FILUNDAMENTAS OF PROGRAMMINGHOME TASKSLAB MANUAL 10

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Task 1

main.cpp

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

using namespace std;

int main() {

  vector<int> vec = {1, 2, 3, 4, 5};
  vector<int>::iterator it;

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

  vec.push_back(5);

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

  vec.pop_back();

  for(it = vec.begin(); it != vec.end(); ++it) {
      cout << *it << " ";
  }
  return 0;
}
```

```
1 2 3 4 5
1 2 3 4 5 5
1 2 3 4 5
```

Task 2

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

double calculateMean(vector<int>& grades) {
    double sum = 0;
    for(int grade : grades) {
        sum += grade;
    }
    return sum / grades.size();
}

double calculateMedian(vector<int>& grades) {
    vector<int> sortedGrades = grades;
    int n = sortedGrades.size();
    for(int i = 0; i < n; i++) {
        for(int j = 0; j < n - i - 1; j++) {
            if(sortedGrades[j] > sortedGrades[j + 1]) {
                swap(sortedGrades[j], sortedGrades[j + 1]);
            }
        }
    }
    if(n % 2 == 0) {
        return (sortedGrades[n / 2 - 1] + sortedGrades[n / 2]) / 2.0;
    } else {
        return sortedGrades[n / 2];
    }
}

int calculateMode(vector<int>& grades) {
    int mode = grades[0];
    int maxCount = 0;
    for(int grade : grades) {
        int count = 0;
        for(int g : grades) {
            if(g == grade) {
                count++;
            }
        }
        if(count > maxCount) {
            mode = grade;
            maxCount = count;
        }
    }
    return mode;
}

int main() {

    int n;
    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 name and grade for student " << (i+1) << ": ";
        cin >> names[i] >> grades[i];
    }

    cout << "Mean of the grades: " << calculateMean(grades) << endl;
    cout << "Median of the grades: " << calculateMedian(grades) << endl;

    int mode = calculateMode(grades);
    cout << "Mode of the grades: " << mode << endl;

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