

ECE 476/676 - Homework #4

Timing, Analog I/O, Motors with Binary Inputs - Due Monday, September 23rd

Analog I/O: Electronic Trombone

Write a Python program to turn your Pico board into an electronic trombone

- When the analog input (joystick) is all the way left, the Pico outputs 220Hz
- When the analog input is all the way right, the Pico outputs 440Hz
- The frequency is proportional to the voltage inbetween

When button GP14 is pressed, output a square wave with the frequency determined by the joystick position

- When released, no sound is output

- 1) Give the resulting Python program
- 2) Test your code at
 - 220Hz (analog input = 0V)
 - 440Hz (analog input = 3.3V)
 - inbetween (check the voltage and frequency)
- 3) Demonstrate your electronic trombone

Electronic Sunflower

Write a Python program so that a digital servo motor points at the sun (or some other light source)

- 4) Design hardware so that the voltage is a maximum (0-3.3V) when pointing at a light source
- 5) Write a Python subroutine to read the voltage from problem #4
 - Check that the number returned is a maximum when pointing at the light source)
- 6) Write a Python subroutine which controls the angle of a DC servo motor
 - Check that you can control the angle of the servo
- 7) Write a Python program that searches for what angle maximizes the output of the light sensor
- 8) Demonstrate your program.