Kevin Tavara

ECE-447-201

04.21.2021

Lab 8: ADC and LDR

Introduction: The purpose of this lab is to implement a program that will constantly read the voltage of a node in the voltage divider circuit and to display this value on the LCD of the MSP430. While also configuring the LED on the MSP430 to turn on once every 1/10 of a second using a timer and using another timer generate a signal that's frequency is calculated using the current displayed value. The SW1 button on the MSP430 will disable the buzzer.

Hardware Design:
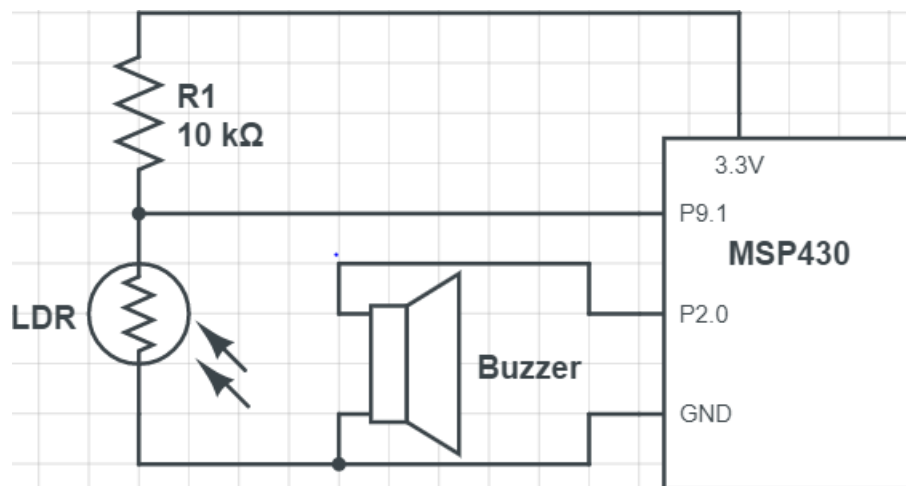
Software Design:
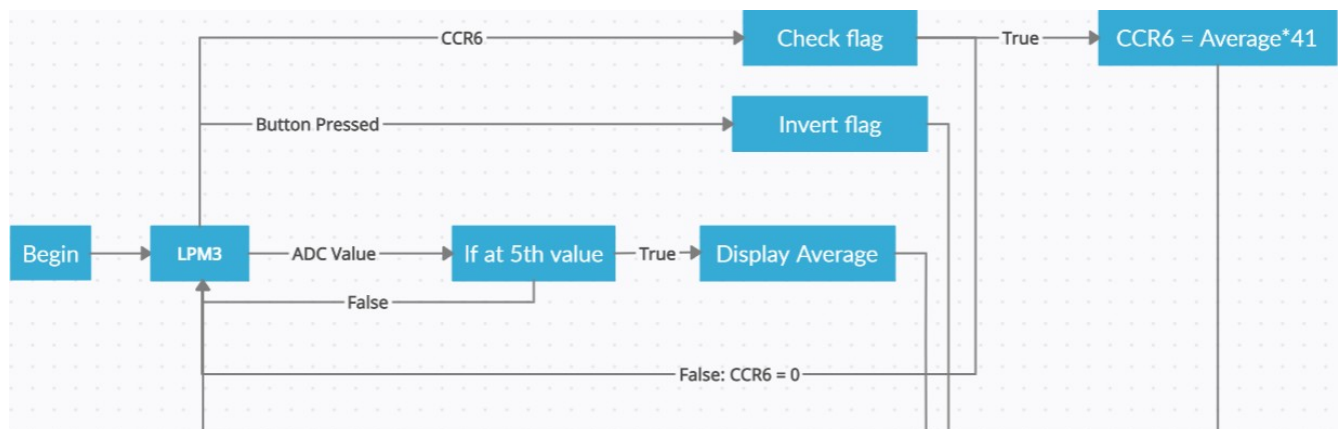
Conclusions: I successfully managed to implement all the desired functions of the lab. The button disables the buzzer. The buzzers frequency is calculated using the current light level. The LCD displays the current value of the voltage divider node.

Questions:

1) Because I needed to read one ADC value every 1/10 of a second I configured timer B0 using SMCLK with a divider of 8 and setting TB0CCR0 to 409 because ((1MHz/8)/ 409) is approximately equal to 1/10 of second and the interrupt enabled.

2) The timer that makes the buzzer produce the noise is put in Set/Reset mode with the interrupt enabled. Now when SW1 is pressed TB0CCR6 is set to 0, otherwise TB0CCR6 will be equal to the displayed value multiplied by 41, reason for using 41 is it seems to map to 3kHz at max voltage more accurately.

3) The formula I'm using is Voltage = Binary Value / 1250, I developed it using my multimeter to track the current voltage and the LCD on the MSP430 to display the current binary value of the voltage.

Demo Video: https://youtube.com/shorts/tvKbazdt-jY?feature=share