COMP9032 Lab 3

Oct. 2023

1. Objectives

In this lab, you will work in group to learn AVR programming on

- Input from keypad, and
- Output to LCD

2. Preparation

- Read the document LCD_Manual.pdf for the general description of Dot Matrix LCD.
- Discuss with group members on how to complete the lab task.

3. Task (25 marks, due **your lab session in Week 7**)

Write an assembly program that calculates linear function *y = a*x-b*, where *a*, *b, x, and y* are all 8-bit signed integers; a, b, and x are positive, but the result y can be negative. The program takes decimal integers *a*, *x* and *b* from the keypad and displays the result on the LCD. When there is an overflow in the calculation, the LED bar flashes.

It is required that the result displayed on the LCD can be in either the decimal or the hexadecimal format. The default format is decimal. You can use key "C" to convert the value to hexadecimal and pressing the key again will convert it back to decimal.
In addition, you can use key "*" for multiplication, key "D" for subtraction, and key "#" for "=".

For example, to get 12*4-58, your input key sequence is 1→2→*→4→D→5→8 → #. Its result -10 will be displayed on the LCD; If "C" is pressed, the display will then change to -0xA.

Assemble your program using Microchip Studio and run it on the AVR Microcontroller board. Demonstrate your work to the lab tutor.

Assessment: The task will be accessed based on both **overall group work** and **individual presentation** during the demonstration which is split into

1) One member demonstrates your group work with the lab board.
2) Other members each explain part of your assembly code.

Your mark of this lab consists of 40% from the overall group work and 60% from your individual presentation.