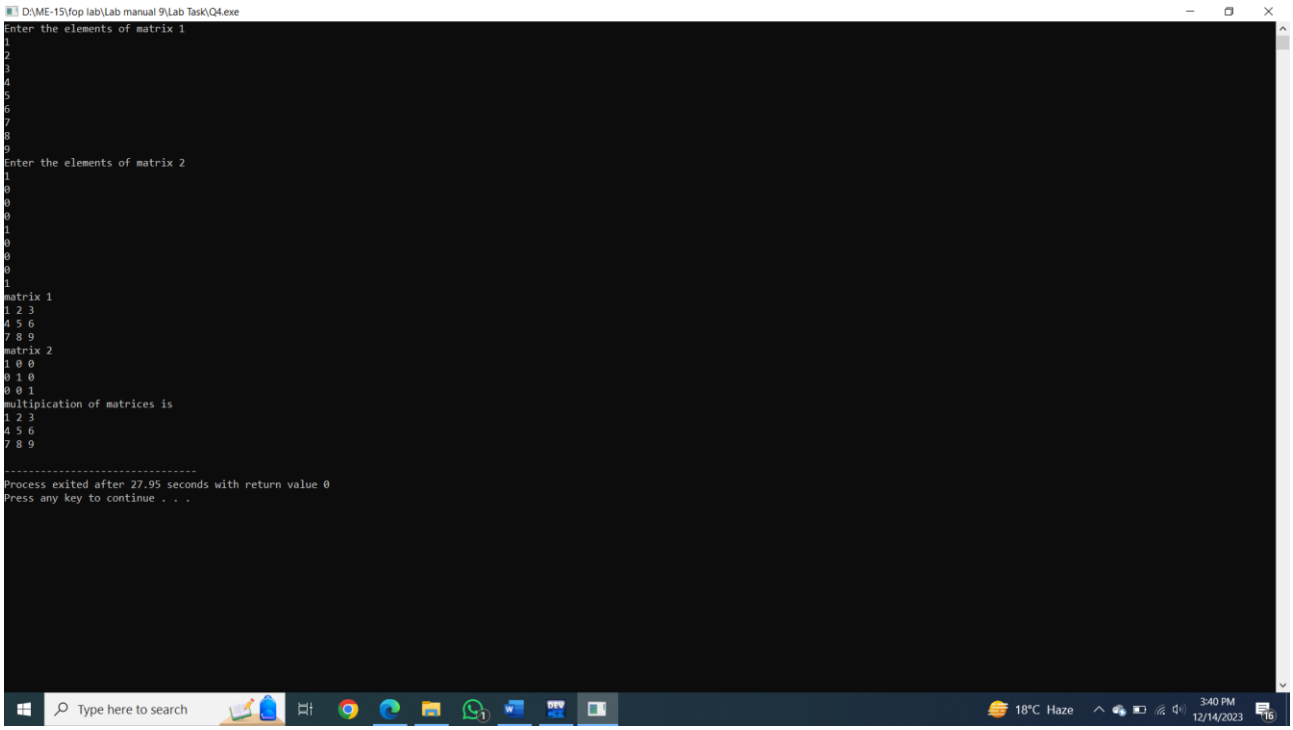
```
cout<<arr[j][i]<<" ";
}
cout<<endl;
}
}

int main(){

int arr[3][3];
cout<<"Enter the elements of matrix "<<endl;
for(int i=0; i<3;i++){
for(int j=0; j<3; j++){

cin>>arr[i][j];
}
}

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

cout<<arr[i][j]<<" ";
}
cout<<endl;
}

transpose(arr);
return 0;
}
```



Q4:

