CS2100 Computer Organisation

Lab 01: A Bit of C and Data Representation (Week 24th August)

Instruction

Short and clean
We have separated the lab information into i) **instruction** and ii) **report**. You **ONLY** need to submit your **report** into Luminus Folder no longer than 2359 on the same day you have the online lab. Whenever there is a question in the instruction (easily identified as they have **[X pts]** tagged to the end), write / type your answer in the corresponding location in the **report** document.

Objective:

You will learn how to write a simple C program that do simple number base conversion. Two birds with one stone.

Reference:

Refer to Lecture 02 and 03 for the relevant topics.

Preparation (before the lab):

1. Find a suitable C programming environment for your own use. There are many choices:
    a. [Windows] Visual Studio Code with GCC
    b. [Windows] Cygwin
    c. [Windows] Use Windows Linux Subsystem to start a Ubuntu Linux box. You can easily get gcc and relevant tools on it.
    d. [Windows/MacOS] Can ssh to sunfire if you have a account.
    e. [Linux] Many options. Get gcc and use any editor your like (vim, nano, etc).
    f. [MacOS] Use XCode
    g. [Any platform] Google "online C compiler], there are many good online C compiler sites.

2. Download and compile the given **lab1.c** and **hello.c** source code.

3. The purpose of the **lab1.c** is:
    a. Read a single **non-negative** integer X from user. [Already coded]
    b. Convert X to binary form and hexadecimal form. [**Your work**]
    c. Print the result. [**Your work**]

    Sample output can be found at the end of this document.

For Online Lab:

a. Please check for the zoom link of your session on Luminus->Forum->Admin.
b. Please use the **name on your student card** as your display name in the zoom session. No nick name, no short form. This allows lab TA to quickly check your work.

Lab Procedure as follows.

1. Lab TA will ask you to share screen. Show your C coding environment by compiling and running **hello.c.** That program contains a simple "Hello World!" message. Feel free to change thpe message before the class 😊. **[Demo = 2 pt]**

2. Once you finished the demo, you are "done" for lab 1 online session. Please stay back and observe your classmate, you may be able to learn a new way to run C and / or give advice on alternative approach / setup.

3. Complete your **lab1.c** then answer the following in your **lab report**:
    a. Brief description of the approach you used for binary form conversion. [**4 pts**, includes program correctness]
    b. Brief description of the approach you used for hexadecimal form conversion. [**4 pts**, includes program correctness]

4. Submit your completed **lab report** (pdf or words format) and **lab1.c in a single .zip file with your student ID.** e.g. **A1234567X_Lab1.zip**. Deadline: **2359 of the lab day.**

Marking Scheme: Report – 8 marks; Demo – 2 marks; Total: 10 marks.

Sample output for `lab1.c` [User input in bold red]

Enter X: **43** **101011** **2B**	Example used in lecture 03, slide 11 Binary form of 43_{10} is 101011_2 Hexadecimal form of 43_{10} is $2B_{16}$
Enter X: **65432** **1111111110011000** **FF98**	
Enter X: **1234567890** **10010011001011000000001011010010** **499602D2**	