Experiment 4

Student Name: Anjali Singh **UID: 20BCS9239**
Branch: CSE **Section/Group:607/A**
Semester: 5th **Date of Performance:28/08/22**
Subject Name: CC Lab **Subject Code: 21CSP-314**

1. **Aim/Overview of the practical:** To implement the concept of searching and sorting.

2. **Task to be done/ Which logistics used:**

In this practical we are going understand various problems and find out better approach to solve particular problem related to searching and sorting on hackerrank.

a) Missing Numbers

Given two arrays of integers, find which elements in the second array are missing from the first array.

Example
arr =
[7,2,5,3,5,3] brr
=
[7,2,5,4,6,3,5,3]

The brr array is the original list. The numbers missing are [4,6].

Notes

If a number occurs multiple times in the lists, you must ensure that the frequency of that number in both lists is the same. If that is not the case, then it is also a missing number.
Return the missing numbers sorted ascending.
Only include a missing number once, even if it is missing multiple times.
The difference between the maximum and minimum numbers in the original list is less than or equal to 100.

b) Pairs

iven an array of integers and a target value, determine the number of pairs of array elements that have a difference equal to the target value.

Example
K = 1;
Arr=[1,2,3,4]

There are three values that differ by k=1:2-1=1, 3-2 =1, and 4-3 =1. Return 3.

Function Description

Complete the pairs function below.

pairs has the following parameter(s):

- int k: an integer, the target difference
- int arr[n]: an array of integers

Returns

- int: the number of pairs that satisfy the criterion

3. Steps for experiment/practical/Code:

A) Missing Numbers

```
vector<int> missingNumbers(vector<int> arr, vector<int> brr)
{
    map<int, int> arr_1;
    map<int, int> brr_1;
    for (int i = 0; i < arr.size(); i++)
    {
        arr_1[arr[i]]++;
    }
    for (int i = 0; i < brr.size(); i++)
    {
        brr_1[brr[i]]++;
    }
    vector<int> ans;
    map<int, int>::iterator j = arr_1.begin();
    for (auto i : brr_1)
    {
        if (i.first == j->first)
        {
            if (j != arr_1.end())
            {
                if (i.second == j->second)
                {
                    j++;
                }
                else
                {
                    ans.push_back(i.first);
                    j++;
                }
            }
        }
        else
        {
            ans.push_back(i.first);
        }
    }
    return ans;
```

```
}
}
```

B) Pairs.

```
int pairs(int k, vector<int> arr)
{
    unordered_map<int, int> m;
    int count = 0;
    for (int i = 0; i < arr.size(); i++)
    {
        m[arr[i]]++;
    }
    for (int i = 0; i < arr.size(); i++)
    {
        if (m[arr[i] + k])
        {
            count++;
        }
    }
    return count;
}
```

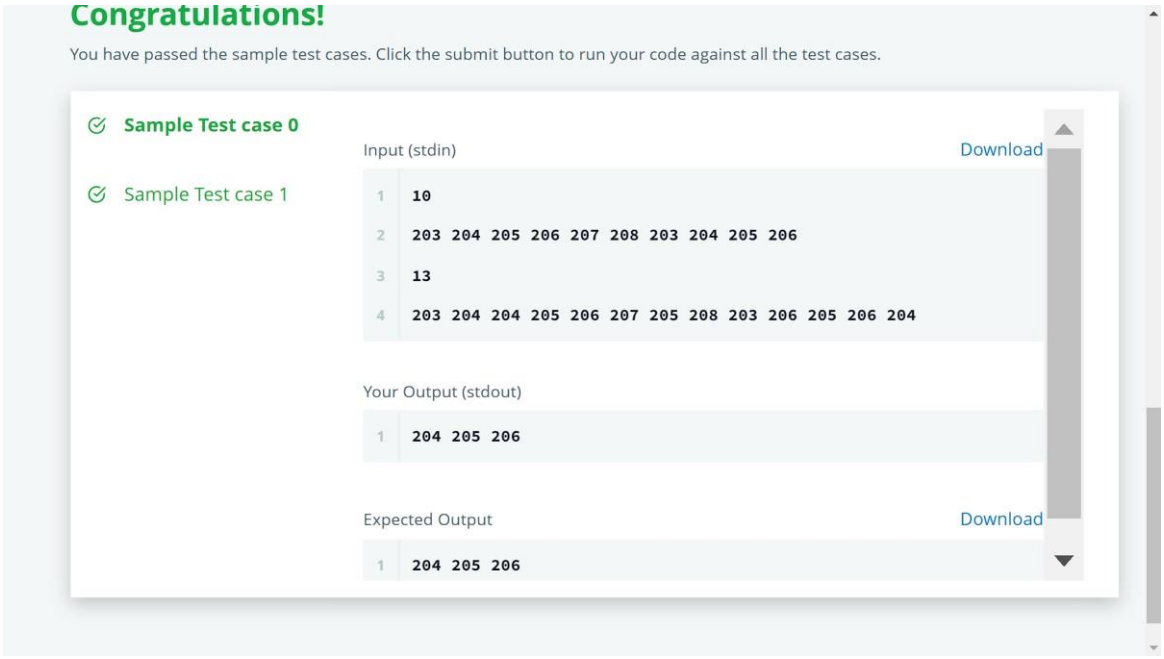
5. Observations/Discussions/ Complexity Analysis:

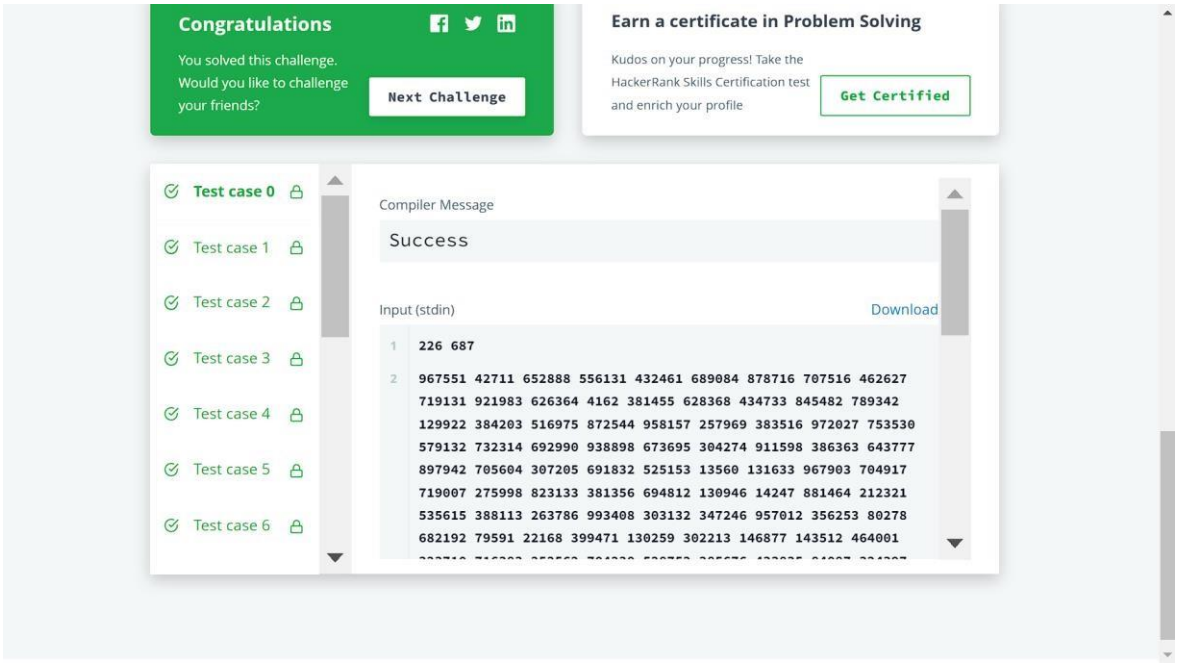
- a). In missingNumbers function we are comparing two vectors arr and brr and trying to find missing values that are present in brr but not in arr. Also we are checking to ensure that If a number occurs multiple times in the lists, you must ensure that the frequency of that number in both lists is the same. If that is not the case, then it is also a missing number. We are applying sorting technique here.

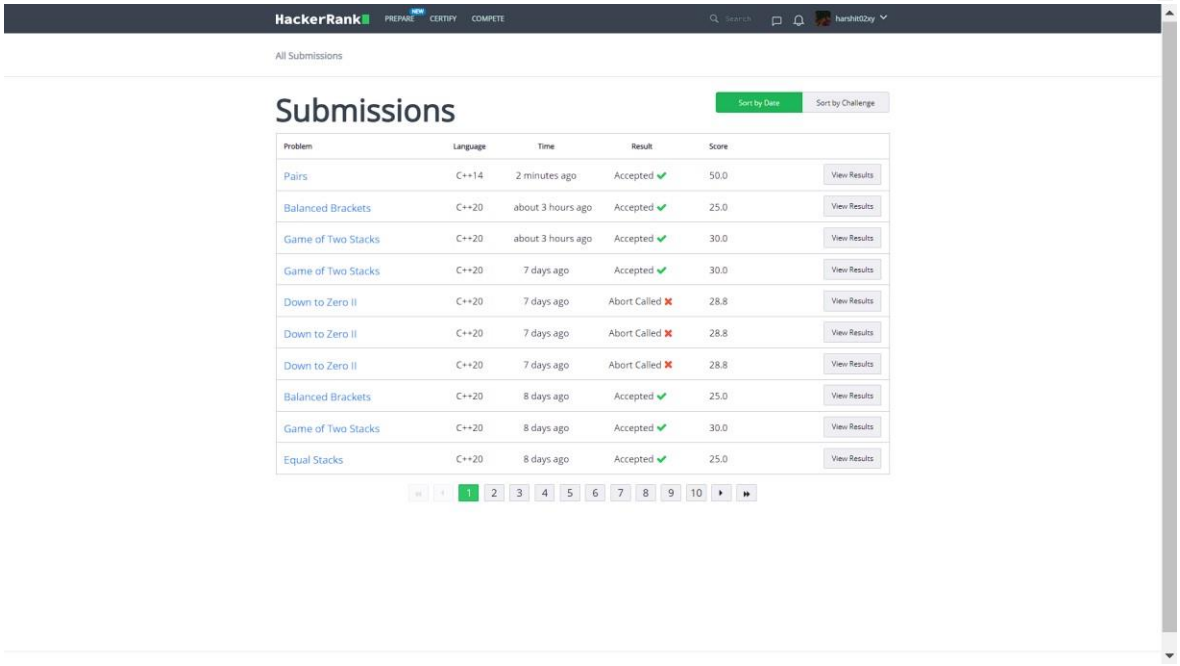
- b) In pairs we have given an array of integers and a target value, determine the number of pairs of array elements that have a difference equal to the target value. We are using

unordered map in this question. And in the end we are returning the number of pairs that satisfy the criterion.

6. Result/Output/Writing Summary:







Learning outcomes (What I have learnt):

1. **I have learnt how to use different functions and library of c++.**

2. **I have learnt how to deal with real time problems.**

3. **Both questions help me to build different logic and concept.**

4. **Learnt how to implement searching and sorting and do various types of functions with it.**

Evaluation Grid (To be created as per the SOP and Assessment guidelines by the faculty):

Sr. No.	Parameters	Marks Obtained	Maximum Marks
1.			
2.			
3.			