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| Name of Course | **DATA STRUCTURE AND ALGORITHMS** | Course Code | **CSEB3213** |
| Lecturer | **DR AZHANA AHMAD** | Semester | **SEM 1 2023/24** |

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| Student Name |  |
| ID |  |
| SECTION |  |
| Date |  |

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| Assessment | LAB 1 – Vector and List |
| Weightage | 2% |
| Course Outcome to achieve | |  | | --- | | CLO2: Produce a computing solution by applying appropriate data structures and algorithms. (C3,PLO2) | |

**LAB 1: INTRODUCTION TO STL VECTOR AND LIST**

**Objectives**

Introduction on:

1. STL Vector and List as dynamic container

2. Member functions of STL Vector and List

**Instruction**

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

/\*Subject code : CSEB3213/CSEB324 Data Structure & Algorithms

Section : 02A

Student name : XXX

Student ID no: XXX

Question no : XXX \*/

**LEVEL: EASY**

**Question 1 (5 marks)**

The following codes contain errors and incomplete. Fix all the errors and missing code segments by transferring the program to Visual Studio (or any compatible IDE).

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| #include<iostream>  **//import suitable preprocessor**  using namespace std;  void display(**/\*suitable argument\*/**){  **//display all data in the list using iterator**  }  int main() {  list<int> rec {2,4,6,8};  **//declare suitable variables**  cout << "\nOriginal list:";  display(**/\*suitable argument\*/**);    cout<<"\n\nEnter three additional data:";  for (int i=1;i<4;i++) {  cin>>no;  **//add new data at the beginning of the list**  }  cout << "List after adding three data:";  display(**/\*suitable argument\*/**);  -------------------------------------------------------------  cout << "\n\nChange the 3rd data to 9";  **//missing codes**  cout << "\nList after update the 3rd data:";  display(**/\*suitable argument\*/**);    cout << "\n\nSort the data in acsending order";  **//missing codes**  cout << "\nList after the data are sorted:";  display(**/\*suitable argument\*/**);    cout << "\n\nDelete data 4";  **//missing codes**  cout << "\nList after data 4 is deleted:";  display(**/\*suitable argument\*/**);    cout << "\n\nDelete the first three data";  **//missing codes**  cout << "\nList after the first three data are deleted:";  display(**/\*suitable argument\*/**);  return 0;  } |

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| **Sample of Output** |
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**Question 2 (5 marks)**

Based on your solution to **Question 1**, convert the entire program to STL vector implementation while keeping the same result.

(Hint\*: include #algorithm to call some relevant function( ))

**LEVEL: MODERATE**

**Question 3 (10 marks)**

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

1. Import suitable preprocessor (header)
2. Create a struct named ***Book*** that holds data members: bookName (string), bookID (int), price (float) and bookQty (int)
3. Complete a function named **registerBook()**. This function should accept all input of struct data members.
4. Complete a function named **displayBook()** based on following conditions:

* Option 1 (individual): User will enter book ID as input and function will display the details of individual book.
* Option 2: Function will display details of all books in record. // begin(), end(), iterator

**LEVEL: CHALLENGING (Self-Lab Revision Exercise)**

**Question 4**

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

1. Complete a function named **deleteBook()**. This function should delete selected data based on book ID entered by user.
2. Complete a function named **updateBook()**. User will enter book ID as input and the function should be able to update details of book based on following options:

* Option 1 (bookName): function will update the book name based on input entered by user.
* Option 2 (bookPrice): function will update the book price based on input entered by user.
* Option 3 (bookQty): function will update the book quantity based on input entered by user.

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| **Sample of Program** |
| **//Question 3(1)**  **//Question 3(2)**  int menu() {  int choice;  cout << "::BOOK STORE PROGRAM MENU::\n";  cout << "1. Register book\n";  cout << "2. Display book record\n";  cout << "3. Delete book\n";  cout << "4. Update Book\n";  cout << "5. Exit program\n";  cout << "Enter choice: ";  cin >> choice;  return choice;  }  void registerBook(/\* suitable variable\*/) {  **//Question 3(3)**  }  void displayBook(/\* suitable variable\*/) {  **//Question 3(4)**  }  void deleteBook(/\* suitable variable\*/) {  **//Question 4(1)**  }  void updateBook(/\* suitable variable\*/) {  **//Question 4(2)**  }  int main() {  vector<Book>Record;  Book data;  int choice;  do {  choice = menu();  switch (choice) {  case 1: //call function registerBook() and push the data to vector.  case 2: //call function displayBook()  case 3: //call function deleteBook()  case 4: //call function updateBook()  }  } while (choice != 5);  } |