National University of Science and Technology

School of Mechanical and Manufacturing Engineering

HU-117 Fundamental of programming

English Assignment:
Teacher: sir Affan

Introduction:

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Section: ME-15B

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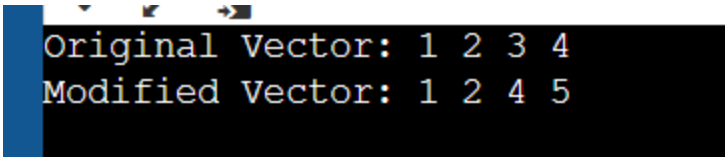
Task No: 1

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

int main() {

   vector<int> myVector = {1, 2, 3, 4};
   cout << "Original Vector: ";
   for (auto it = myVector.begin(); it != myVector.end(); ++it) {
      cout << *it << " ";
   }
   cout << std::endl;
   myVector.push_back(5);
   if (!myVector.empty()) {
      int positionToRemove = 2;
      myVector.erase(myVector.begin() + positionToRemove);
   }


   cout << "Modified Vector: ";
   for (const auto& element : myVector) {
      cout << element << " ";
   }
   cout <<endl;

   return 0;
}
```

Output:

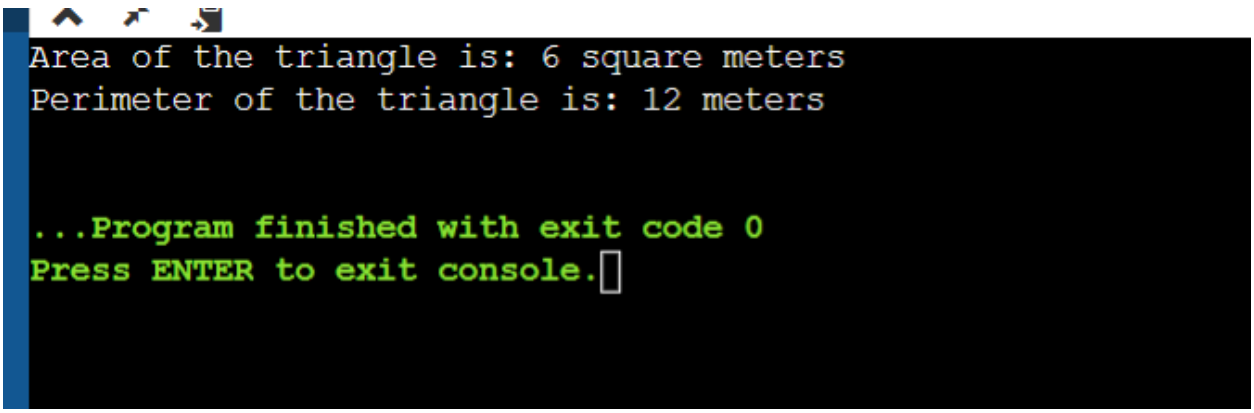


Task No:2

```
#include <iostream>
#include <cmath>
using namespace std;

class Triangle {
   private:
      float a, b, c;

   public:
      Triangle(float x, float y, float z) {
         a = x;
         b = y;
         c = z;
      }


      void print_area() {
         float s = (a + b + c) / 2;
         float area = sqrt(s * (s - a) * (s - b) * (s - c));
         cout << "Area of the triangle is: " << area << " square meters" << endl;
      }
```

```
    void print_perimeter() {
        float perimeter = a + b + c;
        cout << "Perimeter of the triangle is: " << perimeter << " meters" << endl;
    }
};

int main() {
    Triangle t(3, 4, 5);



    t.print_area();
    t.print_perimeter();


