The University of Western Australia
Dept. of Electrical & Electronic Engineering
Prof. Thomas Bräunl

Digital & Embedded Systems
ELEC4403

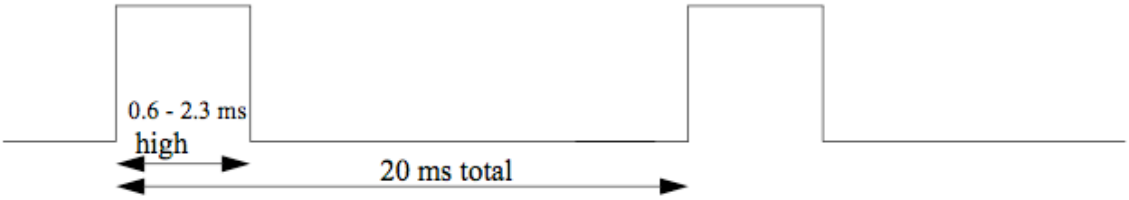
Lab Assignment 5 –Servo **Points: 10**

EQUIPMENT:
Arduino Nano Embedded Controller
USB cable to connect to laptop
Protoboard with cables
4 LEDs with resistors or 7-segment display
1 Servo
1 analog PSD sensor

Control a Servo Actuator from an Analog Sensor

EXPERIMENT 1 (3 points)

Write a program in **C or Python** that will output a repetitive rectangle signal as below with 1ms high and 19ms low.



Display the generated curve on an oscilloscope; there should be a stable signal. Then **connect a servo** to the output line. It should drive to a fixed location.

EXPERIMENT 2 (3 points)

Connect an analog PSD sensor to the Nano controller. Write a **C or Python** program to continuously read its value. Transform the input data range [0..255] to a 4-bit number and display it using 4 LEDs or a 7-seg. display on an output port. (For testing, you can also write back the values via the USB link to your laptop).

EXPERIMENT 3 (4 points)

Combine the two previous experiments as follows:

- In a continuous loop, read the PSD sensor value, then set the servo output accordingly.
- Vary servo up-time output in range 1.0-2.0ms, depending on PSD input.

The servo should move to different positions, depending on the PSD sensor's measured distance.