Darius Quick

9/11/25

Milestone 1 Lab Explanation

1. At what frequency can you see the LED start to blink?

You can see the LED start to blink at 60 Hz but it is easier iif you reduce it below 30Hz. At 60Hz you are able to see it as fading smoothly rather than blinking. At 30 Hz you can see the LED blink visibly.

1. At what duty cycle is the intensity of the LED perceptibly diminished from the initial 50% duty cycle?

The initial duty cycle is 0% at start, but if you consider mid-range (~50% duty cycle), the LED brightness will start to appear dimmer as the duty cycle drops below ~50% or increases toward 100%. You will start to notice a visible dimming around 40–45% duty cycle when decreasing, and 60–65% when increasing.

1. When changing the duty cycle of the PWM, the loop used an increment of 5 every tenth of a second. Was this perceptibly smooth? If not, what could you change to improve the visual response? Why?

With increments of 5 every 0.1 seconds, the LED fade is reasonably smooth, but if you are perceptive, you might notice slight steps in brightness. To improve smoothness:

* Reduce the increment (range(0, 101, 1))
* Reduce the sleep interval (time.sleep(0.05) or 0.02)

This increases the number of intermediate brightness levels, making the fade appear more continuously allowing you to see smaller changes in brightness more smoothly.

1. What function sets the PWM frequency for a GPIO line?

The function is GPIO.PWM(pin, frequency)

Or

pwm18 = GPIO.PWM(18, 60) # 60 Hz

1. What function sets the duty cycle for a GPIO line?

The function is pwm.ChangeDutyCycle(duty\_cycle)

Or

pwm18.ChangeDutyCycle(dutyCycle)