

**National University of Sciences & Technology**

**School of Mechanical and Manufacturing Engineering**

**(SMME)**

**FOP**

**Lab Manual 10**

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**Class:**

***Mechanical Engineering (ME-15) Section-C***

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Task 1  
#include <iostream>

#include <vectors>

using namespace std;

void printVector(const vector& vec) {

cout << "Elements in the vector: ";

for (int i = 0; i < vec.size(); ++i) {

cout << vec[i] << " ";

}

cout << endl;

}

int main () {

vector vec;

vec.push\_back(10);

vec.push\_back(20);

vec.push\_back(30);

vec.push\_back(40);

printVector(vec);

vec.push\_back(5);

int positionToRemove = 2;

if (positionToRemove >= 0 && positionToRemove < vec.size()) {

vec.erase(vec.begin() + positionToRemove);

cout << "Element at position " << positionToRemove << " removed successfully." <<< "Invalid position to remove." << endl;

}

printVector(vec);

return 0;

}

Task 2

#include <iostream>

#include<vector>

#include<string>

#include<algorithm>

#include<unordered\_map>

#include<numeric>

using namespace std;

int main() {

int numPairs;

cout << "Enter the number of name/grade pairs: ";

cin >> numPairs;

vector names(numPairs);

vector grades(numPairs);

cout << "Enter names and grades:" << endl;

for (int i = 0; i < numPairs; ++i) {

cout << "Name " << i + 1 << ": ";

cin >> names[i];

cout << "Grade " << i + 1 << ": ";

cin >> grades[i];

}

double mean = accumulate(grades.begin(), grades.end(), 0.0) / numPairs;

cout << "Mean of the grades: " << mean << endl;

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

double median;

if (numPairs % 2 == 0) {

median = (grades[numPairs/ 2 - 1] + grades[numPairs / 2]) / 2.0;

} else {

median = grades[numPairs/ 2];

}

cout << "Median of the grades: " << median << endl;

unordered\_map freq;

int mode = -1, maxFreq = 0;

for (int grade : grades) {

maxFreq = max(maxFreq, ++freq[grade]);

if (freq[grade] == maxFreq) {

mode = grade;

}

}

cout << "Mode of the grades: " << mode << endl;

cout << "Names of students with the mode as their grade:" << endl;

for (int i = 0; i < numPairs; ++i) {

if (grades[i] == mode) {

cout << names[i] << endl;

}

}

return 0;

}