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Laboratory 2: "MSP432"

Pre-lab Submittal:	None.
Demonstration and Submittal:	Due by the end of the Week 3 lab session day. Late submittals will be penalized per the course syllabus.

Objectives

- Gain experience with the MSP432 microcontroller and its peripherals.

This is an individual lab. Each student must independently complete this assignment. While discussing ideas and potential solutions with your classmates is permitted, sharing code is prohibited.

All software must be written in C using the CCS IDE.

For this laboratory, you will interface the MSP432 to the LCD, an analog input signal, and will generate a PWM output.

Specifications:

- Connect a potentiometer to 3.3V and ground and connect its wiper terminal to an analog input on the MSP432.
- Perform Analog-to-Digital (A/D) conversions on this analog input with the following specs:
 - Use 'single-channel single-conversion' mode
 - Use 10-bit resolution.
 - Use a timer and its interrupt to periodically initiate a new A/D conversion. **In your report, indicate what period you used and why.**
 - Use the A/D interrupt to handle getting the new conversion value when it is done.
- Treat the A/D reading as a percentage. Use a timer to generate a PWM signal with a duty cycle corresponding to this percentage but inverted, i.e., if the input is at 20%, set the duty cycle to 80%, if at 70%, set the duty cycle to 30%, etc. Use a scope to observe and measure this signal. (If you also connect an LED with series limiting resistor to this output, you can get a qualitative indication of the duty cycle.)
- On the LCD, display the raw A/D reading and the calculated duty cycle of the PWM signal. Only update the LCD with new values when SW1 is pressed. Use an interrupt with P1.1 to initiate this action. Do not call the LCD functions within the ISR.

Submittal

In your lab report, include:

- Cover page per report guidelines
- Printed copies of your source code
- Schematic diagram
- Scope plots of representative PWM outputs and the corresponding analog input signal