Software Engineering Design – Advanced Programming Techniques, Semester 2024-2

RMIT UNIVERSITY

LAB ASSESSMENT – MOCK TEST QUESTIONS

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

NOTE: only do and submit **one source .cpp file for each question 1-2, and don't zip them together.**

Question 1 (10 pts)

Write a C++ program which take a number as **an argument from the command line**, which is one of following data type:

- *an integer number (e.g. 12)*
- *a floating-point number (e.g. 3.14)*
- *a hexadecimal number which must be preceded by "0x" (e.g. 0x19, 0xAC).*

a) Write a function named **doubleVal**() with multiple overloaded versions that accept an integer, a floating-point number or **a string represented a hexadecimal number**, and return a doubled value *(with integer/ double data type).*

b) Use that function inside main() to print out the doubled value. *Format the I/O stream so that the precision is two digits after the decimal point for floating point value, and it prints outs in hexadecimal format (with 0x prefix) for hexadecimal value*

Note: Assume that the user always enters valid data with positive value only.

Hint: *You may need to use stringstream with I/O formatting to convert from any numerical string to integer/ double.*

Sample Run:

./a.exe 12
24

./a.exe 12.1235
24.25

./a.exe 0xAC
0x158

Question 2 (15 pts)

Write a C++ program which defines a class named **Student** with private attributes ***name*** (string) and ***scores*** (an array of 3 integers to hold scores of the students). Provide constructor for the class.

a) Write two methods for the class
   - **inputData**(): ask the user to input data (name and scores) for the student
   - **showInfo**(): print out information of the student

   Test them in main() with an object.

b) Overload the >> and << operators so that it can be used with Student objects as below:
   - **cin >> object** : it will call the inputData() function to input data
   - **cout << object** : it will call the showInfo() function to print out info.
   - **object1 > object2**: return true if average score of object1 is larger than that of object2; return false otherwise.
   - **int n + object**: return a result object that has same name, but all scores are increased by **n**.

   Test them all in main().

c) Create an array of 10 **Student** objects and read all information from a file named **data.txt** (attached) to assign values for them.

   Print out info of the student with highest average score.

   Hint: *you may need to use getline() function with delimiter.*