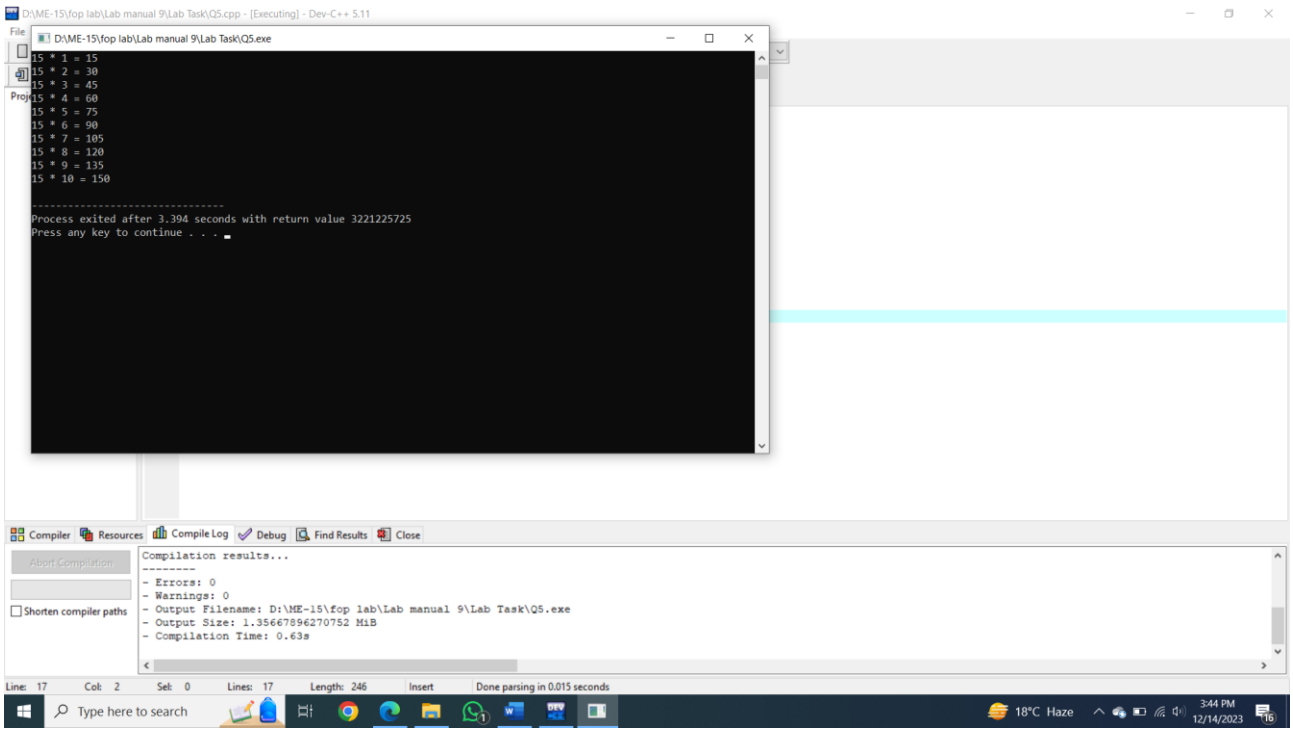
```
#include<iostream>
using namespace std;
void matrixmulti(int matrix1[3][3], int matrix2[3][3],int mult[3][3]){
for(int i=0; i<3;i++){
for(int j=0; j<3; j++){
int sum = 0;
for(int k = 0; k<3;k++){

sum += matrix1[i][k]*matrix2[k][j];
mult[i][j]=sum;
}
}
}
cout<<"multipication of matrices is "<<endl;

for(int i=0; i<3;i++){
for(int j=0; j<3; j++){
cout<<mult[i][j]<<" ";
}cout<<endl;
}

}
int main(){
```

```
int matrix1[3][3], matrix2[3][3], mult[3][3];
cout<<"Enter the elements of matrix 1 "<<endl;
for(int i=0; i<3;i++){
for(int k=0; k<3; k++){
cin>>matrix1[i][k];
}
}
cout<<"Enter the elements of matrix 2 "<<endl;
for(int k=0; k<3;k++){
for(int j=0; j<3; j++){
cin>>matrix2[k][j];
}
}
cout<<"matrix 1"<<endl;
for(int i=0; i<3;i++){
for(int k=0; k<3; k++){
cout<<matrix1[i][k]<<" ";
}
cout<<endl;
}
cout<<"matrix 2"<<endl;
for(int k=0; k<3;k++){
for(int j=0; j<3; j++){
cout<<matrix2[k][j]<<" ";
}
cout<<endl;
}
matrixmulti(matrix1,matrix2,mult);

return 0;
}
```



Q5:

```
#include <iostream>
using namespace std;

void table(int N, int i)
{
if (i <= 10)

cout <<N<<" * "<<i<< " = "<< N * i<<endl;
return table(N, i + 1);
}
int main()
{
int N = 15;
table(N, 1);

return 0;
}
```

