1. Objectives

   In this lab, you will gain more practical experience on LCD. Specifically, your tasks in this lab are:

   - Studying the LCD and programming to print characters on it.

2. Preparation

   Before coming to the laboratory, you should:

   2.1. Read through the document available at:
         for general description of Dot Matrix LCD

   2.2. Read through the task description of this experiment, trying to understand what you will be doing;

   2.3. Write your programs at home in order to finish the experiment on time; and

   2.4. Obtain one or two floppy disk on which to store your work.

3. Introduction to the DMC LCD

   The AVR Microcontroller Board comes with a 2 x 16 character Liquid Crystal Display (LCD) module. This module can be controlled via any of the ATMega64 ports.
   In order to read/write from/to the LCD, here is the list of things you must satisfy:
   - Initializing LCD
- Checking the busy flag of LCD
- Determining which register (instruction register or data register) in the LCD controller to write to or read from
- Read/write data from/to the LCD

The pin descriptions, timing constraints and detail instruction specifications can be found in the LCD User’s Manual.

4. Task: Read-Write

Write an assembly program that receives a character types in from the keypad and prints it on the LCD. When the first line is full, the display goes to the next line. When the two lines are all full, and display is cleared and ready to display a new set of characters. Assemble your program using AVR Studio, and run it on the AVR Microcontroller Board. Demonstrate your working program to the Laboratory assessor.

| Check Point A: | Signature: |

5. Note:

The task is worth 5 marks. Your programs should be well commented. Up to 1 mark will be deducted for the program without proper and sufficient comments.