

Embedded System & Computer Organization

Assignment 1

This assignment is worth 20% of your total score for this course.

Demonstrate your solutions and get them evaluated by one of the TAs in the respective lab session.

Four points for the 4th problem, each of the other problems is worth 3 points. No points if you miss the submission date

Reference:

1. My Annotated ARM Notes
2. ARMSIM User Guide

The above two can be accessed from cloud storage.

3. <https://www.daniweb.com/programming/software-development/threads/467821/first-program-in-arm-assembly-unable-to-write-to-file>

Problems:

1. Write an ARM assembly program to WRITE to a file. Write 1 line of text to this file. Make sure you close the file after you write to it. **Submission due Jan 24th or 25th**
2. Write an ARM assembly program to read from the file that you created in Problem 1. Open this file in READ mode, READ and dump its contents to STDOUT. **Submission due on Jan 24th or 25th.**
3. Write an ARM assembly program to receive 3 different Integers (Comma separated) inputs from a file. After receiving all the three values, print them on STDOUT on separate lines. **Submission due on Jan 24th or 25th.**
4. In some single threaded embedded system applications, we use timers built using assembler subroutine. This type of routines is sufficient and reasonably accurate for many applications. Develop a subroutine “*Stimer*” that can create 1000 (approximately) Clock cycles delay. Using this subroutine write another subroutine “*Ltimer*” that can create delay which are multiples of 10000 (approximately) cycles. The *Ltimer* is simple and no need to other timers. The *Ltimer* can be used to create periodic scan of I/O devices or any periodic activity. **Submission due on Jan 31st or Feb 1st.**
5. Write ARM assembly code that can make the two red LEDs in *Embest Plugin of ARMSIM* to glow alternatively at observable rate. Your code should be user configurable for various rate. User timer developed in problem 4. **Submission due on Feb 21st or 22nd.**
6. Write ARM assembly code that can make the 8-segment display to go from 0 to 9 at an observable rate. Your code should be user configurable for various rate. **Submission due on Feb 21st or 22nd.**

Assignment 2

This assignment is worth 20% of your total score for this course.

Demonstrate and get it evaluated by one of the TAs before the end of the respective lab session.

Each problem is worth 3 points except for the first; it is worth 11 points. No points if you miss the submission date

1. Develop and demonstrate traffic light operation using PIC assembly. Create suitable delays using **a sub-routine**.
Due on Feb 28th or March 1st
2. Develop and demonstrate traffic light operation using PIC assembly. Create suitable delays using **Timer2**. **Due on March 3rd or 4th**.
3. Create a PIC program that does both (1) & (2) with 2 different **coordinated** traffic lights. The two lights are at an intersection servicing two orthogonal roads. **Due on March 3rd or 4th**.
4. Compute the Interrupt handling time for **Timer2**. **No due date and no submission for this**.
5. This problem requires submission. The due date is 28th and 29th of March; if this date coincides with Quiz 2 then week after that. This also a group assignment, a maximum of 3 people in a group. You decide the group. Demonstrate PIC I²C READ with PIC SDE tool. It is not complex, the code is there, and did walk you through the code in the class.