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

```
#include <bits/stdc++.h>
#include<vector>
using namespace std;
int main()
{
vector<int> v;
v.push_back(1);
v.push_back(2);
v.push_back(3);
v.push_back(4);
cout << "Elements in the vector: "<<endl;
for ( auto it=v.begin();it!=v.end();++it) {
cout << *it << " "<<endl;
}
cout<<endl;
v.push_back(5);
int positionToRemove=3;
if(positionToRemove>=0 && positionToRemove<v.size()) {
v.erase(v.begin() + positionToRemove);
}
cout << "Vector after pushing 5 and rem
for(const auto& element :v){
cout<<element<<" "<<endl;
}
cout <<endl;
}
```

Output

```
/tmp/sR3XAQj1ns.o
Elements in the vector:
1
2
3
4

Vector after pushing 5 and removing element at position 3:
1
2
3
5
```

2. Write a complete C++ program that uses 2 vectors, 1 for names (string) and 1 for grades (int)

a. Ask the user for the number of name/grade pairs that will be entered.

b. Display the mean of the grades.

c. Display the median of the grades.

d. Display the mode of the grades.

e. Display the names of the students with the mode as their grade.

```
#include <bits/stdc++.h>
using namespace std;
int main() {
int pairs;
cout << "Enter the number of name/grade pairs: ";
cin >> pairs;
vector<string> names;
vector<int> grades;
for (int i = 0; i < pairs; ++i) {
string name;
int grade;
cout << "Enter name #" << i + 1 << ": ";
cin >> name;
cout << "Enter grade for " << name << ": ";
cin >> grade;
names.push_back(name);
grades.push_back(grade);
}
double mean = accumulate(grades.begin(), grades.end(), 0.0) / pairs;
```

```
cout << "Mean of grades: " << fixed << setprecision(2) << mean << endl;
sort(grades.begin(), grades.end());
int medianIndex = pairs / 2;
double median;
if (pairs % 2 == 0) {
median = (grades[medianIndex - 1] + grades[medianIndex]) / 2.0;
} else {
median = grades[medianIndex];
}
cout << "Median of grades: " << fixed << setprecision(2) << median << endl;
unordered_map<int, int> frequency;
int maxFrequency = 0;
int mode;
for (int grade : grades) {
frequency[grade]++;
if (frequency[grade] > maxFrequency) {
maxFrequency = frequency[grade];
mode = grade;
}  }
cout << "Mode of grades: " << mode << " (occurs " << maxFrequency << " times)" << endl;
cout << "Names of students with the mode grade (" << mode << "): ";
for (int i = 0; i < pairs; i++) {
if (grades[i] == mode) {
        cout << names[i] << " ";
    }
  }
  cout << endl;
   return 0;
}
```

Output

```
/tmp/sR3XAQj1ns.o
Enter the number of name/grade pairs: 2
Enter name #1: ali
Enter grade for ali: 50
Enter name #2: zeeshan
Enter grade for zeeshan: 30
Mean of grades: 40.00
Median of grades: 40.00
Mode of grades: 30 (occurs 1 times)
Names of students with the mode grade (30): ali
```