# EGB240 1B Assessment

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**Sawtooth Falling | 2400fmin | 5200fmax | 25finc**

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Week 5 Lecture Notes

* Conversion between binary and hex

## A screenshot of a cell phone Description automatically generated

* Pulse Width Modulation is a method of driving an analogue system from a digital quantity

A close up of a logo

Description automatically generatedA screenshot of a cell phone

Description automatically generated Low pass filtering can be applied to eliminate the harmonics t and above f(PWM)

* PWM must be kept at 50% for this assignment
* Period of PWM. T(PWM) = Top x T
* Duty cycle = output compare register /Top

Microcontroller I/O

* DDRx, PINx, PORTx
* Reading from PINx. Writing as an output from PORTx
* Polling vs Interrupt design;

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Description automatically generatedPolling is an infinite loop continuously checking if an event has occurred and taking appropriate action.

Disadvantage> Waste processor time

Interrupt driven is when an event occurs, the main program execution pauses and control passes to the interrupt service routine.

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Button Debouncing

* Bounce can happen when opening or closing a switch
* Debouncing can be done via hardware or software solution
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  Description automatically generatedSample the signal then consider stable value

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Description automatically generatedWeek 5 Lectorial

Demo 0

* Load, build and download skeleton code to Teensy
* Source(src) == main C code

Demo 1

* Not pressed 5V. Pressed 0V
* LED output >> PortD
* PortF 7,6,5,4 => 0 inputs
* PortD 7,6,5,4 => 1 outputs

Demo 2

* Period of 1sec. B6 can be configured for OC1B or OC4B is the Jout for this assessment
* Timer control TCCR1A

Normal mode. 3rd mode >> fast PWM

5,4 bits >>

waveform control >> 3,2,1,0

Mode 14 or 15 >> Use mode 15

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Description automatically generatedWe want 1s for T(PWM)

Pre scaler of 256

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Clear >> compare match

Set >> Top

F(pwm) = 1/T

Top = T/ 1.048 x 65535