

Lab manual-10

Muhammad Sibghat Rasool

457035

TASK 1:

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

int main() {
    std::vector<int> myVector;
    myVector.push_back(1);
    myVector.push_back(2);
    myVector.push_back(3);
    myVector.push_back(4);
    std::cout << "Original Vector: ";
    for (std::vector<int>::iterator it = myVector.begin(); it != myVector.end(); ++it) {
        std::cout << *it << " ";
    }
    std::cout << std::endl;
    myVector.push_back(5);
    std::cout << "Vector after pushing 5: ";
    for (std::vector<int>::iterator it = myVector.begin(); it != myVector.end(); ++it) {
        std::cout << *it << " ";
    }
    std::cout << std::endl;
    size_t positionToRemove = 2;
    if (positionToRemove < myVector.size()) {
        myVector.erase(myVector.begin() + positionToRemove);
        std::cout << "Vector after removing element" << positionToRemove << ": ";
```

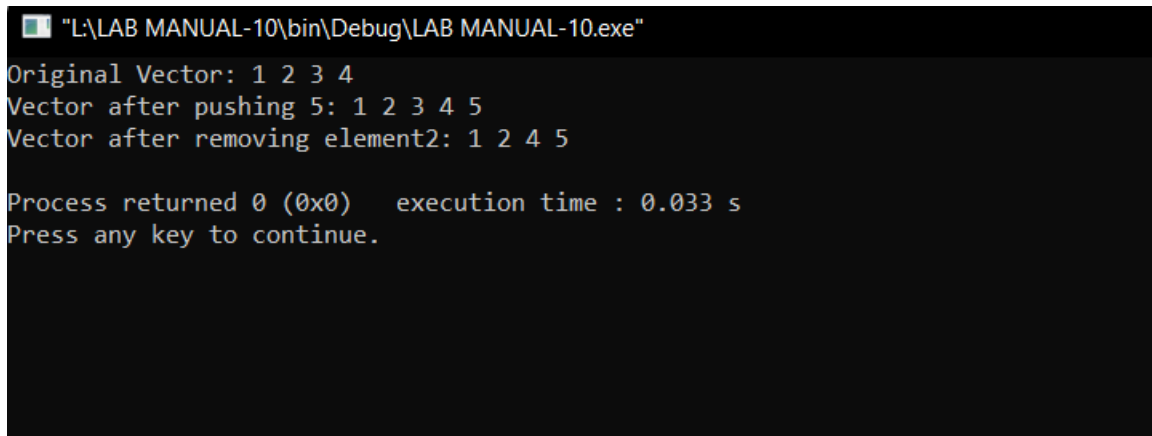
```

    for (std::vector<int>::iterator it = myVector.begin(); it != myVector.end(); ++it) {
        std::cout << *it << " ";
    }

    std::cout << std::endl;
} else {
    std::cout << "Invalid position" << std::endl;
}

return 0;
}

```



```

L:\LAB MANUAL-10\bin\Debug\LAB MANUAL-10.exe
Original Vector: 1 2 3 4
Vector after pushing 5: 1 2 3 4 5
Vector after removing element2: 1 2 4 5

Process returned 0 (0x0)   execution time : 0.033 s
Press any key to continue.

```

Task 2:

```

#include<bits/stdc++.h>

using namespace std;

double calculateMean(const vector<int>& grades) {
    int sum = 0;

    for (int grade : grades) {
        sum += grade;
    }

    return static_cast<double>(sum) / grades.size();
}

```

```

double calculateMedian(vector<int>& grades) {
    size_t size = grades.size();
    sort(grades.begin(), grades.end());

    if (size % 2 == 0) {
        return static_cast<double>(grades[size / 2 - 1] + grades[size / 2]) / 2;
    } else {
        return grades[size / 2];
    }
}

vector<int> calculateMode(const vector<int>& grades) {
    map<int, int> frequencyMap;
    for (int grade : grades) {
        frequencyMap[grade]++;
    }
    int maxFrequency = 0;
    vector<int> mode;
    for (const auto& entry : frequencyMap) {
        if (entry.second > maxFrequency) {
            maxFrequency = entry.second;
            mode = {entry.first};
        } else if (entry.second == maxFrequency) {
            mode.push_back(entry.first);
        }
    }
    return mode;
}

```

```
int main() {  
    int numPairs;  
    cout << "Enter the number of name/grade pairs: ";  
    cin >> numPairs;  
    if (numPairs <= 0) {  
        cout << "Invalid input. Exiting program." << endl;  
        return 1;  
    }  
    vector<string> names;  
    vector<int> grades;  
    for (int i = 0; i < numPairs; ++i) {  
        string name;  
        int grade;  
        cout << "Enter name #" << i + 1 << ": ";  
        cin >> name;  
        cout << "Enter grade #" << i + 1 << ": ";  
        cin >> grade;  
        names.push_back(name);  
        grades.push_back(grade);  
    }  
    cout << "Mean of the grades: " << calculateMean(grades) << endl;  
    return 0;  
}
```

```

"L:\LAB MANUAL-10\bin\Debug\LAB MANUAL-10.exe"
Enter the number of name pairs: 4
Enter name:1: sibghat
Enter grade:1: 56
Enter name:2: musa
Enter grade:2: 56
Enter name:3: dawood
Enter grade:3: 78
Enter name:4: aslam
Enter grade:4: 79
Mean of the grades: 67.25
Median of the grades: 67
Mode(s) of the grades: 56
Students with the mode as their grades: sibghat musa

Process returned 0 (0x0)   execution time : 46.245 s
Press any key to continue.

```

TASK 3:

```

#include <bits/stdc++.h>

using namespace std;

class Triangle {
private:
    double side1, side2, side3;
public:
    Triangle(double s1, double s2, double s3) : side1(s1), side2(s2), side3(s3) {}

    double calculateArea() const {
        double s = (side1 + side2 + side3) / 2;
        return sqrt(s * (s - side1) * (s - side2) * (s - side3));
    }

    double calculatePerimeter() const {

```

```

        return side1 + side2 + side3;
    }

    void printDetails() const {
        cout << "Triangle Details:" << endl;
        cout << "Side 1: " << side1 << endl;
        cout << "Side 2: " << side2 << endl;
        cout << "Side 3: " << side3 << endl;
        cout << "Area: " << calculateArea() << " square meters" << endl;
        cout << "Perimeter: " << calculatePerimeter() << " meters" << endl;
    }
};

int main() {
    Triangle myTriangle(3, 4, 5);
    myTriangle.printDetails();
    return 0;
}

```

```

L:\LAB MANUAL-10\bin\Debug\LAB MANUAL-10.exe
Triangle Details:
Side 1: 3
Side 2: 4
Side 3: 5
Area: 6 square meters
Perimeter: 12 meters

Process returned 0 (0x0)   execution time : 0.060 s
Press any key to continue.

```

TASK 4:

```

#include <bits/stdc++.h>

using namespace std;


struct Employee {
    string name;
    double salary;
    int hoursWorkedPerDay;
};

void increaseSalary(Employee& emp) {
    if (emp.hoursWorkedPerDay > 8) {
        emp.salary += (emp.hoursWorkedPerDay - 8) * 10;
    }
}

int main() {
    const int numEmployees = 10;
    Employee employees[numEmployees];
    for (int i = 0; i < numEmployees; ++i) {
        cout << "Enter name:" << i + 1 << ": ";
        getline(cin, employees[i].name);
        cout << "Enter salary:" << i + 1 << ": ";
        cin >> employees[i].salary;
        cout << "Enter hours of work per day:" << i + 1 << ": ";
        cin >> employees[i].hoursWorkedPerDay;
        cin.ignore();
    }
    for (int i = 0; i < numEmployees; ++i) {
        increaseSalary(employees[i]);
    }
}

```

```
cout << "\nEmployee Details after Salary Increase:\n";  
for (int i = 0; i < numEmployees; ++i) {  
    cout << "Name: " << employees[i].name << ", Final Salary: $" << employees[i].salary <<  
endl;  
}  
return 0;  
}
```

 "L:\LAB MANUAL-10\bin\Debug\LAB MANUAL-10.exe"

```
Enter salary:6: 56000  
Enter hours of work per day:6: 6  
Enter name:7: sohail  
Enter salary:7: 89000  
Enter hours of work per day:7: 3  
Enter name:8: khurram  
Enter salary:8: 99000  
Enter hours of work per day:8: 4  
Enter name:9: masroor  
Enter salary:9: 57000  
Enter hours of work per day:9: 6  
Enter name:10: haroon  
Enter salary:10: 1000000  
Enter hours of work per day:10: 7  
  
Employee Details after Salary Increase:  
Name: sibghat, Final Salary: $100000  
Name: ali, Final Salary: $90000  
Name: musa, Final Salary: $80010  
Name: aslam, Final Salary: $70000  
Name: zaigham, Final Salary: $30000  
Name: saleem, Final Salary: $56000  
Name: sohail, Final Salary: $89000  
Name: khurram, Final Salary: $99000  
Name: masroor, Final Salary: $57000  
Name: haroon, Final Salary: $1e+06
```