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| Name of Course | **DATA STRUCTURE AND ALGORITHMS** | Course Code | **CSEB3213/CSNB344** |
| Lab Tutor | **DR AZHANA AHMAD** | Semester | **SEM 1 2023/24** |

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| Student Names |  |  |
| ID s |  |  |
| SECTION |  | |
| Date |  | |

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

**Instructions**

1. This is a duo lab exercise.
2. You are compulsory to choose **ANY** 2 questions.
3. Submit your complete **cpp** programs, **with sample of output** via Brighten (only one person submitted)
4. Do attach this code segment in all files:

/\*Subject code : CSEB3213/CSEB324/CSNB344 Data Structure & Algorithms

Section : 02A

Student name : XXX

Student ID no: XXX

Question no : XXX \*/

**LEVEL: EASY**

**Question 1**

The following program contains errors and incomplete.

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| #include <iostream>  using namespace std;  class scorun {  public:  string name;  int point;  //missing code  };  scorun \*createScorun() {  scorun \*n = new scorun();  //missing code  }  void insertNode(/\*suitable parameter\*/) {  //variable declaration    do{  n = createScorun ();  //insert first node into linked list  //missing code  //insert second node onwards at the end of linked list  else {  //missing code  }  cout<<"Press [y] for new record:";  cin>>choice;  }while(choice=='y');  }  void display(/\*suitable parameter\*/) {  cout<<"All records : ";  //missing code  }  int main() {  scorun \*head = NULL;  insertNode(/\*suitable argument\*/);  cout <<"\n\*\*List of existing record\*\*"<<endl;  //call display()  //call analysis()  return 0;  } |

1. Complete the program above with correct code.
2. Modify the program by adding function **analysis()**. The function shall display total no of students with low scorun point (less than 300) together with the student details based on data in the linked list.

**LEVEL: MODERATE**

**Question 2**

*Source: Sem 1 2022/2023 Lab Test Set 2*

This program will generate a dean list record based on the students’ cgpa. Using the requirements and incomplete program provided below, write a complete C++ program for the dean list program using **STL List and Linked List** implementation.

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| **Order Tracking Program** |
| //suitable header(s)  using namespace std;  struct Data{  string name;  float cgpa;  };  struct Node{  string name;  float cgpa;  Node \*next;  };  void filterRecord(/\*suitable parameter(s)\*/){  /\*this function shall copy all data from storage student and store it in a singly  linked list, ONLY if the value of cgpa is 3.50 and above \*/  }  void display(Node \*head){  cout<<"\n:: Dean List Record ::"<<endl;  /\*this function shall display all data in the singly linked list \*/  }  int main()  {  list<Data>student = {{"Mei Ling",3.92}, {"Rajesh", 2.68}, {"Husin", 3.7}};  Data temp;  /\*suitable variable(s)\*/    cout<<":: New Record ::"<<endl;  /\*this section shall prompt user to input data for student name and cgpa.  Store the input data at the beginning of the storage student \*/    cout<<"\n:: All Students Record ::"<<endl;  /\*this function shall display all data in the storage student using iterator \*/    filterRecord(/\*suitable argument(s)\*/);  display(head);  cout<<"End of Program";  return 0;  } |

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| **Sample of Output** |
| **Text  Description automatically generated** |

**Question 3**

Referring to Sample of Program at last page, complete the following questions using **Linked List**:

1. Create a struct named ***Meal*** that holds data members as follows:

* string : name, remark;
* integer : quantity
* float : price, total

1. Complete a function named **mealInfo()**. This function should accept all input of struct data members.

* Default remark value is “Normal”.
* For membership, customer will get 10% discount of total price. Set the remark to “Membership”.

1. Complete a function named **addMeal()**.This function should add/register the meal into linked list.
2. Complete a function named **display()** based on following options:

* Option 1 (individual): User will enter meal name as input and function will display the details of individual meal. [4 marks]
* Option 2: Function will display details of all registered meals in record.

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

**Question 4**

Based on your solution in **Question 3**, complete a function named **update()**. User will enter meal name as search input and the function shall update the details of meal as follows:

* Option 1: function will update the meal name.
* Option 2: function will update the meal quantity and recalculate the total payment.
* Option 3: function will update the meal price and recalculate the total payment.

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| **Sample of Program** |
| #include <iostream>  using namespace std;  class Meal {  **//Question 3(1)**};  int menu() {  int choice;  cout << "::FOOD ORDERING::\n";  cout << "1. Add meal\n";  cout << "2. Display meal\n";  cout << "3. Update meal\n";  cout << "4. Exit program\n";  cout << "Enter choice: ";  cin >> choice;  return choice;  }  Meal \*mealInfo() {  **//Question 3(2)**  //create a new node  //accept user’s data inputs  //return address of new node to addMeal()}  void addMeal(/\*suitable parameters\*/){  **//Question 3(3)**  //invoke mealInfo() and accept new node’s address  //add new node to linked list  }  void display(/\*suitable parameters\*/) {  **//Question 3(4)**  //accept user’s input (option)  //display meal according to user’s input (option)  }  void update(/\*suitable parameters\*/) {  **//Question 4**  //update meal according to user’s input (option)  }  int main() {  //declaration of variables  cout<<"Enter customer name : ";  getline(cin, name);  cout<<"Enter table no : ";  cin>>table;  do {  choice = menu();  switch (choice) {  case 1: //call function addMeal()  case 2: //call function display()  case 3: //call function update()  }  } while (choice != 4);  return 0;  } |