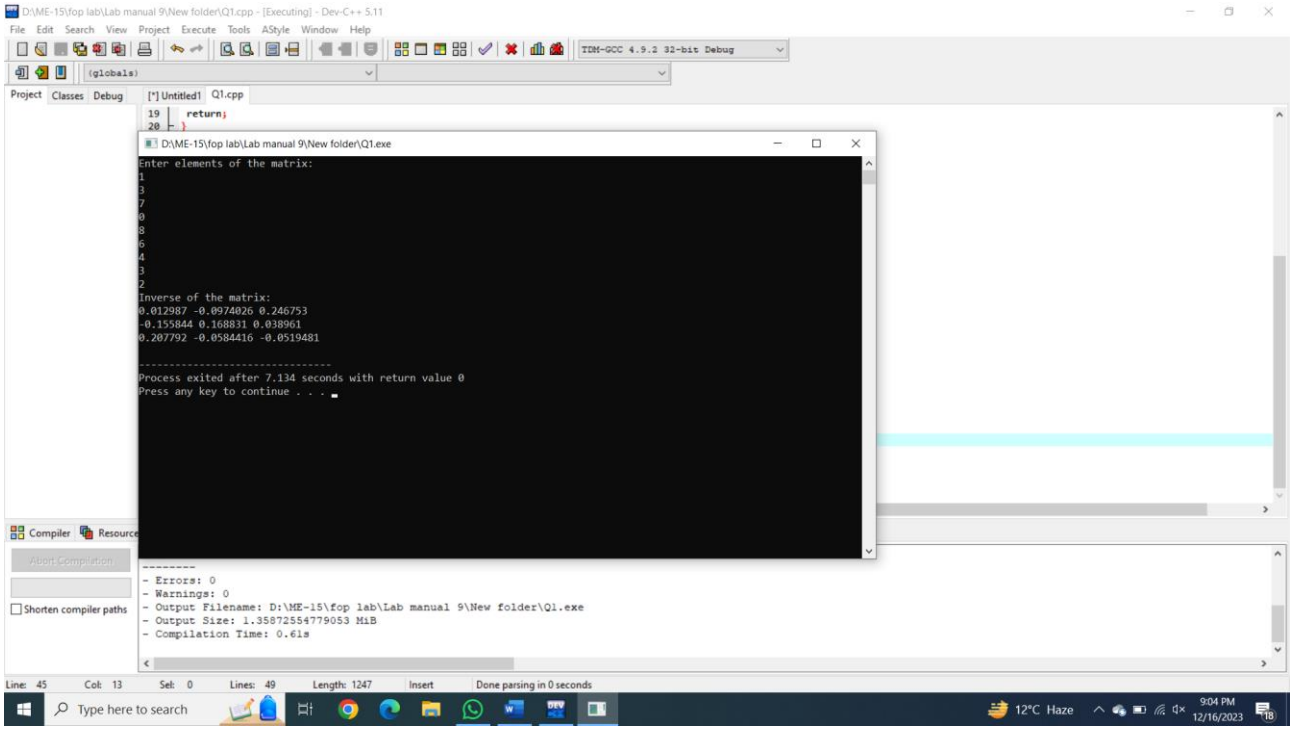


Home Task

Q1:

```
#include<iostream>
using namespace std;
double Determinant(int mat[3][3]) {

return mat[0][0] * (mat[1][1] * mat[2][2] - mat[1][2] * mat[2][1]) - mat[0][1] * (mat[1][0] * mat[2][2] - mat[1][2] * mat[2][0]) + mat[0][2] * (mat[1][0] * mat[2][1] - mat[1][1] * mat[2][0]);
}

void Adjoint(int mat[3][3], int adj[3][3]) {
for (int i=0; i<3; i++) {
for (int j=0; j<3; j++) {
adj[i][j] = (mat[(j+1)%3][(i + 1)%3]* mat[(j+2)%3][(i+2)%3]) - (mat[(j+1)%3][(i+2)%3]*mat[(j+2)%3][(i+1)%3]);
}
}
}
void Inverse(int mat[3][3], double inv[3][3]) {
double det = Determinant(mat);
if (det==0) {
cout<<"Inverse does not exist (Matrix is singular)!"<<endl;
return;
```

```
}
int adj[3][3];
Adjoint(mat,adj);
for (int i=0; i<3; i++) {
for (int j=0; j<3; j++) {
inv[i][j]=adj[i][j]/det;
}
}
}
int main() {
int mat[3][3];
cout << "Enter elements of the matrix:"<<endl;
for (int i=0; i<3; i++) {
for (int j=0; j<3; j++) {
cin>>mat[i][j];
}
}
double inv[3][3];
Inverse(mat, inv);
if (Determinant(mat) != 0) {
cout << "Inverse of the matrix:"<<endl;
for (int i=0; i<3; i++) {
for (int j=0; j<3;j++) {
cout<<inv[i][j] << " ";
}
cout<<endl;
}
}
return 0;
}
```


D:\ME-15\fop lab\Lab manual 9\New folder\Q1.cpp - [Executing] - Dev-C++ 5.11
File Edit Search View Project Execute Tools AStyle Window Help
TDM-GCC 4.9.2 32-bit Debug
(globals)
Project Classes Debug
[*] Untitled1 Q1.cpp
19 return;
20 }
D:\ME-15\fop lab\Lab manual 9\New folder\Q1.exe
Enter elements of the matrix:
1
3
7
0
8
6
4
3
2
Inverse of the matrix:
0.012987 -0.0974026 0.246753
-0.155844 0.168831 0.038961
0.207792 -0.0584416 -0.0519481
Process exited after 7.134 seconds with return value 0
Press any key to continue . . .
Compiler Resources
Abort Compilation
Shorten compiler paths
- Errors: 0
- Warnings: 0
- Output Filename: D:\ME-15\fop lab\Lab manual 9\New folder\Q1.exe
- Output Size: 1.35872554779053 MiB
- Compilation Time: 0.61s
Line: 45 Col: 13 Sel: 0 Lines: 49 Length: 1247 Insert Done parsing in 0 seconds
Type here to search
12°C Haze
9:04 PM
12/16/2023