National University of Sciences and Technology (NUST)
School of Electrical Engineering and Computer Science

Department Of Electrical Engineering and Computer Sciences

Instructor: Mehreen Tahir **Date:** December 10, 2023

Lab Engineer: Mehwish Kiran **Time:** 10:00am – 12:50pm

CS 212: Object Oriented Programming

Lab 12: STL

Information	Description
Name:	Irfa Farooq
CMS ID:	412564
Class:	BEE-14
Section:	D
Tenure:	Fall 2023

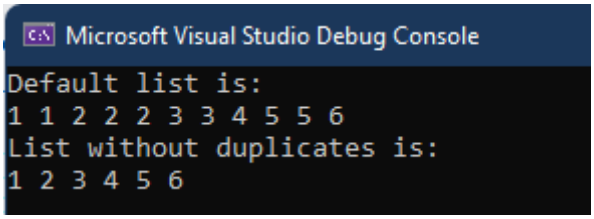
Task 1: Create a template function remove_duplicates()that takes a list and remove consecutive duplicates from the list.

Code:

```
#include <iostream>
#include <list>

template <class T>
T remove_duplicates(T& L) {
    for (auto i = L.begin(); i != L.end(); i++) {
        for (auto j = std::next(i); j != L.end();) {
            if (*i == *j) {
                j = L.erase(j);
            }
            else {
                j++;
            }
        }
    }
    return L;
}
int main() {
    std::list<int> List = { 1, 1, 2, 2, 2, 3, 3, 4, 5, 5, 6 };
    std::cout << "Default list is: " << std::endl;
    for (auto i : List) {
        std::cout << i << " ";
    }
    std::cout << std::endl;
    std::cout << "List without duplicates is: " << std::endl;
    for (auto i : remove_duplicates(List)) {
        std::cout << i << " ";
    }
    std::cout << std::endl;
}
```

Output Screenshots



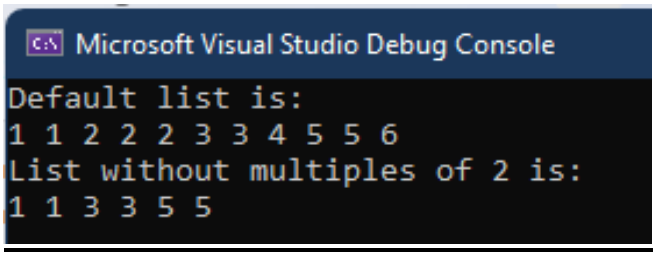
Task 2: Create a template function remove_multiples () that takes a list and a number (int) as an argument and removes all the multiples of the number from list.

Code:

```
#include <iostream>
#include <list>

template <class T>
T remove_multiples(T& L, int n) {
    for (auto i = L.begin(); i != L.end();) {
        if (*i % n == 0) {
            i = L.erase(i);
        }
        else {
            i++;
        }
    }
    return L;
}
int main() {
    std::list<int> List = { 1, 1, 2, 2, 2, 3, 3, 4, 5, 5, 6 };
    std::cout << "Default list is: " << std::endl;
    for (auto i : List) {
        std::cout << i << " ";
    }
    std::cout << std::endl;
    std::cout << "List without multiples of 2 is: " << std::endl;
    for (auto i : remove_multiples(List, 2)) {
        std::cout << i << " ";
    }
    std::cout << std::endl;
}
```

Output Screenshots



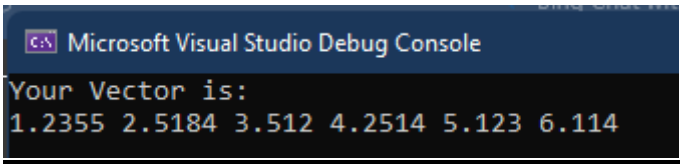
Task 3: Create template function display that displays all the items of the vector.

Code:

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

template <class T>
void display(T& V) {
    for (auto i:V) {
        std::cout << i << " ";
    }
    std::cout << std::endl;
}
int main() {
    std::vector<double> Vector = { 1.2355, 2.5184, 3.512, 4.2514, 5.123, 6.114};
    std::cout << "Your Vector is: " << std::endl;
    display(Vector);
}
```

Output Screenshots



Conclusion:

In this lab, we were able to grasp the concepts of two libraries i.e.; list and vector within the boundaries of STL and made use of them in writing different functions. Other than that, we were able to understand the importance of STL itself and how we can make efficient codes using their pre-defined functions.