NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY

CS-114- FUNDAMENTAL OF PROGRAMMING

LAB MANUAL 8 HOME TASKS

SUBMITTED BY:

TOSEEF HAIDER

SECTION:ME-15 (C)

CMS ID: 457249

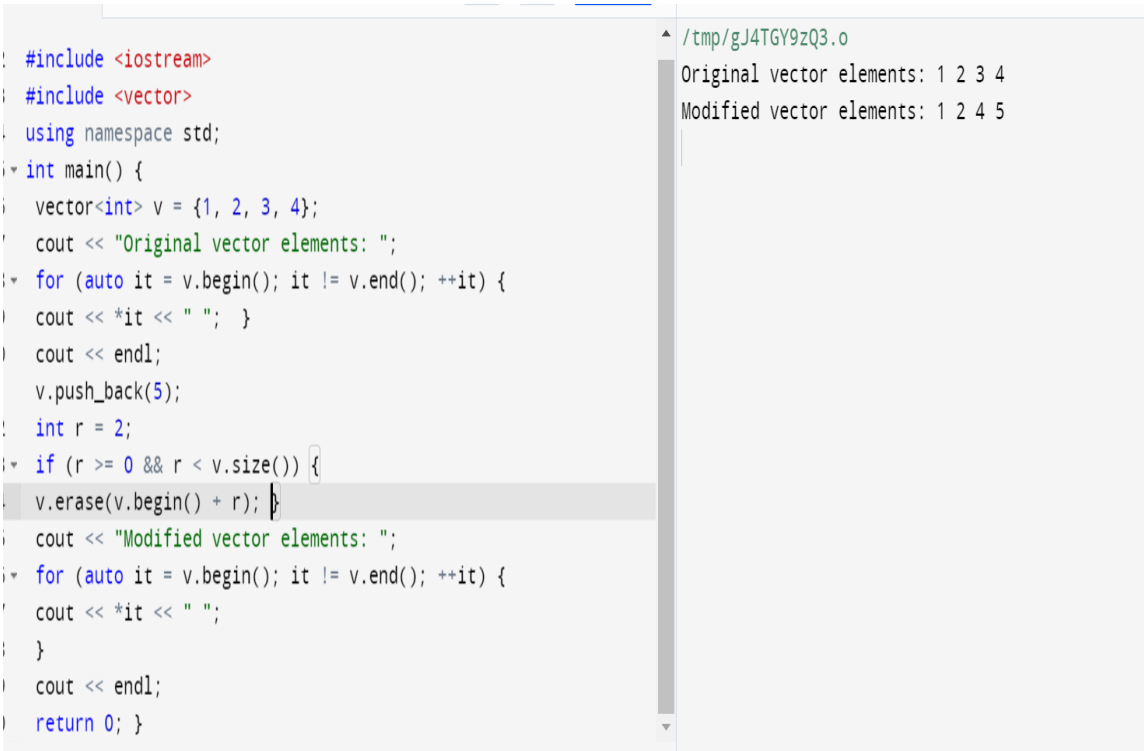
SUBMITTED TO:

COURSE INSTRUCTOR: DR TALHA SHAHID

LAB INSTRUCTOR: MUHAMMAD AFFAN

TASK 1:

1. Iterate Through Vector Using Iterators and print all pushed elements. Next you need to push integer 5 and remove element at that position.



```cpp
#include <iostream>
#include <vector>
using namespace std;
int main() {
 vector<int> v = {1, 2, 3, 4};
 cout << "Original vector elements: ";
 for (auto it = v.begin(); it != v.end(); ++it) {
 cout << *it << " ";  }
 cout << endl;
 v.push_back(5);
 int r = 2;
 if (r >= 0 && r < v.size()) {
 v.erase(v.begin() + r); }
 cout << "Modified vector elements: ";
 for (auto it = v.begin(); it != v.end(); ++it) {
 cout << *it << " ";
 }
 cout << endl;
 return 0; }
```

```
/tmp/gJ4TGY9zQ3.o
Original vector elements: 1 2 3 4
Modified vector elements: 1 2 4 5
```

TASK 2:

1. Write a complete C++ program that uses 2 vectors, 1 for names (string) and 1 for grades (int)
    a. Ask the user for the number of name/grade pairs that will be entered.
    b. Display the mean of the grades.
    c. Display the median of the grades.
    d. Display the mode of the grades.
    e. Display the names of the students with the mode as their grade.

```
#include <bits/stdc++.h>
```

```
using namespace std;

int main() {
    int pairs;
    cout << "Enter the number of name/grade pairs: ";
    cin >> pairs;

    vector<string> names;
    vector<int> grades;

    for (int i = 0; i < pairs; ++i) {
        string name;
        int grade;

        cout << "Enter name #" << i + 1 << ": ";
        cin >> name;

        cout << "Enter grade for " << name << ": ";
        cin >> grade;

        names.push_back(name);
        grades.push_back(grade);
    }

    double mean = accumulate(grades.begin(), grades.end(), 0.0) / pairs;
    cout << "Mean of grades: " << fixed << setprecision(2) << mean << endl;

    sort(grades.begin(), grades.end());
```

```
int medianIndex = pairs / 2;
double median;

if (pairs % 2 == 0) {
   median = (grades[medianIndex - 1] + grades[medianIndex]) / 2.0;
} else {
   median = grades[medianIndex];
}

cout << "Median of grades: " << fixed << setprecision(2) << median << endl;

unordered_map<int, int> frequency;
int maxFrequency = 0;
int mode;

for (int grade : grades) {
   frequency[grade]++;

   if (frequency[grade] > maxFrequency) {
      maxFrequency = frequency[grade];
      mode = grade;
   }
}

cout << "Mode of grades: " << mode << " (occurs " << maxFrequency << " times)" << endl;

cout << "Names of students with the mode grade (" << mode << "): ";
for (int i = 0; i < pairs; i++) {
   if (grades[i] == mode) {
```

```
            cout << names[i] << " ";
        }
    }

    cout << endl;

    return 0;
}
```

RESULT:

```
/tmp/rqwyRJA3IA.o
Enter the number of name/grade pairs: 3
Enter name #1: ALI
Enter grade for ALI: 67
Enter name #2: ASIF
Enter grade for ASIF: 23
Enter name #3: ZAIN
Enter grade for ZAIN: 80
Mean of grades: 56.67
Median of grades: 67.00
Mode of grades: 23 (occurs 1 times)
Names of students with the mode grade (23): ALI
```