

COMP9032 Lab 3

Oct. 2025

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 (90 marks, **due in your lab session in Week 7**)

Write an assembly program that checks whether the inequality $\sqrt{a^2 + b^2} > c$ holds. The program takes a , b and c from the keypad and displays all input values and the result on the LCD with (a, b, c) being shown on the first line and the result (T or F) on the second line. When the result is true, the LED bar also flashes.

Here we assume that a and b are 8 bits and c 4 bits. You can use key “#” to separate input values. For example, for $a=12$, $b=2$, and $c=4$, your input key sequence is $1 \rightarrow 2 \rightarrow \# \rightarrow 2 \rightarrow \# \rightarrow 4 \rightarrow \#$.

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

The task will be assessed based on group work and individual performance, as detailed below.

- Group work (50 marks)

All participating group members will receive the same marks based on the following criteria:

- Successful building of the project code without errors - 5 marks
- Successful loading of the compiled code onto the hardware – 5 marks
- Demonstrating that the code runs correctly and validates the intended design – 40 marks
 - Correct implementation of keypad input (10 marks)
 - Correct implementation of LCD output (10 marks)
 - Two valid test cases (20 marks)

- Individual performance (40 marks)

Each student will be individually assessed based on:

- Their understanding of the group work – 10 marks
- Their clear and accurate explanation of a specific part of the group work, as assigned by the tutor – 30 marks