15-348 Embedded Systems
Spring 2017
Assignment 2
Due Date: February 15, by 10pm

This is a programming homework. You should also demo your code to the TA or course instructor on or before due date. Submit all .c and .asm files zipped as a single file on autolab.

Task 1:

(30 pts) Programming:

1. Configure PORT D0 – D3 to be outputs
2. Configure PORT E1, F0, and F4 to be inputs to enable onboard push buttons
3. Connect the provided push button to Port E1
4. Connect PORT D0 – D3 to the four LEDs provided to you.
5. Write an assembly program to do the following:

    - N = Read the number of times Push Button 1 is pressed, then released. Each time Push Button is pressed and released, increment N by 1.
    - When Push Button 2 is pressed, find the sum of all numbers from 1 to N on the four LEDs. Image that each LED represents one bit of this sum and the four LEDs combined together form a four bit number
    - If the Sum cannot be represented by four bits, then turn on the red LED.
    - If Push Button 3 is pressed and released, turn off all LEDs and set N to 0. Functionality for Button 1 and 2 should work the same as before.
    - **Please demo your working code to the instructor or the TA**

Task 2:

(30 pts) Programming:

1. Configure PORT E1, F0, and F4 to be inputs to enable onboard push buttons
2. Connect the provided push button to Port E1
3. Connect PORT D0 – D3 to the four LEDs provided to you.
4. Configure Port E2 to be output.
5. Connect Port E2 to the motor provided.
6. Write an assembly program to do the following:

    - N = Read the number of times Push Button 1 is pressed, then released. Each time Push Button is pressed and released, increment N by 1.

- When Push Button 2 is pressed, set N to be N%7 and turn the motor on based on the following criteria
    - N = 0 Motor does not move
    - N = 1, Motor rotates clockwise at lowest speed
    - N = 2, Motor rotate clockwise at medium speed
    - N = 3, Motor rotate clockwise at highest speed
    - N = 4, Motor rotates counter-clockwise at lowest speed
    - N = 5, Motor rotate counter-clockwise at medium speed
    - N = 6, Motor rotate counter-clockwise at highest speed
    - Lowest, medium, and highest are subjective, but there should be a clearly observable difference between these three speeds.
- Pressing Button 3 should set N to 0 and stop the motor. The functionality of Buttons 1 and 2 should not be affected by this action.

- **Please demo your working code to the instructor or the TA**