NATIONAL UNIVERSITY OF SCIENCES & TECHNOLOGY

SCHOOL OF MECHANICAL AND MANUFACTURING ENGINEERING

SEMESTER # 01

CLASS: - ME 15 [SEC A]

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Fundamentals of Programming

LAB MANUAL 10

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Submitted to **MUHAMMAD AFFAN**

QUESTION NUMBER 01

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

#include<iostream>
#include<vector>
using namespace std;
int main(){

        vector<int> v;
        v.push_back(4);
        v.push_back(6);
        v.push_back(9);
        v.push_back(1);
        v.push_back(2);
        v.push_back(4);
        v.push_back(8);
        v.push_back(12);
        v.push_back(23);
        v.push_back(55);
        v.push_back(13);
        v.push_back(28);
        v.push_back(90);
        vector<int>::iterator it;
        for (it=v.begin(); it!=v.end();it++ ){
                cout<<*it<<" ";
        }
        cout<<endl;


v.erase(v.begin() + 4, v.begin()+5);

v.insert(    v.begin()+4, 5);

        for (it=v.begin(); it!=v.end();it++ ){
                cout<<*it<<" ";
        }

        return 0;
}
```

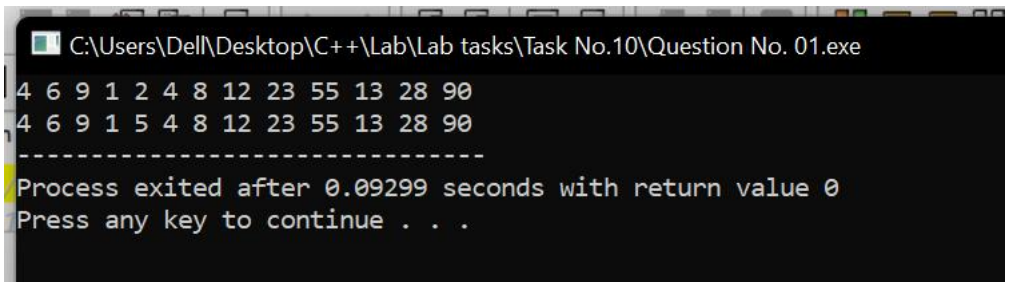

QUESTION NUMBER 02

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

#include <iostream>
#include <vector>


using namespace std;

void vsort(vector<int> vec, float a){
        int temp;
        for (int i=0; i<a; i++){
                for (int j=0;j<a-1;j++){
                        if    ( vec[j] > vec[j+1]) {
                        temp= vec[j];
