Software Engineering Design – Advanced Programming Techniques, Semester 2023-3

RMIT UNIVERSITY

LAB ASSESSMENT 2 (30%) – TEST QUESTIONS

Test Duration: 120 mins (+ 15 mins for submission)

NOTE: only submit **three .cpp file for three questions**, and DON'T zip them together.

Question 1 (6 pts)

Write a C++ program to ask the user to input **studentName** and **studentID**. Save it to the file namely **studentName.dat**

Sample Run:

```
Input your student name: An Nguyen
Input your student id: s4010128
Your data is saved !
```

➔ *Content saved in file An Nguyen.dat :*

```
Student Name: An Nguyen
Student ID: s4010128
```

Question 2 (12 pts)

A traveller would like to plan for her trip with list of visiting cities in order as below

- Hue: 5 days
- Da Nang: 3 days
- Nha Trang: 4 days
- Da Lat: 2 days
- Can Tho: 3 day

a) Use linked list concepts to record that trip plan. Write a function to print out the trip plan exactly as above. Hint: Define a class, e.g. namely **City**, with attributes are ***name***, ***stayingDays*** and **nextCity*.

b) Write a function which allows the user to *update the trip plan by inputting the City's name and the new staying days*. If the city's staying days is set to 0, remove that city from the trip plan. Print out how many days that the traveller will stay from that City to the end of the trip.

Example Run:

```
Enter the City's name: Nha Trang
Update the number of staying days: 5
> Updated. There will be a total of 10 days staying in this and next
cities in the trip.

Enter the City's name: Da Lat
Update the number of staying days: 0
> Removed from the trip plan. There will be a total of 3 days staying in
the next cities in the trip.
```

Test all the functions in **main()** with appropriate output messages.

Question 3 (12 pts)

Write a C++ program to help manage a retail shop as below:

The shop has a ***name*** and a ***list of selling products***. Each product is characterized by a *name*, a *price*, and its *stock quantity*. The shop has a function to create value and print out the **bill for each customer** with given *list of bought products* including their *purchasing quantities* (the bill when printing out should include these information).

The shop manages each customer with a ***name***, *the* ***last bill, and their earning points*** from a loyalty program. The customers earn points based on their spending (*gets 1 point per 1$ purchase*), which can be redeemed in future purchases (*redeems 10 points for $1*). Customers should have the option to return a product from the last purchase.

The shop can generate a sale report which prints out its *total revenue*, the *best-selling product*, and *revenue of each product*.

Implement classes with suitable attributes and methods to satisfy the above requirement. Test them in main() with appropriate output messages.