EEE102 C++ Programming and Software Engineering II

Assessment 1

Fundamental of C++ language

Assessment Number	1
Contribution to Overall Marks	15%
Submission Deadline	March 16, 23:55

How the work should be submitted?

SOFT COPY ONLY !

(MUST be submitted through ICE so that the TAs can run your programs during marking.)

Make sure your name and ID are printed on the cover page of your report.

Assessment Overview

This assessment aims at testing some basic concepts of C++ programming and initiates the routine of code development using the software development process (**SDP**), namely the five main steps of the software development process:

1. Problem statement: formulate the problem.
2. Analysis: determine the inputs, outputs, variables, etc
3. Design: define the list of steps (the algorithm) needed to solve the problem.
4. Implementation: the C++ code has to be submitted as a separate file. Just indicate here the name of the file.
5. Testing: explain how you have tested and verified your C program.

You will need to apply this methodology to each one of the following simple exercises.

What should be submitted?

A short ***report*** (up to a few pages of texts plus C++ source codes) detailing for all the questions of the assignment. The answer for each question should follow the SDP method:

a) SDP steps 1 to 3. (30% of the total marks for that question)

b) SDP step 4 (implementation): your C++ source code including the comments. (50%)

c) SDP step 5 (testing): you will explain how you have tested the correctness of your C++ program and will include some sample runs of your C++ Programs. (20%). **Testing result must be shown by screenshot.**

The report in Microsoft Word format **(.DOCX file)** and **C++ source code (with comments)**, for all questions should also be zipped into ***a single file***. (It is a good practice to include comments in your code stating the aim of the program, what are the inputs, what are the outputs, which algorithm is used, who is the author and so on.)

EXERCISE 1 (5 POINTS OUT OF 15)

Write a program that asks a student to enter his/her student ID number and then full name, and then constructs, stores and displays a third string, consisting of the user's student ID number followed by a comma, a space and the full name. A sample run could look like this:

Enter your student ID number: 12010182
Enter your full name: Zhang Xinyi
You are: 12010182, Zhang Xinyi

NOTICE: use TWO methods to implement this program:

1. Use **`char`** arrays and functions from the **`cstring`** header file;
2. Use **`string`** objects and methods from the **`string`** header file.

EXERCISE 2 (5 POINTS OUT OF 15)

George invests $200 at 10% ***simple interest***. At the same time, Paul invests $200 at 5% ***compound interest***. Write a program that finds how many years it takes for the value of Paul's investment to exceed the value of George's investment and then displays the value of both investments at that time.

HINT: ***Simple interest*** – that is, every year, the investment earns 10% of the original investment, which means it earns $20 every year;

Compound interest – that is, interest is 5% of the current balance, including previous additions of interest. It means Paul earns $10 for the first year, giving him $210. The next year he earns 5% of $210, which is $10.5, and so on.

EXERCISE 3 (5 POINTS OUT OF 15)

There is a double circulating based football match between four schools: A, B, C and D. The scores between each other are listed below:

A VS B, 2:1;
A VS D, 1:4;
A VS C, 2:2;
B VS D, 3:1;
B VS C, 4:2;
D VS C, 1:1.

If *won* for 3 points, *tie* for 1 point, *lose* for no point, write a program to rank these four teams (If two teams have same points, check the goal difference; if two teams have same points and goal difference, check the goals). Export the result in a reasonable way, such as:

The rank of the four teams are: D C B A

NOTICE: the scores do not need to be inputted from keyboard.