                        vec[j]=vec[j+1];
                        vec[j+1]= temp;

                        }


                }
        }
        if ( int (a)%2 !=0 )
{
        cout<<" median of grades is: "<<vec[(a)/2]<<endl;
        }

        else {
                cout<<"The median of grades is: "<<vec[(a+1)/2]<<" "<<vec[(a+3)/2]<<endl;
        }
}


int main() {
        vector<int> v;
    vector<string> a;
  string name;
  float n, grade , sum;
  cout<<" Enter the number of students: ";
  cin>>n;
  for ( int i=0;i<n;i++){
        cout<<"Enter the name of student: "<<endl; cin>>name;
        cout<<" enter the grades of student: "<<endl; cin>>grade;
        a.push_back(name);
        v.push_back(grade);
          sum=+grade;
  }
```
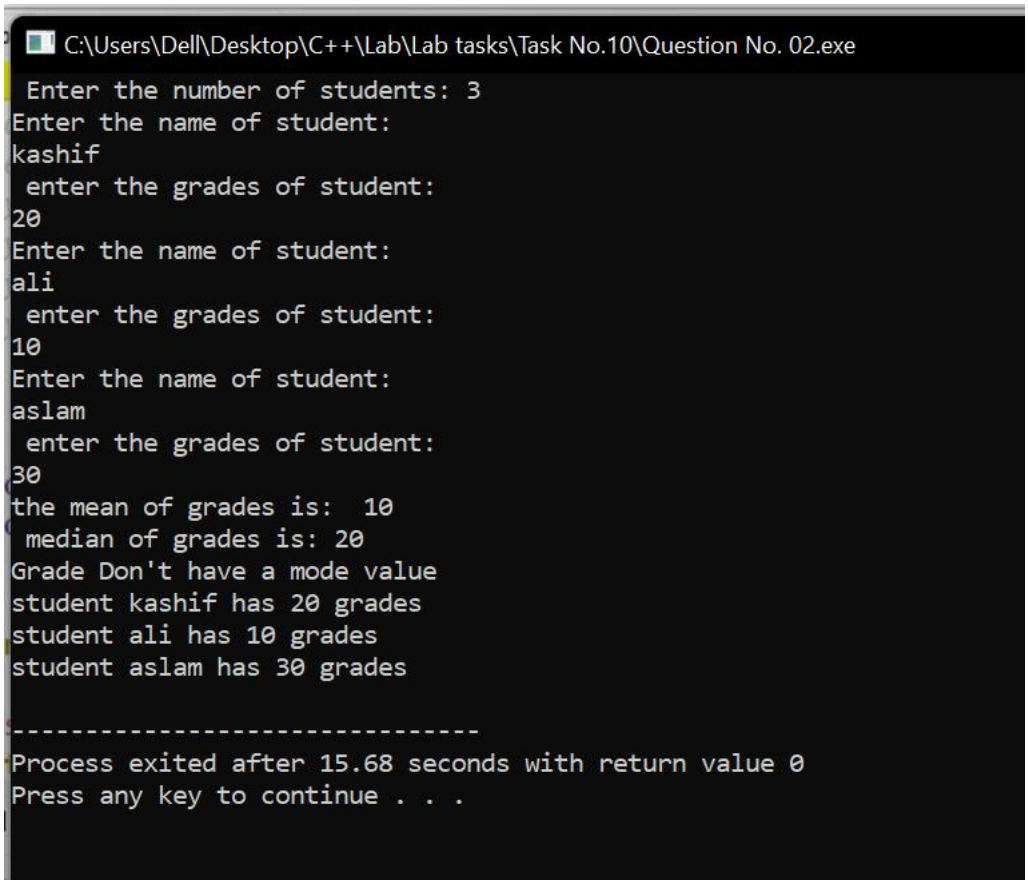

```
  cout<<"the mean of grades is:    "<<sum/n<<endl;

  vsort (v,n);


  int MostRepeated=-1;      //intialize with invalid value
    int Frequency=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 > Frequency){
                        Frequency = count;
                        MostRepeated= v[i];
              }
              }

            if (MostRepeated != -1){
                        cout<<"Mode Of Grades "<<MostRepeated<<endl;
              }
              else{
                        cout<<"Grade Don't have a mode value"<<endl;
              }

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

                        cout<<"student "<<a[i]<<" has "<<v[i]<<" grades "<<endl;
              }




        return 0;
}
```


