Kevin Tavara

ECE-350-001

10.07.2020

Lab 2: Servo Actuator Control

Servo Sweep Python Script:

servo1.py servo2.py*

```
1  import RPi.GPIO as GPIO
2  import time
3
4  GPIO.setmode(GPIO.BOARD)
5
6  GPIO.setup(11, GPIO.OUT)
7
8  p = GPIO.PWM(11, 50)
9
10 p.start(1.5)
11
12 try:
13         while True:
14             p.ChangeDutyCycle(0.5)  # turn CCW stop
15             time.sleep(3) # sleep 3 second
16             p.ChangeDutyCycle(9.5)  # turn CW stop
17             time.sleep(3) # sleep 3 second
18             p.ChangeDutyCycle(0.5)  # turn CCW stop
19             time.sleep(0.6) # short stop for sweep
20             p.ChangeDutyCycle(9.5)  # turn CW stop
21             time.sleep(3) # sleep 1 second
22 except KeyboardInterrupt:
23         p.stop()
24         GPIO.cleanup()
```

- Simple code outputting the change in duty cycle to GPIO17.

Servo Protractor Python Script:

servo1.py servo2.py

```
import RPi.GPIO as GPIO
import time

GPIO.setmode(GPIO.BOARD)

GPIO.setup(11, GPIO.OUT)

p = GPIO.PWM(11, 50)

p.start(1.5)

try:
        while True:
            p.ChangeDutyCycle(0.5)  # turn CCW stop
            time.sleep(3) # sleep 3 second
            p.ChangeDutyCycle(1.6)  # turn to 36 degrees
            time.sleep(3) # sleep 3 second
            p.ChangeDutyCycle(3.3)  # turn to 72 degrees
            time.sleep(3) # sleep 3 second
            p.ChangeDutyCycle(5)  # turn to 108 degrees
            time.sleep(3) # sleep 3 second
            p.ChangeDutyCycle(7.5)  # turn to 144 degrees
            time.sleep(3) # sleep 3 second
            p.ChangeDutyCycle(9.5)  # turn CW stop
            time.sleep(5) # sleep 5 second
except KeyboardInterrupt:
        p.stop()
        GPIO.cleanup()
```

- Code written after a lot of trial and error. This code gave the most favorable outcome.

Questions:

1) What is the duty cycle?

Initial duty cycle = 1.5ms; Period = 20 ms; Duty Cycle = (1.5/20) *100 = 7.5%

2) Servo Position Angle vs. Command Duty Cycle Plot: