NUST

NATIONAL UNIVERSITY
OF SCIENCES & TECHNOLOGY

Lab Manual # 10:

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Task#1:

```
#include<iostream>
#include<vector>
using namespace std;
 int main()
{
vector<int> V;
int element , l, index ;
cout<<"Enter Length of Vector:";
cin>>l;
cout<<"Enter Elements in the Vector:";
for(int i=0; i<l; i++){
cin>>element;
V.push_back(element);
}
            cout<<"Vector :";
for(int i=0; i<V.size(); i++){
cout<<V[i]<<" ";
}
vector<int> :: iterator itr = V.begin() ;
cout<<"Enter the index from where the element is to be replaced with 5:";
cin>>index;
if(index<l){
V.erase(itr+index);
V.insert(itr +index, 5);
   for(int i=0; i<V.size(); i++){
cout<<V[i]<<" ";
   }
}
```

```
   else
       cout<<"Index greator than Length of vector.";


return 0;
}
```

```
Enter Length of Vector:10
Enter Elements in the Vector:0 1 2 3 4 11 6 7 8 9
Vector :0 1 2 3 4 11 6 7 8 9 Enter the index from where the element is to be replaced with 5:5
0 1 2 3 4 5 6 7 8 9
--------------------------------
Process exited after 26.14 seconds with return value 0
Press any key to continue . . .
```

Task#2:

```
#include<iostream>
#include<string>
#include<vector>
using namespace std;
void sort(vector<int> v, float a){
for(int i=0; i<a; i++){
        for(int j=0; j<a-1; j++){
                if(v[j]>v[j+1]){
                        int temp;
                        temp = v[j];
                        v[j] = v[j+1];
                        v[j+1] = temp;
}
}
}
if(int(a)%2==!0){
cout<<"Median of the Grades is :"<<v[(a)/2]<<endl;
}
```

```
else
cout<<"Median of the Grades is :"<<v[(a+1)/2]<<" "<<v[(a+3)/2]<<endl;
}
int main(){
vector<int> v;
   vector<string> vc;
   string name;
   float n , G , sum;
   cout<<"Enter the number of students :";
   cin>>n;
   for(int i=0;i<n;i++){
   cout<<"Enter the name and grade of the student :";
   cin>>name>>G;
   vc.push_back(name);
   v.push_back(G);
sum+=G;
}
   cout<<"\nThe mean of grades is :"<<sum/n<<endl;
   sort(v , n);
int mostRepeated = -1;
   int maxFrequency = 0;
   for (size_t i = 0; i < v.size(); ++i) {
      int count = 0;
      for (size_t j = i + 1; j < v.size(); ++j) {
         if (v[i] == v[j]) {
            ++count;
         }
      }
      if (count > maxFrequency) {
```

```
            maxFrequency = count;
            mostRepeated = v[i];
        }
    }
    if (mostRepeated != -1) {
        std::cout << "Mode of Grades : " << mostRepeated << std::endl;
    } else {
        std::cout << "Grades do not have a mode value." << std::endl;
    }
    for(int i=0; i<n; i++){
            cout<<"Student "<<vc[i]<<" has grade "<<v[i]<<endl;
}
return 0;
}
```

```
Enter the number of students :5
Enter the name and grade of the student :A
93
Enter the name and grade of the student :B
82
Enter the name and grade of the student :C
78
Enter the name and grade of the student :D
61
Enter the name and grade of the student :E
50

The mean of grades is :72.8
Median of the Grades is :78
Grades do not have a mode value.
Student A has grade 93
Student B has grade 82
Student C has grade 78
Student D has grade 61
Student E has grade 50

--------------------------------
Process exited after 77.49 seconds with return value 0
Press any key to continue . . .
```

Task#3:

```
#include <iostream>

#include <cmath>

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 calculatePerimeter() {

      return side1 + side2 + side3;

   }
```

```
    double calculateArea() {
        double s = calculatePerimeter() / 2;
        return sqrt(s * (s - side1) * (s - side2) * (s - side3));
    }
    void displayInfo() {
        double perimeter = calculatePerimeter();
        double area = calculateArea();
        cout << "Triangle with sides " << side1 << " m, " << side2 << " m, and " << side3 << " m:" << endl;
        cout << "Perimeter: " << perimeter << " m" << endl;
        cout << "Area: " << area << " square meters" << endl;
    }
};
int main() {
    Triangle triangleExample(3, 4, 5);
    triangleExample.displayInfo();
    return 0;
}
```

```
Triangle with sides 3 m, 4 m, and 5 m:
Perimeter: 12 m
Area: 6 square meters

--------------------------------
Process exited after 5.14 seconds with return value 0
Press any key to continue . . .
```

Task#4:

```
#include<iostream>
#include<vector>
```

```
#include<string>
using namespace std;

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

int main(){
int num, i;
vector<int> vec;
const int no_employees = 10;
   Employee employees[no_employees];

   for (int i = 0; i < no_employees; ++i) {
      cout << "Enter name of employee " <<": ";
      cin >> employees[i].name;

      cout << "Enter salary " << ": ";
      cin >> employees[i].salary;

      cout << "Enter hours of work per day " << ": ";
      cin >> employees[i].hoursperday;

      cout << endl;
   }

   for (int i = 0; i < no_employees; ++i) {
```

```
        if (employees[i].hoursperday >= 12) {
            employees[i].salary += 150;
        } else if (employees[i].hoursperday >= 10) {
            employees[i].salary += 100;
        } else if (employees[i].hoursperday >= 8) {
            employees[i].salary += 50;
        }
    }

    cout << "Employee Details:" << endl;
    for (int i = 0; i < no_employees; ++i) {
        cout << "Name: " << employees[i].name << ", Final Salary: $" << employees[i].salary << endl;
    }
}
```

```
Enter name of employee : AA
Enter salary : 300
Enter hours of work per day : 2

Enter name of employee : BB
Enter salary : 400
Enter hours of work per day : 4

Enter name of employee : CC
Enter salary : 350
Enter hours of work per day : 3

Enter name of employee : DD
Enter salary : 500
Enter hours of work per day : 7

Enter name of employee : EE
Enter salary : 800
Enter hours of work per day : 10

Enter name of employee : FF
Enter salary : 650
Enter hours of work per day : 8

Enter name of employee : GG
Enter salary : 1000
Enter hours of work per day : 11

Enter name of employee : HH
Enter salary : 450
Enter hours of work per day : 6

Enter name of employee : II
Enter salary : 2000
Enter hours of work per day : 24

Enter name of employee : JJ
Enter salary : 700
Enter hours of work per day : 9

Employee Details:
Name: AA, Final Salary: $300
Name: BB, Final Salary: $400
Name: CC, Final Salary: $350
Name: DD, Final Salary: $500
Name: EE, Final Salary: $900
Name: FF, Final Salary: $700
Name: GG, Final Salary: $1100
Name: HH, Final Salary: $450
Name: II, Final Salary: $2150
Name: JJ, Final Salary: $750

--------------------------------
Process exited after 203.5 seconds with return value 0
Press any key to continue . . .
```