C:\Users\Dell\Desktop\C++\Lab\Lab tasks\Task No.10\Question No. 02.exe
Enter the number of students: 3
Enter the name of student:
kashif
enter the grades of student:
20
Enter the name of student:
ali
enter the grades of student:
10
Enter the name of student:
aslam
enter the grades of student:
30
the mean of grades is: 10
median of grades is: 20
Grade Don't have a mode value
student kashif has 20 grades
student ali has 10 grades
student aslam has 30 grades

Process exited after 15.68 seconds with return value 0
Press any key to continue . . .

QUESTION NUMBER 03

```
/*_____________________________________________________
Write a program to print the area and perimeter of a triangle
  having sides of 3 m, 4 m and 5 m by creating a class named
'Triangle' with a function to print the area and perimeter.
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*/

#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() {
	// Create an instance of the Triangle class with sides 3 m, 4 m, and 5 m
	Triangle triangleExample(3, 4, 5);

	// Display information about the triangle
	triangleExample.displayInfo();

	return 0;
}
```

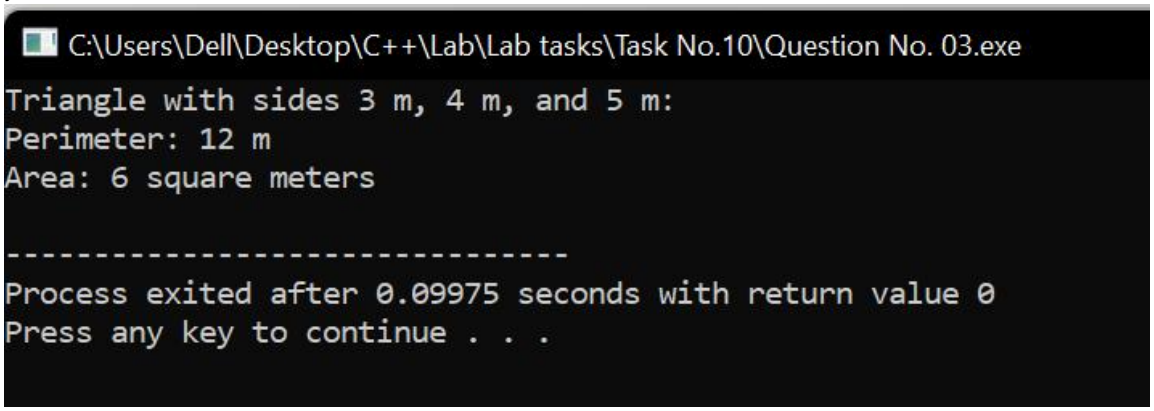

QUESTION NUMBER 04

```
/*_____________________________________________________
.Write a structure to store the names, salary,
  and hours of work per day of 10 employees in a company.
  Write a program to increase the salary depending on the
  number of hours of work per day as follows and then
  print the name of all the employees along
  with their final salaries.
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*/

#include <iostream>
#include <string>

using namespace std;

// Define a structure to store employee information
struct Employee {
	string name;
	double salary;
	int hoursWorked;
};

// Function to calculate the increase in salary based on hours of work per day
double calculateSalaryIncrease(int hoursWorked) {
	if (hoursWorked >= 12) {
		return 150.0;
	} else if (hoursWorked >= 10) {
		return 100.0;
	} else if (hoursWorked >= 8) {
		return 50.0;
	} else {
		return 0.0;
	}
}

int main() {
	const int numEmployees = 10;
	Employee employees[numEmployees];

	// Input employee information
	for (int i = 0; i < numEmployees; ++i) {
		cout << "Enter name of employee " << i + 1 << ": ";
		cin >> employees[i].name;

		cout << "Enter salary of employee " << i + 1 << ": ";
		cin >> employees[i].salary;

		cout << "Enter hours of work per day for employee " << i + 1 << ": ";
		cin >> employees[i].hoursWorked;
	}

	// Increase salary based on hours of work per day
	for (int i = 0; i < numEmployees; ++i) {
```

```
        double increase = calculateSalaryIncrease(employees[i].hoursWorked);
        employees[i].salary += increase;
    }

    // Display employee names and final salaries
    cout << "\nEmployee Information:\n";
    for (int i = 0; i < numEmployees; ++i) {
        cout << "Name: " << employees[i].name << "\tFinal Salary: $" << employees[i].salary << endl;
    }

    return 0;
}
```

```
Enter salary of employee 6: 100
Enter hours of work per day for employee 6: 12
Enter name of employee 7: nd
Enter salary of employee 7: 9900
Enter hours of work per day for employee 7: 6
Enter name of employee 8: hshalj
Enter salary of employee 8: 1000
Enter hours of work per day for employee 8: 8
Enter name of employee 9: djjd
Enter salary of employee 9: 100
Enter hours of work per day for employee 9: 9
Enter name of employee 10: fal
Enter salary of employee 10: 1000
Enter hours of work per day for employee 10: 1

Employee Information:
Name: kashif    Final Salary: $250
Name: ali       Final Salary: $350
Name: alsam     Final Salary: $250
Name: djda      Final Salary: $250
Name: jdjs      Final Salary: $149
Name: dhad      Final Salary: $250
Name: nd        Final Salary: $9900
Name: hshalj    Final Salary: $1050
Name: djjd      Final Salary: $150
Name: fal       Final Salary: $1000
```