# LAB 01

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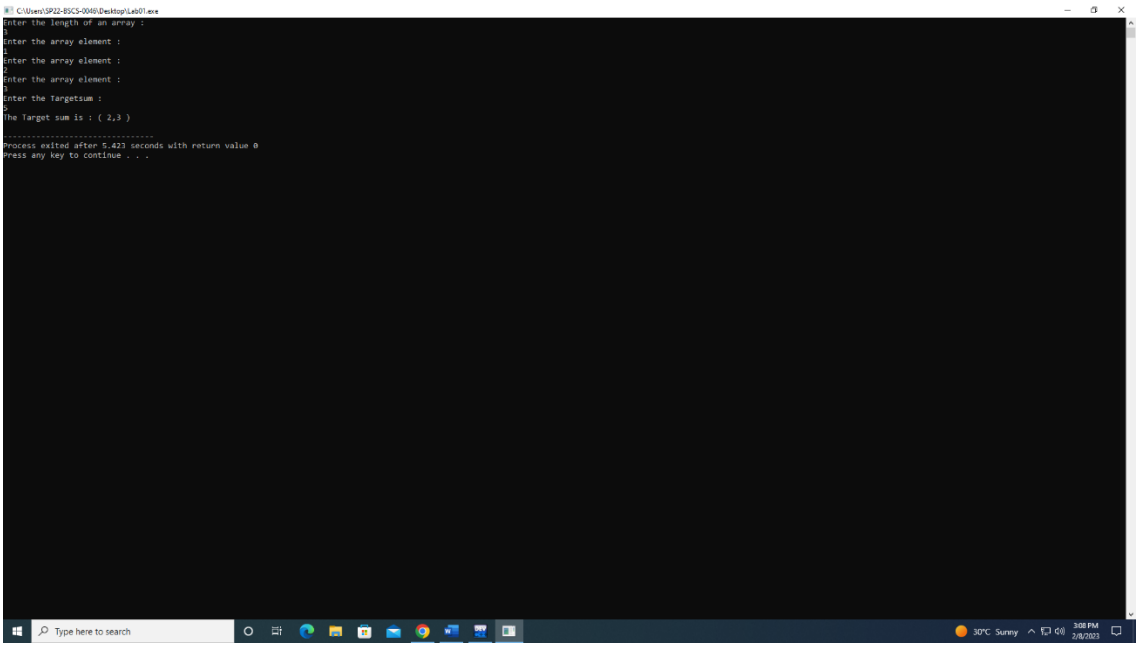
SP22-BSCS-0046

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:

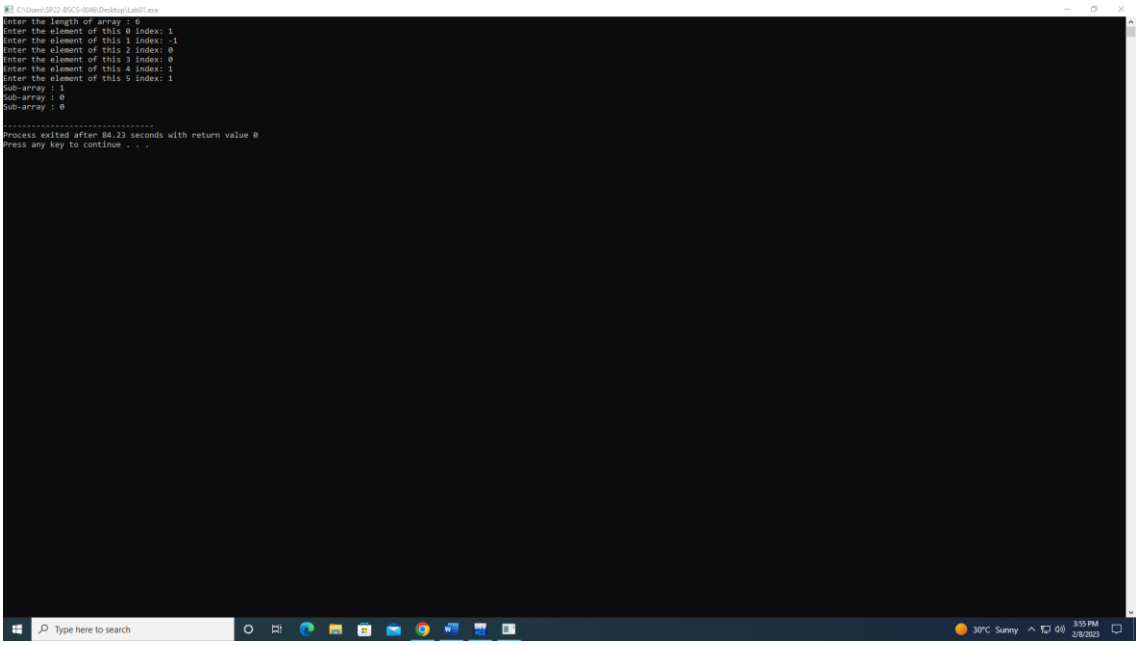



2. Find All Sub-Arrays that produce sum 0 from Array.
Source code:

```
#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<=k;l++){
                              cout<<array[l]<<" ";
                              }
                          cout<<"\n";
                          break;
                        }
```

```
            }
    }


}
```

Picture:



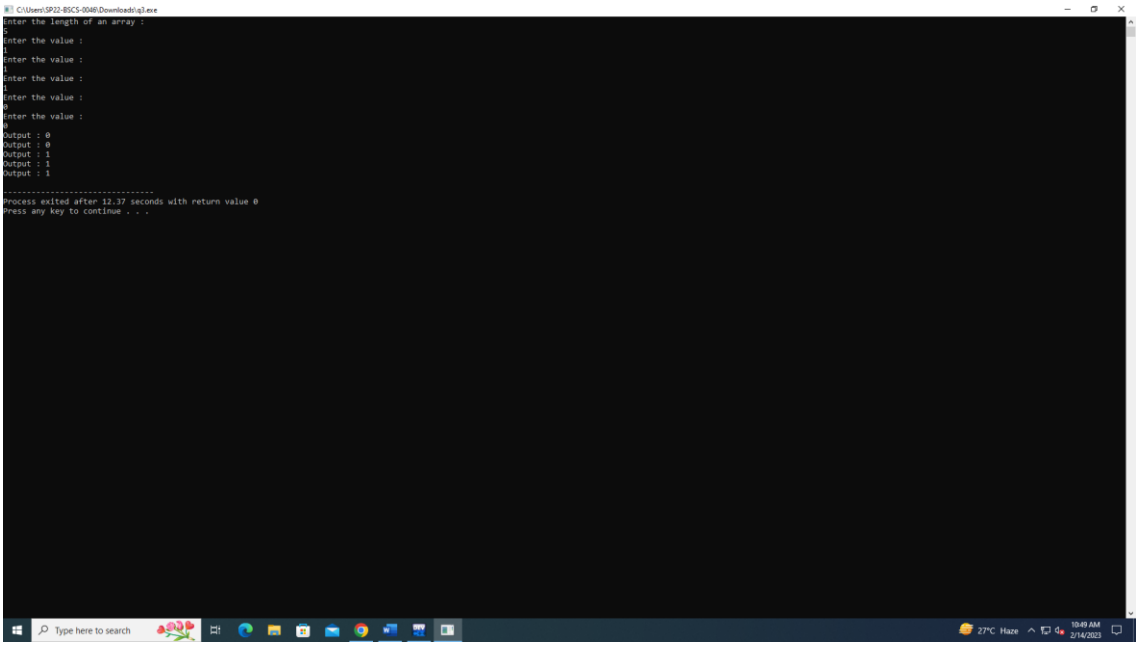

3. Sort Binary Array.

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:



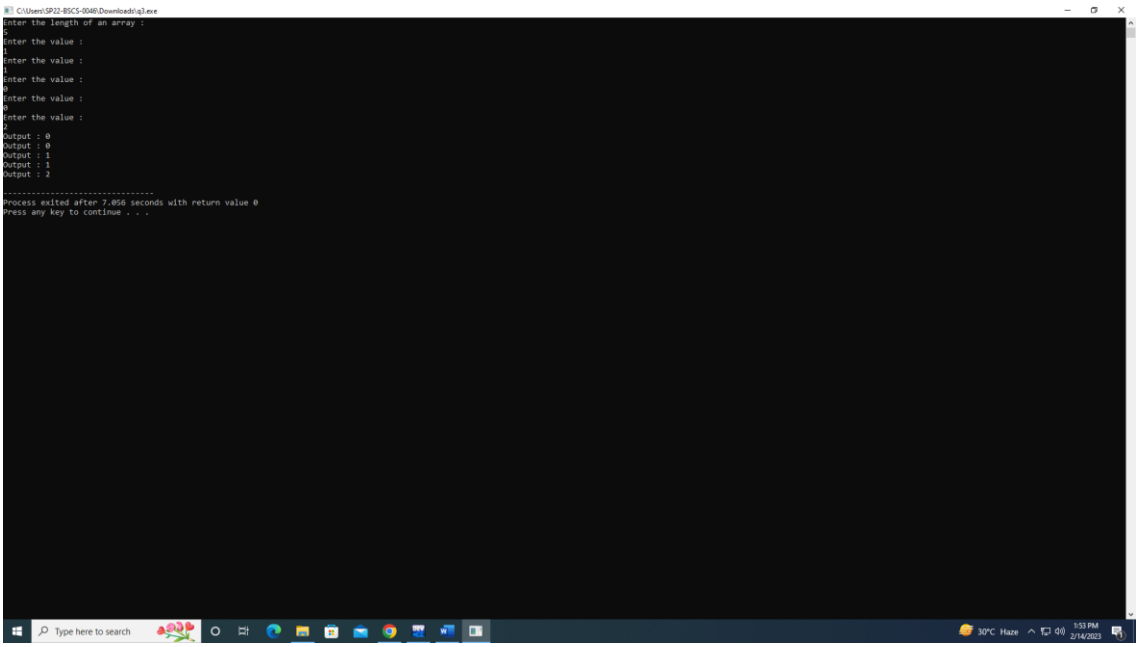

4. Dutch National Flag Problem.

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:



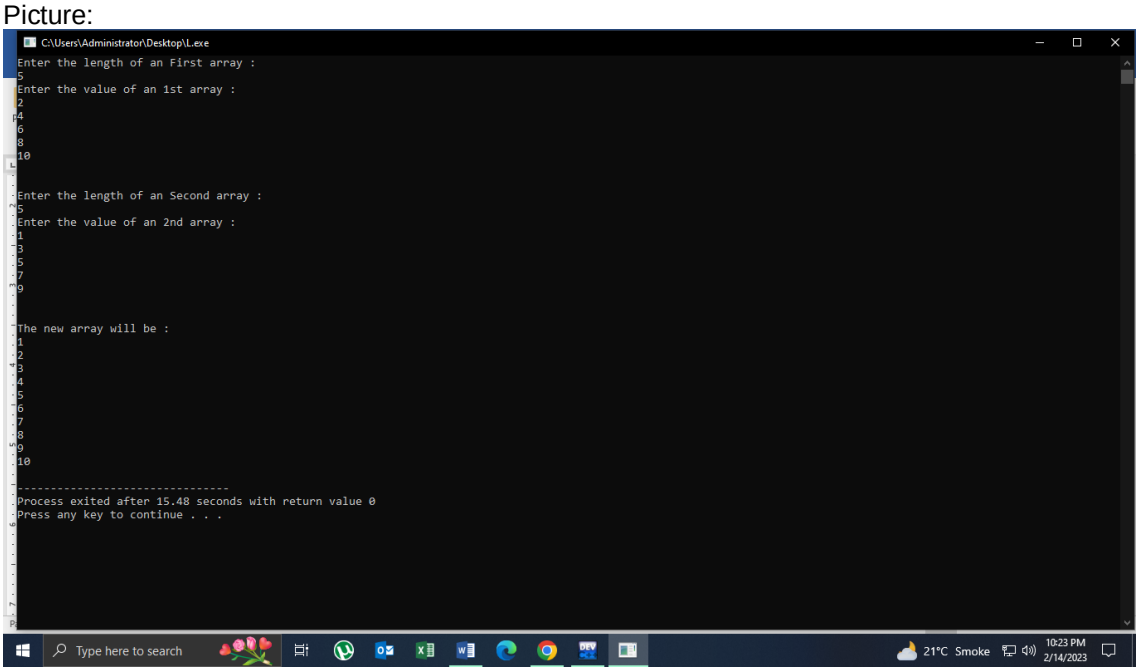

5. In-place Merge of two Sorted Arrays.

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:



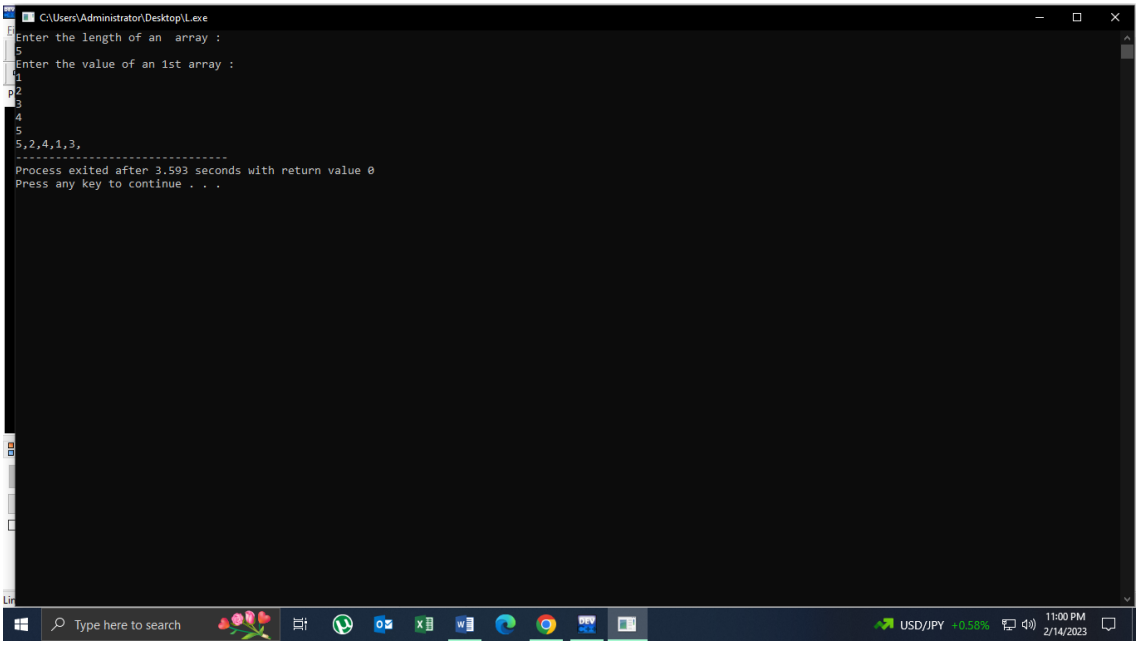

6. Fisher-Yates Shuffle.

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:



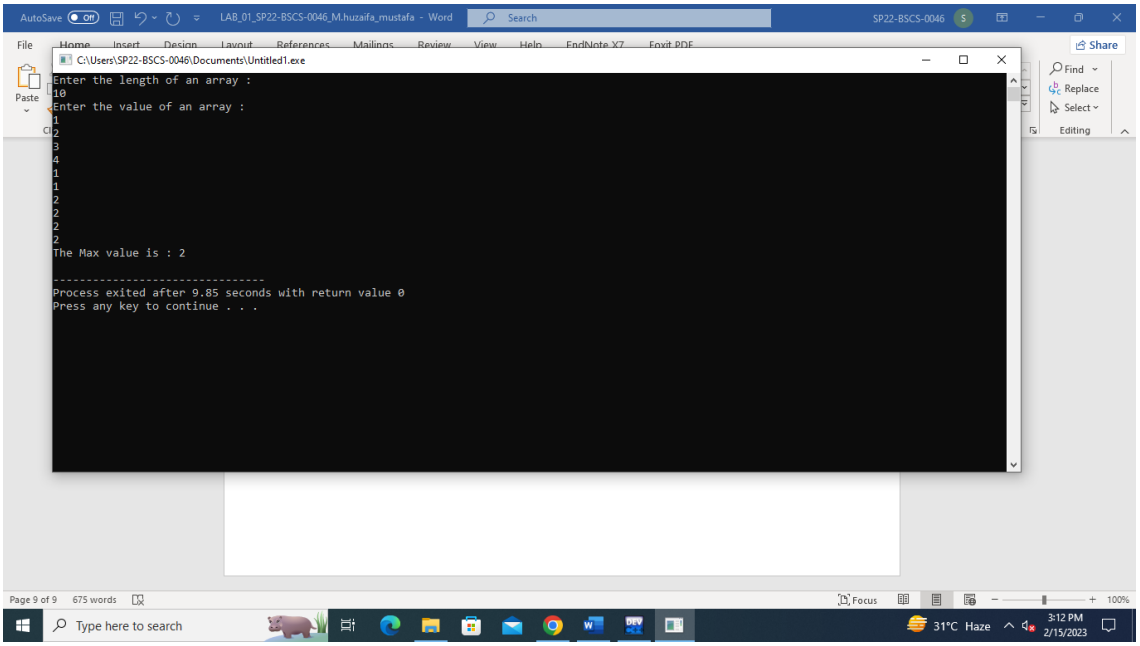

7. Boyer–Moore Majority Vote.

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:


C:\Users\SP22-BSCS-0046\Documents\Untitled1.exe
Enter the length of an array :
10
Enter the value of an array :
1
2
3
4
1
1
2
2
2
2
The Max value is : 2
--------------------------------
Process exited after 9.85 seconds with return value 0
Press any key to continue . . .