    return 0;
}
```

Output:

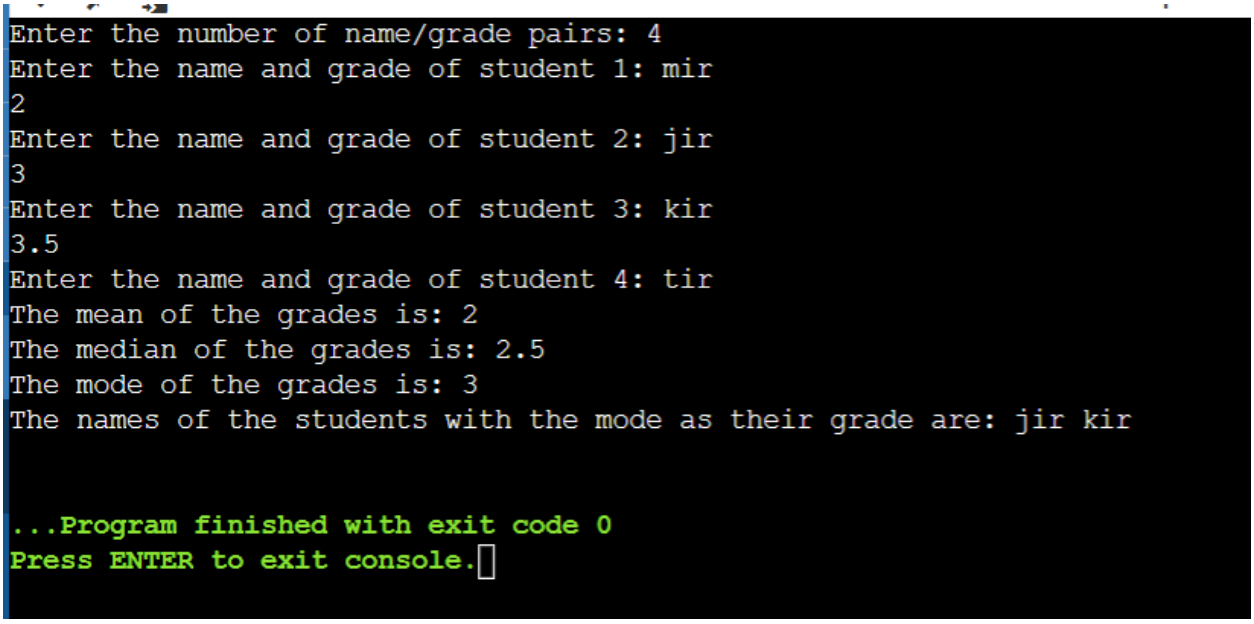


Task no:3

```
#include <iostream>
#include <vector>
#include <algorithm>
#include <map>
using namespace std;

double mean(const vector<int>& v) {
   int sum = 0;
   for (int x : v) {
      sum += x;
   }
   return (double)sum / v.size();
}

double median(vector<int> v) {
   sort(v.begin(), v.end()); // Sort the vector in ascending order
   int n = v.size();
   if (n % 2 == 0) {
      return (v[n/2] + v[n/2 - 1]) / 2.0;
   }
   else { // If the size is odd, the median is the middle element
      return v[n/2];
   }
```

```
}

int mode(const vector<int>& v) {
    map<int, int> freq;
    int max_freq = 0;
    int mode = 0;
    for (int x : v) {
        freq[x]++;
        if (freq[x] > max_freq) {
            max_freq = freq[x];
            mode = x;
        }
    }
    return mode;
}

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

    vector<string> names(n);
    vector<int> grades(n);
```

```
    for (int i = 0; i < n; i++) {
        cout << "Enter the name and grade of student " << i + 1 << ": ";
        cin >> names[i] >> grades[i];
    }


    cout << "The mean of the grades is: " << mean(grades) << endl;
    cout << "The median of the grades is: " << median(grades) << endl;
    cout << "The mode of the grades is: " << mode(grades) << endl;


    cout << "The names of the students with the mode as their grade are: ";
    for (int i = 0; i < n; i++) {
        if (grades[i] == mode(grades)) {
            cout << names[i] << " ";
        }
    }
    cout << endl;

    return 0;
}
```



Task No: 4

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

struct Employee {
  string name;
  int salary;
  int hours;
};

// Define a function to increase the salary based on hours
```

```
void increase_salary(Employee& e) {
  if (e.hours == 8) {
    e.salary += 50;
  }
  else if (e.hours == 10) {
    e.salary += 100;
  }
  else if (e.hours >= 12) {
    e.salary += 150;
  }
}

void print_employee(const Employee& e) {
  cout << "Name: " << e.name << endl;
  cout << "Salary: $" << e.salary << endl;
  cout << "Hours: " << e.hours << endl;
  cout << endl;
}

int main() {

  Employee employees[10];

  for (int i = 0; i < 10; i++) {
```

```
    cout << "Enter the name, salary and hours of work per day of employee " << i +
1 << endl;
    cin >> employees[i].name >> employees[i].salary >> employees[i].hours;
  }

  for (int i = 0; i < 10; i++) {
    increase_salary(employees[i]);
  }



  cout << "The name and final salary of each employee are:" << endl;
  for (int i = 0; i < 10; i++) {
    print_employee(employees[i]);
  }

  return 0;
}
```

```
Enter the name, salary and hours of work per day of employee 1
1
230
7
Enter the name, salary and hours of work per day of employee 2
2
340
3
Enter the name, salary and hours of work per day of employee 3
3
246
7
Enter the name, salary and hours of work per day of employee 4
4
349
8
Enter the name, salary and hours of work per day of employee 5
5
560
7
Enter the name, salary and hours of work per day of employee 6
6
340
9
Enter the name, salary and hours of work per day of employee 7
235
2309
5
Enter the name, salary and hours of work per day of employee 8
7
450
8
Enter the name, salary and hours of work per day of employee 9
8
560
6
```

```
Enter the name, salary and hours of work per day of employee 10
9
650
7
The name and final salary of each employee are:
Name: 1
Salary: $230
Hours: 7

Name: 2
Salary: $340
Hours: 3

Name: 3
Salary: $246
Hours: 7

Name: 4
Salary: $399
Hours: 8

Name: 5
Salary: $560
Hours: 7

Name: 6
Salary: $340
Hours: 9

Name: 235
Salary: $2309
Hours: 5

Name: 7
Salary: $500
Hours: 8
```

```
Name: 235
Salary: $2309
Hours: 5

Name: 7
Salary: $500
Hours: 8

Name: 8
Salary: $560
Hours: 6

Name: 9
Salary: $650
Hours: 7



...Program finished with exit code 0
Press ENTER to exit console.
```