Experiment 1.3

Student Name : UTKARSH JOSHI	UID : 21BCS9158
Branch : CSE	Section/Group : ST- 802 A
Semester : 5th	Date Of Performance : 21 Aug 2023
Subject Name : DAA Lab	Subject Code : 21CSH - 311

Aim : Evaluate the complexity of the developed program to find frequency of elements in a given array.

Objectives :

- Understand and compute the time and space complexity of the program as a measure of its efficiency in terms of execution time and memory usage..
- Gain insights into the program's performance characteristics by interpreting how its execution time and memory consumption scale with varying input sizes.
- Recognize the impact of data structure choices on program performance and learn to make informed decisions when selecting appropriate structures for specific scenarios.

Input/Apparatus Used :

- C++ Compiler

Procedure/Algorithm :

a) Start
b) Read the size of the array, n.
c) Declare an integer array arr of size n.
d) Read n elements and store them in the arr array.
e) Declare an empty unordered map named frequencyMap with keys as integers and values as integers.
f) For each element element in the arr array:

g) Increment the corresponding value of element in the frequencyMap by 1.
h) If element is not yet present in the frequencyMap, add it as a key with a value of 1. **i)** Print "Frequency of elements:".
j) For each key-value pair (key, value) in the frequencyMap:
k) Print key followed by ": " and then value followed by " times". **l)** End

Sample Code :

```
#include <iostream> #include <unordered_map>
using namespace std; int main() {     int n;
cout << "Enter the size of the array: ";
cin >> n;
      int arr[n];     cout << "Enter the elements
of the array:\n";     for (int i = 0; i < n; ++i)
{          cin >> arr[i];
    }
      unordered_map<int, int>
frequencyMap;     for (int i = 0; i < n;
++i) {          frequencyMap[arr[i]]++;
    }      cout << "Frequency of elements:\n";     for (const
auto& entry : frequencyMap) {          cout << entry.first << ": "
<< entry.second << " times\n";
             }    cout<<"Utkarsh
Joshi"<<" 21BCS9158";     return 0;
}
```

Observations/Outcome :

```
Enter the size of the array: 3
Enter the elements of the array:
1 1 2
Frequency of elements:
2: 1 times
1: 2 times
```

Time Complexity :
The time complexity of the implemented function is O (n) .

Name : Utkarsh Joshi

UID : 21BCS9158