

**LAB MANUAL**  
**DATASTRUCTURE USING C++**

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S.no	<b>WEEK 1</b>
1.	<p>Write a program in C++ perform various operations on an Array</p> <ul style="list-style-type: none"><li>a. Write a program in C++ to insert elements in an array.</li><li>b. Write a program in C++ to delete elements from an array.</li><li>c. Write a program in C++ to update the contents of an array.</li><li>d. Write a program in C++ to Reverse an Array</li><li>e. Write a program in C++ to find largest element in array</li><li>f. Write a program in C++ to find smallest element in array</li></ul>
2.	<p>Write a program in C++ to perform various operations on matrices.</p> <ul style="list-style-type: none"><li>a. Write a program in C++ to perform Addition of Two Matrices</li><li>b. Write a program in C++ to perform Subtraction of Two Matrices</li><li>c. Write a program in C++ to perform Transpose of a Matrix</li><li>d. Write a program in C++ to Multiply Two Matrices</li></ul>

**1. Write a program in C++ to insert, delete and update the contents of an array.**

*/\*Insert Element in Array \*/*

```
#include<iostream.h>
#include<conio.h>

class insertarray
{
    private:

        int arr[50], size, insert, i, pos;

    public:
        void getarray()
        {
            cout<<"Enter Array Size : ";
            cin>>size;
            cout<<"Enter array elements : ";
            for(i=0;i<size;i++)
            {
                cin>>arr[i];
            }
        }
        void elementinsert()
        {
            cout<<"Enter element to be inserted : ";
            cin>>insert;
            cout<<"At which position (Enter index number) ? ";
            cin>>pos;

            // now create a space at the required position
            for(i=size; i>pos; i--)
            {
                arr[i]=arr[i-1];
            }
            arr[pos]=insert;
            cout<<"Element inserted successfully..!!\n";
        }

        void display()
        {
            cout<<"Now the new array is : \n";
            for(i=0; i<size+1; i++)
            {
                cout<<arr[i]<<" ";
            }
        }
};

void main()
{
    insertarray obj;
    obj.getarray();
    obj.elementinsert();
}
```

```
obj.display();
getch();
}
```

/\* C++ Program - Delete Element from Array \*/

```
#include<iostream.h>
#include<conio.h>

class insertarray
{
private:

    int arr[10],size,insert,i,pos;

public:
    void getarray();
    void deletearray();
    void display();
};
void insertarray::getarray()
{
    cout<<"Enter Array Size : ";
    cin>>size;
    cout<<"Enter array elements : ";
    for(i=0;i<size;i++)
    {
        cin>>arr[i];
    }
}
void insertarray::deletearray()
{
    int del,count;
    cout<<"Enter element to be deleted : ";
    cin>>del;
    for(i=0; i<size; i++)
    {
        if(arr[i]==del)
        {
            for(int j=i; j<(size-1); j++)
            {
                arr[j]=arr[j+1];
            }
            count++;
            break;
        }
    }
    if(count==0)
    {
        cout<<"Element not found..!!";
    }
    else
    {

```

```

        cout<<"Element deleted successfully..!!\n";
    }
}

void insertarray::display()
{
    cout<<"Now the new array is : \n";
    for(i=0; i<size-1; i++)
    {
        cout<<arr[i]<<" ";
    }
}

void main()
{
    clrscr();
    insertarray obj;
    obj.getarray();
    obj.deletearray();
    obj.display();
    getch();
}

```

/\* C++ Program – Update Element of an Array \*/

```

#include<iostream.h>
#include<conio.h>

class insertarray
{
    private:

        int arr[10],size,insert,i,pos;

    public:
        void getarray();
        void update();
        void display();
};

void insertarray::getarray()
{
    cout<<"Enter Array Size : ";
    cin>>size;
    cout<<"Enter array elements : ";
    for(i=0;i<size;i++)
    {
        cin>>arr[i];
    }
}

void insertarray::update()
{
    int index;
    cout<<"Enter Index Number to Update Value :";
    cin>>index;
}

```

```

if(index>size||index<0)
{
    cout<<"Invalid Index Entered-> Valid Range(0-size)"<<endl;
}
else
{
    cout<<"Enter the New Value For Index array[ "<<index<<" ] = ";
    cin>>arr[index];
    cout<<"ntttArray Updated... Successfully "<<endl;
}
}
void insertarray::display()
{
    cout<<"Now the new array is : \n";
    for(i=0; i<size; i++)
    {
        cout<<arr[i]<<" ";
    }
}

void main()
{
    clrscr();
    insertarray obj;
    obj.getarray();
    obj.update();
    obj.display();
    getch();
}

```

## 2. Write a program in C++ to perform various operations on matrices.

*/\* C++ Program - Add Two Matrices \*/*

```

#include<iostream.h>
#include<conio.h>

class matrix
{
    private:
        int mat1[3][3], mat2[3][3], i, j, mat3[3][3];

    public:
        void getmatrix();
        void sum();
        void display();
};

void matrix::getmatrix()
{
    cout<<"Enter matrix 1 elements :";
    for(i=0; i<3; i++)
    {

```

```

    for(j=0; j<3; j++)
    {
        cin>>mat1[i][j];
    }
}
cout<<"Enter matrix 2 elements :";
for(i=0; i<3; i++)
{
    for(j=0; j<3; j++)
    {
        cin>>mat2[i][j];
    }
}
}

void matrix::sum()
{
    cout<<"Adding the two matrix to form the third matrix .....\\n";
    for(i=0; i<3; i++)
    {
        for(j=0; j<3; j++)
        {
            mat3[i][j]=mat1[i][j]+mat2[i][j];
        }
    }
    cout<<"The two matrix added successfully...!!";
}

void matrix::display()
{
    cout<<"The new matrix will be :\\n";
    for(i=0; i<3; i++)
    {
        for(j=0; j<3; j++)
        {
            cout<<mat3[i][j]<<" ";
        }
        cout<<"\\n";
    }
}

void main()
{
    clrscr();
    matrix obj;
    obj.getmatrix();
    obj.sum();
    obj.display();
    getch();
}

```

```
/* C++ Program - Subtract Two Matrices */
```

```
#include<iostream.h>
#include<conio.h>

class matrix
{
    private:
        int mat1[3][3], mat2[3][3], i, j, mat3[3][3];

    public:
        void getmatrix();
        void sub();
        void display();
};

void matrix::getmatrix()
{
    cout<<"Enter matrix 1 elements :";
    for(i=0; i<3; i++)
    {
        for(j=0; j<3; j++)
        {
            cin>>mat1[i][j];
        }
    }
    cout<<"Enter matrix 2 elements :";
    for(i=0; i<3; i++)
    {
        for(j=0; j<3; j++)
        {
            cin>>mat2[i][j];
        }
    }
}

void matrix::sub()
{
    cout<<"Subtracting array (array1-array2) ... \n";
    for(i=0; i<3; i++)
    {
        for(j=0; j<3; j++)
        {
            arr3[i][j]=arr1[i][j]-arr2[i][j];
        }
    }
}

void matrix::display()
{
    cout<<"The new matrix after subtraction will be :\n";
    for(i=0; i<3; i++)
    {
        for(j=0; j<3; j++)
        {
            cout<<mat3[i][j]<<" ";
        }
    }
}
```



```
        cout<<"\n";
    }
}

void main()
{
    clrscr();
    matrix obj;
    obj.getmatrix();
    obj.sub();
    obj.display();
    getch();
}
```