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CMPE 443 PRINCIPLES OF EMBEDDED SYSTEMS DESIGN

PRELAB #009 “ADC”

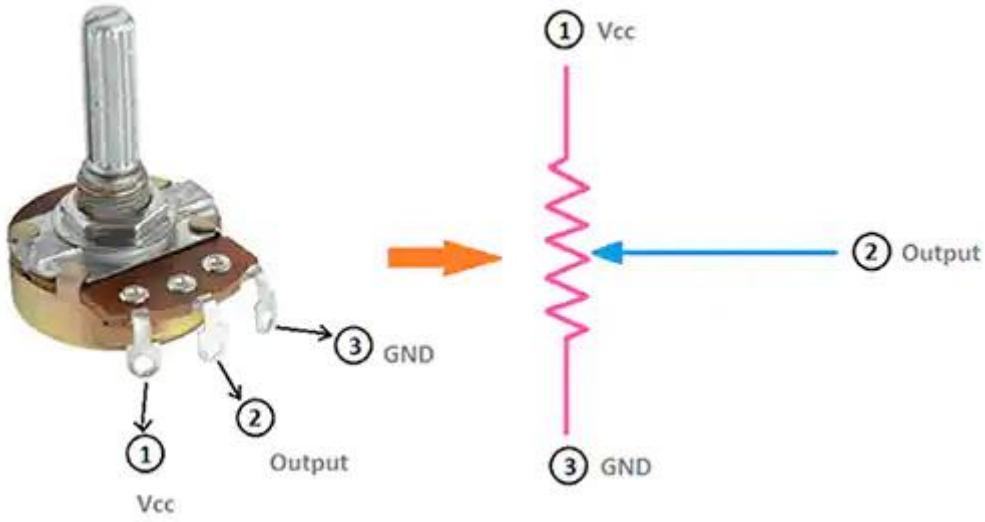
1) Problem Definition

In this prelab, you will use a potentiometer with 3 LEDs. According to the potentiometer value, you will change the LED's state.

- R - G - B LEDs are ON. (Potentiometer Value > 3/4 Max Value)
- G - B LEDs are ON, R LED is OFF. (3/4 Max Value >= Potentiometer Value > 2/4 Max Value)
- B LED is ON, R - G LEDs are OFF. (2/4 Max Value >= Potentiometer Value > 1/4 Max Value)
- R - G - B LEDs are OFF. (1/4 Max Value >= Potentiometer Value)

You will use ADC Interrupt.

2) Potentiometer



VCC should be connected to the 3.3V of the board. GND is connected to GND. The output of the potentiometer should be connected to a suitable pin you selected.

3) ADC

- Which ADC you selected? ADC1
- Which ADC channel you selected Channel 1 - ADC12_IN1
- Which pin you selected? PC0

- Enable Clock for ADC `RCC_AHB2ENR |= 1 << 13;`
- Select ADC clock as System clock `RCC_CCIPR1 |= 11 << 28;`

- Change Pin Mode to Analog `GPIOC->MODER |= (11);`
- Change Pin Pull/Down to no pull-up no pull-down

`GPIOC->PUPDR &= ~(11);`

- Change Regular channel sequence length to 1 conversion (SQR)

`ADC1->SQR1 &= ~(1111);`

- Add the channel to first sequence (SQR) `ADC1->SQR1 |= (1 << 6);`
- Configure for Single conversion mode (CFGR) `ADC1->CFGR &= ~(1 << 13);`
- Disable Deep-power-down for ADC (CR) `ADC1->CR &= ~(1 << 29);`
- Enable ADC Voltage regulator (CR) `ADC1->CR |= (1 << 28);`
- Enable ADC (CR) `ADC1->CR |= 1;`

- Enable interrupt for end of regular conversion (IER) `ADC1->IER |= (1 << 2);`
- Start regular conversion of ADC (CR) `ADC1->CR |= (1 << 2);`

4) Code

In this prelab, you need to write code as described at the problem definition.

5) Submission

You will submit one zip file which contains this document and your project (all the files with the last configuration)

The naming of the zip file should be:

PRELAB<exp num>_<StudentID>.zip

6) Related Videos and Links

ADC:

https://www.youtube.com/watch?v=DfpyUWQlQKM

ADC Example Code:

https://embeddedexpert.io/?p=200