COLLEGE OF COMPUTING AND INFORMATICS

CSEB3213 DATA STRUCTURES AND ALGORITHMS

SEM 1 2024/2025

LAB 1: INTRODUCTION TO STL VECTOR

Objectives

Introduction on:

1. STL Vector as dynamic container
2. Member functions of STL Vector

Instruction

1. This is an individual lab exercise.
2. You are compulsory to complete **ALL QUESTIONS for Level Easy and Moderate during lab session.** Level Challenging Question is for Self-Revision Exercise.
3. You are given only **90 minutes** to complete the program.
4. Compile and submit your complete **cpp** programs via Brighten.
5. Do attach this code segment in all files:

```
/*Subject code : CSEB3213 Data Structures & Algorithms
  Section      : 02C
  Student name : XXX
  Student ID no: XXX
  Question no  : XXX */
```

LEVEL: EASY

Question 1 (10 marks)

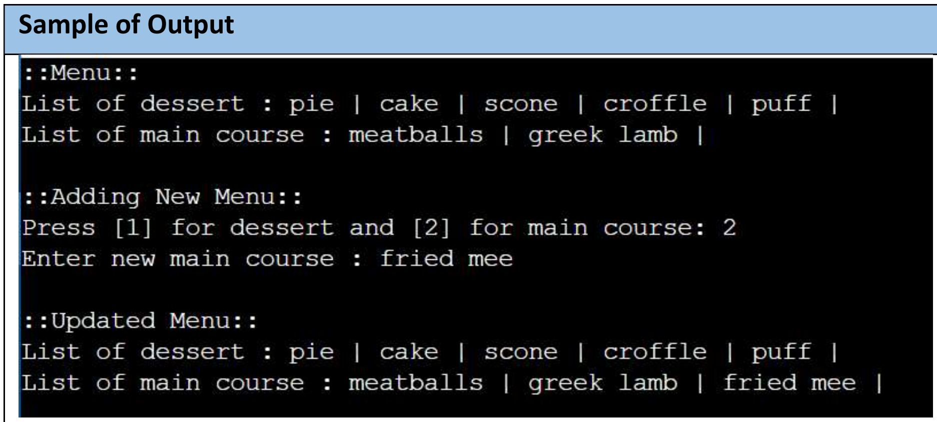
The following diagrams illustrate content of two vectors named **dessert** and **mainCourse**:

dessert	pie	cake	scone	croffle	puff
mainCourse	meat ball	greek lamb			

Complete the C++ program below by adding suitable solution.

```
#include <iostream>
//import suitable preprocessor(s)

using namespace std;

void insert(/*suitable parameter(s)*/){
    //prompt user to enter new menu by choosing [1] for dessert or [2] for main course
}

void display(/*suitable parameter(s)*/){
    //display all data in both STL vectors using iterator
}

int main()
{
    //declaration of both STL vectors

    cout<<"::Menu::"<<endl;
    display(/*suitable argument(s)*/);

    cout<<"\n::Adding New Menu::"<<endl;
    insert(/*suitable argument(s)*/);

    cout<<"\n::Updated Menu::"<<endl;
    display(/*suitable argument(s)*/);
    return 0;
}
```

Sample of Output



```
::Menu::
List of dessert : pie | cake | scone | croffle | puff |
List of main course : meatballs | greek lamb |

::Adding New Menu::
Press [1] for dessert and [2] for main course: 2
Enter new main course : fried mee

::Updated Menu::
List of dessert : pie | cake | scone | croffle | puff |
List of main course : meatballs | greek lamb | fried mee |
```

Question 2 (10 marks)

Source: Semester 1 2023/2024 Midterm Test

Study the incomplete program below.

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


void display(Question 2(c)ii){
    Question 2(d)

}

int main(){
    vector <float> width = {2.0, 2.1, 9.3, 7.4, 8.1};
    vector <float> length = {6.0, 2.3, 4.2, 7.4, 9.1};
    vector <float> area;

    Question 2(a)

    Question 2(b)

    cout<<"List of area : ";
    display(Question 2(c)i);

    return 0;
}
```

(a) Referring to the STL vector named **`width`** and **`length`**, calculate the area and insert the result to STL vector **`area`**.

[3 marks]

(b) Insert a new value 10.4 as 4th data to STL vector **`area`**.

[2 marks]

(c) Suitable argument(s).

[1 mark]

(d) Using a reverse iterator, display all values in STL vector **`area`** in reverse order.

[4 marks]

LEVEL: MODERATE

Question 3 (10 marks)

Referring to ***Sample of Program on the last page***, complete the following questions:

1. Import suitable preprocessor (header)
2. Create a struct named ***meal*** that holds data members: id (integer), name (string) and price (float).
3. Complete a function named **newMenu()**. This function shall accept all input of struct meal's data members.
4. Complete a function named **displayMenu()** based on following conditions:
   - Option 1 (individual): User will enter meal ID no as input and function shall display the details of individual menu.
   - Option 2: Function shall display details of all menus.

Sample of Program

```
//Question 3(1)

//Question 3(2)

int menu() {
       int choice;
       cout << "\n::PROGRAM MENU::\n";
       cout << "1. Add new menu\n";
       cout << "2. Display menu\n";
       cout << "3. Update menu\n";
       cout << "4. Delete menu\n";
       cout << "5. Add customer order\n";
       cout << "6. Display order record\n";
       cout << "7. Exit program\n";
       cout << "Enter choice: ";
       cin >> choice;
       return choice;
}

void newMenu (/* suitable variable*/) {

//Question 3(3)

}

void displayMenu (/* suitable variable*/) {

//Question 3(4)

}

int main() {
       vector<meal>Record {{1001,"Greek Lamb", 20.80},{1002,"Chicken Pasta", 12.90},
{1003,"Tomyam Kung", 22.50}};
       int choice;

       do {
              choice = menu();
```

```
               switch (choice) {
                 case 1: //call function newMenu()
                  case 2: //call function displayMenu()
                 case 3: //call function updateMenu()
               }
        } while (choice != 7);
}
```

LEVEL: CHALLENGING (Self-Lab Revision Exercise)

Question 4

Based on your solution in **Question 3**, complete the following questions:

1. Complete a function named **updateMenu()**. User will enter meal ID no as input and the function shall update details of following menu options based on input entered by user:
    - Option 1 (meal name): function shall update the meal's name.
    - Option 2 (meal price): function shall update the meal's price.
2. Complete a function named **deleteMenu()**. The function shall delete selected menu based on meal ID no entered by user.
3. Create additional struct named **Order** that holds data members: quantity (integer), custName (string), mealName (string) and totalPayment (float).
4. Create an additional function named **customerOrder()**. User will enter the meal ID no as input and the function shall accept input of struct Order's data members such as customer name and quantity, and will calculate the total payment.
3. Create an additional function named **displayRecord().** The function shall display details of all customer orders.