

Fundamentals of Programming

Lab Manual: 09

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Course: ME-15

Section: A

Task: 01

- `#include<iostream>`

`using namespace std;`

`int main() {`

`int matrix[3][3];`

`int x(0),y(0);`

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

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

`cin>>matrix[i][j];`

`}`

`}`

```
for(int i=0;i<3;i++){  
  
    if(i==i){  
  
        x+=matrix[i][i];  
  
    }  
  
    else if ((i+i)==2){  
  
        y+=matrix[i][i+1];  
  
    }  
  
}  
  
cout<<"The sum of left diagnals: "<<x<<endl;  
  
cout<<"The sum of right diagnals: "<<y<<endl;  
  
return 0;  
  
}
```

```
C:\Users\Nafeel Javid\OneDrive\Desktop\Dev c++\lab 9-1.exe
1
2
3
4
5
6
7
8
9
The sum of left diagnals: 15
The sum of right diagnals: 0
-----
Process exited after 4.727 seconds with return value 0
Press any key to continue . . .
```

Task: 02

- `#include<iostream>`

`using namespace std;`

`void add(int ar[3][3],int ar2[3][3])`

`{`

```
int x[3][3];
```

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

```
{
```

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

```
    {
```

```
        x[i][j]=ar[i][j]+ar2[i][j];
```

```
        cout<<x[i][j];
```

```
    }
```

```
    cout<<endl;
```

```
}
```

```
}
```

```
int main()
```

```
{
```

```
    int a[3][3],b[3][3],sum[3][3];
```

```
    cout<<"Enter the values: ";
```

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

```
    {
```

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

```
        {
```

```
            cin>>a[i][j];
```

```
        }
```

```
    }
```

```
    cout<<"Enter the values for second array: ";
```

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

```
{  
  
    for(int j=0;j<3;j++)  
  
    {  
  
        cin>>b[i][j];  
  
    }  
  
}  
  
add(a,b)  
  
}
```

C:\Users\Nafeel Javid\OneDrive\Desktop\Dev c++\lab 9-2.

```
Enter the values: 2
3
4
5
6
7
8
9
9
Enter the values for second array: 9
8
7
6
5
4
3
2
1
111111
111111
111110
-----
Process exited after 10.41 seconds with re
Press any key to continue
```

Task: 03

- #include<iostream>

using namespace std;


```
int transpose(int ar[3][3])
```

```
{
```

```
    int x;
```

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

```
    {
```

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

```
        {if(i<j)
```

```
        {
```

```
            x=ar[i][j];
```

```
            ar[i][j]=ar[j][i];
```

```
            ar[j][i]=x;
```

```
        }
```

```
    }
```

```
}
```

```
}
```

```
int main()
```

```
{
```

```
    int y[3][3],x;
```

```
    cout<<"Enter the values: ";
```

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

```
    {
```

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

```
        {
```

```
            cin>>y[i][j];
```

```
        }
```

```
    }
```

```
transpose(y);
```

```
cout<<"Transpose is: "<<endl;
```

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

```
{
```

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

```
    {
```

```
        cout<<y[i][j];
```

```
    }
```

```
    cout<<endl;
```

```
}
```

```
}
```

```
C:\Users\Nafeel Javid\OneDrive\Deskt
Enter the values: 1
2
3
4
5
6
7
8
9
Transpose is:
147
258
369
```

Task: 04

- #include<iostream>

using namespace std;

int x(int y[3][3],int z[3][3])

{

int p,s[3][3]={0,0,0},{0,0,0},{0,0,0}};

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

```
{
```

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

```
    {
```

```
        p =y[i][j]*z[j][0];
```

```
        s[i][0]=s[i][0]+p;
```

```
    }
```

```
}    for(int i=0;i<3;i++)
```

```
{
```

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

```
    {
```

```
        p=y[i][j]*z[j][1];
```

```
        s[i][1]=s[i][1]+p;
```

```
}
```

```
}    for(int i=0;i<3;i++)
```

```
{
```

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

```
{
```

```
    p=y[i][j]*z[j][2];
```

```
    s[i][2]=s[i][2]+p;
```

```
}
```

```
}
```

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

```
{
```

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

```
{
```

```
        cout<<s[i][j];
```

```
    }
```

```
    cout<<endl;
```

```
}
```

```
}
```

```
int main()
```

```
{
```

```
    int a[3][3],b[3][3];
```

```
    cout<<"Enter the values: ";
```

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

```
    {
```

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

```
        {
```

```
cin>>a[i][j];
```

```
}
```

```
}
```

```
cout<<"Enter the values for second array: ";
```

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

```
{
```

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

```
{
```

```
cin>>b[i][j];
```

```
}
```

```
}
```

```
x(a,b);
```

```
}
```


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```
Enter the values: 9
8
7
6
5
4
3
2
1
Enter the values for second array: 1
2
3
4
5
6
7
8
9
90114138
546984
182430

-----
Process exited after 10.87 seconds with return value 0
Press any key to continue . . .
```

Task: 05

- #include<iostream>

using namespace std;

```
void x(int a,int n)
```

```
{
```

```
if(n>=0)
```

```
{
```

```
    int y;
```

```
    y=n*a;
```

```
    cout<<a<<"*"<<n<<"="<<y<<endl;
```

```
    x(a,n-1);
```

```
}
```

```
}
```

```
int main()
```

```
{
```

```
int z(15),a(10);
```

```
x(15,10);
```

```
return 0;
```

```
}
```

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```
15*10=150
15*9=135
15*8=120
15*7=105
15*6=90
15*5=75
15*4=60
15*3=45
15*2=30
15*1=15
15*0=0
```

```
-----
Process exited after 0.3884 seconds with return value 0
Press any key to continue . . .
```

Task:06

- `#include <iostream>`

```
#include <math.h>
```

```
using namespace std;
```

```
int determinant(int matrix[3][3]) {
```

```
    int determinant = 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 determinant;
```

```
}
```

```
void adjoint(int matrix[3][3], int adj[3][3]) {
```

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

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

```

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

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

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

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

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

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

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

}

```

```

void invert(int matrix[3][3], int adj[3][3]) {

```

```

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

```

```

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

```

```

            matrix[i][j] = adj[i][j];

```

```
}
```

```
}
```

```
}
```

```
int main() {
```

```
    int matrix[3][3] = {
```

```
        {1, 2, 3},
```

```
        {4, 5, 6},
```

```
        {7, 8, 9}
```

```
    };
```

```
    int adj[3][3];
```

```
    adjoint(matrix, adj);
```

```
invert(matrix, adj);
```

```
cout << "Inverted matrix: " << endl;
```

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

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

```
        cout << adj[i][j] << " ";
```

```
    }
```

```
    cout << endl;
```

```
}
```

```
return 0;
```

```
}
```

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Inverted matrix:

3 6 3

3 6 3

3 6 3

Process exited after 0.3966 seconds with return value 0

Press any key to continue . . .