RMIT UNIVERSITY

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

LAB ASSESSMENT 1 (25%) – 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 which asks the user to input the ***total amount of*** **seconds**, and convert it to **hours**, **minutes**, and **seconds**.

Sample Run:

```
Input total amount of seconds: 4000
It is 1 hour(s), 6 minute(s) and 40 second(s).
```

Question 2 (9 pts)

Write a C++ program which can work with **command line arguments** below:

Get two numbers (each could be either hexadecimal or decimal) with an operator sign (**+** or **-**) then print out result.

Sample Run:

```
./a.exe 0x12 + 10
Result is: 28

./a.exe 100 – 0x1A
Result is: 74
```

Question 3 (10 pts)

a) Defines a class namely **Book** with following private attributes
   - **title** (string)
   - **price** (integer)
   - **availableCopies** (integer) which is the number of book copies available to borrow.
   - **borrowerNames[10]** (array of 10 strings) which are names of borrowers (write "NA" if elements are not names of borrowers).

Write constructor for it to initialize the attributes, and three methods as below:

- bool **borrow**(string *borrowerName*): to borrow a book from the library. Return true if succeed and false if fail (e.g. no available copies).
- void **return**(string *borrowerName*): to return a book to the library and remove the borrowerName from the list.

b) Define another class namely **User** with two attributes are **name** (string), **Book* borrowedBooks[5]** (array of Book object pointers). Provide constructor for it, and two methods as below:

- bool **doBorrow**(Book *abook): borrow a book from the library (hint: must call **borrow** () method of Book object).
- void **doReturn**(Book *abook): to return a book to the library (hint: must call **return** () method of Book object).

c) Overload the operators so that we can do following operations

- **User >> Book** : Return all copies of the book from the user
- **Book++** : Increase one available copy of the book in the library.
- int **n + Book**: increase the price of the book by **n**.

Test all functions and operators in main. You should have appropriate message when printing to screen.