

LAB 01

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SP22-BSCS-0046

1. Find All Possible Pairs of Targeted Sum from Array.

Source code:

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

```
int main()
{
    int length;
    cout<<"Enter the length of an array : "<<endl;
    cin>>length;

    int arr[length];

    for(int i=0; i<length; i++)
    {
        cout<<"Enter the array element : "<<endl;
        cin>>arr[i];
    }
    int tsum;

    cout<<"Enter the Targetsum : "<<endl;
    cin>>tsum;

    for(int j = 0 ; j<length-1 ;j++)
    {
        for(int k = j+1; k<length; k++)
        {
            if(arr[j]+arr[k]==tsum)
            {
                cout<<"The Target sum is : "<<"( "<<arr[j]<<","<<arr[k]<<" )"<<endl;
            }
        }
    }

}
```

Picture:

```
C:\Users\SP22-25C3-2049\Desktop\Lab01.exe
Enter the length of an array :
3
Enter the array element :
1
Enter the array element :
2
Enter the array element :
3
Enter the Targetsum :
5
The Target sum is : ( 2,3 )
=====
Process exited after 5.423 seconds with return value 0
Press any key to continue . . .
```

2. Find All Sub-Arrays that produce sum 0 from Array.
Source code:

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

```
int main(void)
{
    int length;
    cout<<"Enter the length of array : ";
    cin>>length;

    int array[length];

    for(int i=0;i<length;i++){
        cout<<"Enter the element of this "<<i<<" index: ";
        cin>>array[i];
    }

    for(int j=0;j<length-1;j++){
        int sum = 0;
        for(int k=j+1;k<length;k++){
            sum = sum+array[k];
            if(sum == 0)
            {
                cout<<"Sub-array : ";
                for(int l=k;l<=j;l++){
                    cout<<array[l]<<" ";
                }
                cout<<"\n";
                break;
            }
        }
    }
}
```

```

    }
}

}

```

Picture:

```

C:\Users\SP32\Desktop\Lab07.exe
Enter the length of array : 6
Enter the element of this 0 index: 1
Enter the element of this 1 index: -1
Enter the element of this 2 index: 0
Enter the element of this 3 index: 0
Enter the element of this 4 index: 1
Enter the element of this 5 index: 1
Sub-array : 1 1
Sub-array : 0
Sub-array : 0
.....
Process exited after 84.23 seconds with return value 0
Press any key to continue . . .

```

3. Sort Binary Array.

Source code:

```

#include<iostream>
using namespace std;

```

```

int main()
{
    int length;
    int j=0;

    cout<<"Enter the length of an array : "<<endl;
    cin>>length;

    int arr[length];

    for(int i = 0;i<length;i++)
    {
        cout<<"Enter the value : "<<endl;
        cin>>arr[i];
        if(arr[i]==0)
        {
            j++;
        }
        else if(arr[i]!=0 && arr[i]!=1){
            i--;
            cout<<"Wrong input "<<endl;
        }
    }
}

```

```

    }
}

for(int i = 0;i<length;i++)
{
    if(i < j){
        arr[i] = 0;
    }
    else{
        arr[i] = 1;
    }
}

for(int i = 0;i<length;i++)
{
    cout<<"Output : "<<arr[i]<<endl;
}
}

```

Picture:

```

C:\Users\SP21-85CS-0048\Downloads>g++
Enter the length of an array :
5
Enter the value :
1
Enter the value :
1
Enter the value :
1
Enter the value :
0
Enter the value :
0
Output : 0
Output : 1
Output : 1
Output : 1
Output : 1
.....
Process exited after 12.37 seconds with return value 0
Press any key to continue . . .

```

4. Dutch National Flag Problem.

Source code:

```

#include<iostream>
using namespace std;

```

```

int main()
{
    int length;
    int j=0;
    int k=0;

    cout<<"Enter the length of an array : "<<endl;
    cin>>length;
}

```

```

int arr[length];

for(int i = 0;i<length;i++)
{
    cout<<"Enter the value : "<<endl;
    cin>>arr[i];
    if(arr[i]==0)
    {
        j++;
    }
    else if(arr[i]==1){
        k++;
    }
    else if(arr[i]!=0 && arr[i]!=1 && arr[i]!=2){
        i--;
        cout<<"Wrong input "<<endl;
    }
}

int n = j+k;
for(int i = 0;i<length;i++)
{
    if(i < j){
        arr[i] = 0;
    }
    else if(i<n){
        arr[i] = 1;
    }
    else{
        arr[i] = 2;
    }
}

for(int i = 0;i<length;i++)
{
    cout<<"Output : "<<arr[i]<<endl;
}
}

