CMPE 443 PRINCIPLES OF EMBEDDED SYSTEMS DESIGN

LAB #004 “General purpose I/O (GPIO) and Data Structures”

1) Preparation for Using Keil and QEMU *(10 minutes)*

This part will not be graded. It will enable you to get ready for the prelab.

You have already generated the **.axf** file from the Keil in PreLab #004. You can directly use this file on the QEMU environment.

- Open the Keil.
- Open the project you did on the PRELAB #004.
- Open Qemu Environment.

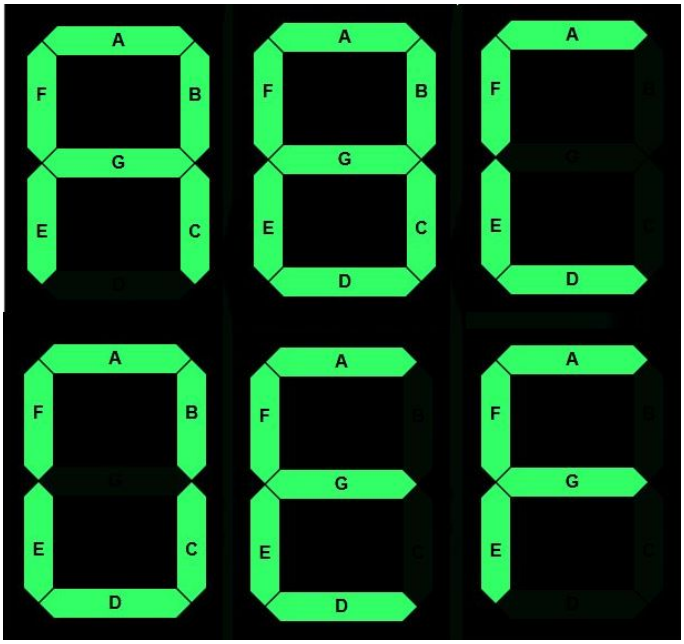
Observe that everything works as it did in the Prelab #004.

2) Using 7-Segment Display *(40 minutes) - 8 pts*

This part will be graded.

a. Coding Part

In Moodle there is a quiz for this lab. The pin values for the 7-Segment Display and Push Button Pin will be generated randomly. You will use 7 pins as output and 1 pin as input. (They are random so if you get the same port and pin number, use the next pin number). At the start, the display will show the A letter and wait. After the push button is pressed, the letters on the display will change with the A - B - C - D - E - F - A ... sequence. The change interval is approximately 1 second. When the push button is pressed, the display will go to the initial state which is in the waiting state with only showing the A letter. Your 7-Segment Display is a Common Cathode.



b. Moodle Quiz Part

Answer the questions in Moodle Quiz. *2 pts*

c. Circuit Part

You should build the circuits for the 7-Segment Display.

You will submit three files: 6 *pts*

LAB<exp num>_<StudentID1>.axf (This will be generated **.axf** file)

LAB<exp num>_<StudentID1>.lpc_vcf (This will be exported circuit file)

LAB<exp num>_<StudentID1>.zip (This will be **source files of project**, **not the whole project**)