```

Picture:

```
C:\Users\GP22-85C3-1048\Downloads\g++
Enter the length of an array :
5
Enter the value :
1
Enter the value :
1
Enter the value :
0
Enter the value :
0
Enter the value :
2
Output : 0
Output : 0
Output : 1
Output : 1
Output : 2
-----
Process exited after 7.056 seconds with return value 0
Press any key to continue . . .
```

5. In-place Merge of two Sorted Arrays.

Source code:

```
#include<iostream>
```

```
using namespace std;
```

```
int main()
```

```
{
```

```
    int l1;
```

```
    int l2;
```

```
    int k;
```

```
    int i;
```

```
    int arrMerge[100];
```

```
    cout<<"Enter the length of an First array : "<<endl;
    cin>>l1;
```

```
    int arrOne[l1];
```

```
    cout<<"Enter the value of an 1st array : "<<endl;
```

```
    for(i = 0; i < l1; i++)
```

```
    {
```

```
        cin>>arrOne[i];
```

```
        arrMerge[i] = arrOne[i];
```

```
    }
```

```
    k = i;
```

```
    cout<<"\n"<<endl;
```

```
    cout<<"Enter the length of an Second array : "<<endl;
```

```
    cin>>l2;
```

```
    int arrTwo[l2];
```

```
    cout<<"Enter the value of an 2nd array : "<<endl;
```

```
    for(i = 0; i < l2; i++)
```

```
    {
```

```
        cin>>arrTwo[i];
```

```
        arrMerge[k] = arrTwo[i];
```

```

        k++;
    }

//    Sorting Array;
    for(int x=0;x<k;x++){
        for(int j=x;j<k;j++){
            if(arrMerge[x]>arrMerge[j]){
                int temp = arrMerge[x];
                arrMerge[x] = arrMerge[j];
                arrMerge[j] = temp;
            }
        }
    }

    cout<<"\n"<<endl;
    cout<<"The new array will be : "<<endl;
    for(i =0 ; i < k; i++){
        cout<<arrMerge[i]<<" "<<endl;
    }
}

```

Picture:

```

C:\Users\Administrator\Desktop\Lexa
Enter the length of an First array :
5
Enter the value of an 1st array :
2
4
6
8
10

Enter the length of an Second array :
5
Enter the value of an 2nd array :
1
3
5
7
9

The new array will be :
1
2
3
4
5
6
7
8
9
10

-----
Process exited after 15.48 seconds with return value 0
Press any key to continue . . .

```

6. Fisher-Yates Shuffle.

Source code:

```

#include <iostream>
#include <ctime>
#include <cstdlib>
using namespace std;

int main()
{
    srand(time(0)); // Initialize random number generator.

    int len;

```

```

    cout<<"Enter the length of an array : "<<endl;
    cin>>len;

    int array[len];
    cout<<"Enter the value of an 1st array : "<<endl;
    for(int i = 0;i < len;i++)
    {
        cin>>array[i];
    }

    int random = len;

    for(int i=0;i<len;i++){
        int r = (rand() % random) + 1;
        int temp = array[i];
        array[i] = array[r];
        array[r] = temp;
        random--;
    }

    for(int i = 0;i<len; i++){
        cout<<array[i]<<" ";
    }
    return 0;
}

```

Picture:

```

C:\Users\Administrator\Desktop\Lex.exe
Enter the length of an array :
5
Enter the value of an 1st array :
5
2
4
1
3
5,2,4,1,3,
-----
Process exited after 3.593 seconds with return value 0
Press any key to continue . . .

```

7. Boyer–Moore Majority Vote.

Source code:

```

#include<iostream>
using namespace std;

```

```

int main()
{
    int length;

```



```

cout<<"Enter the length of an array : "<<endl;
cin>>length;

int arr[length];

cout<<"Enter the value of an array : "<<endl;
for(int i = 0 ;i < length; i++)
{
    cin>>arr[i];
}
int max_Value = 0;
int min_Value = 0;

for(int i = 0;i < length; i++)
{
    int count = 0;
    max_Value = arr[i];
    for(int j = 0; j < length ;j++){
        if(arr[j]==arr[i]){
            count++;
        }
        else{
            break;
        }
    }
    if(min_Value<count){
        max_Value = arr[i];
        min_Value = count;
    }
}

cout<<"The Max value is : "<<max_Value<<endl;

}

```

Picture:

