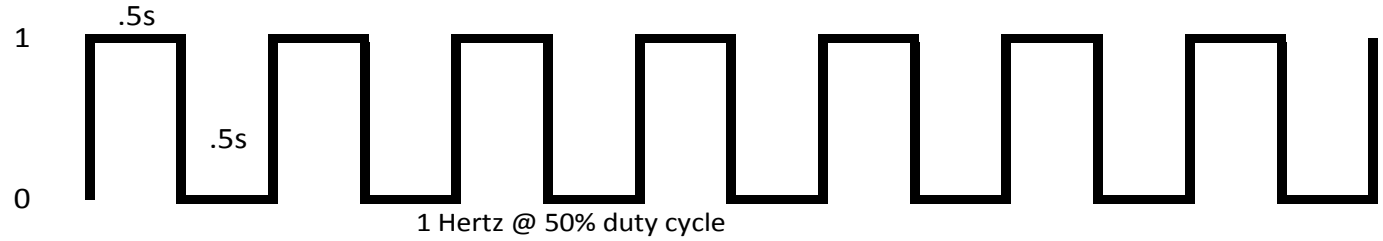
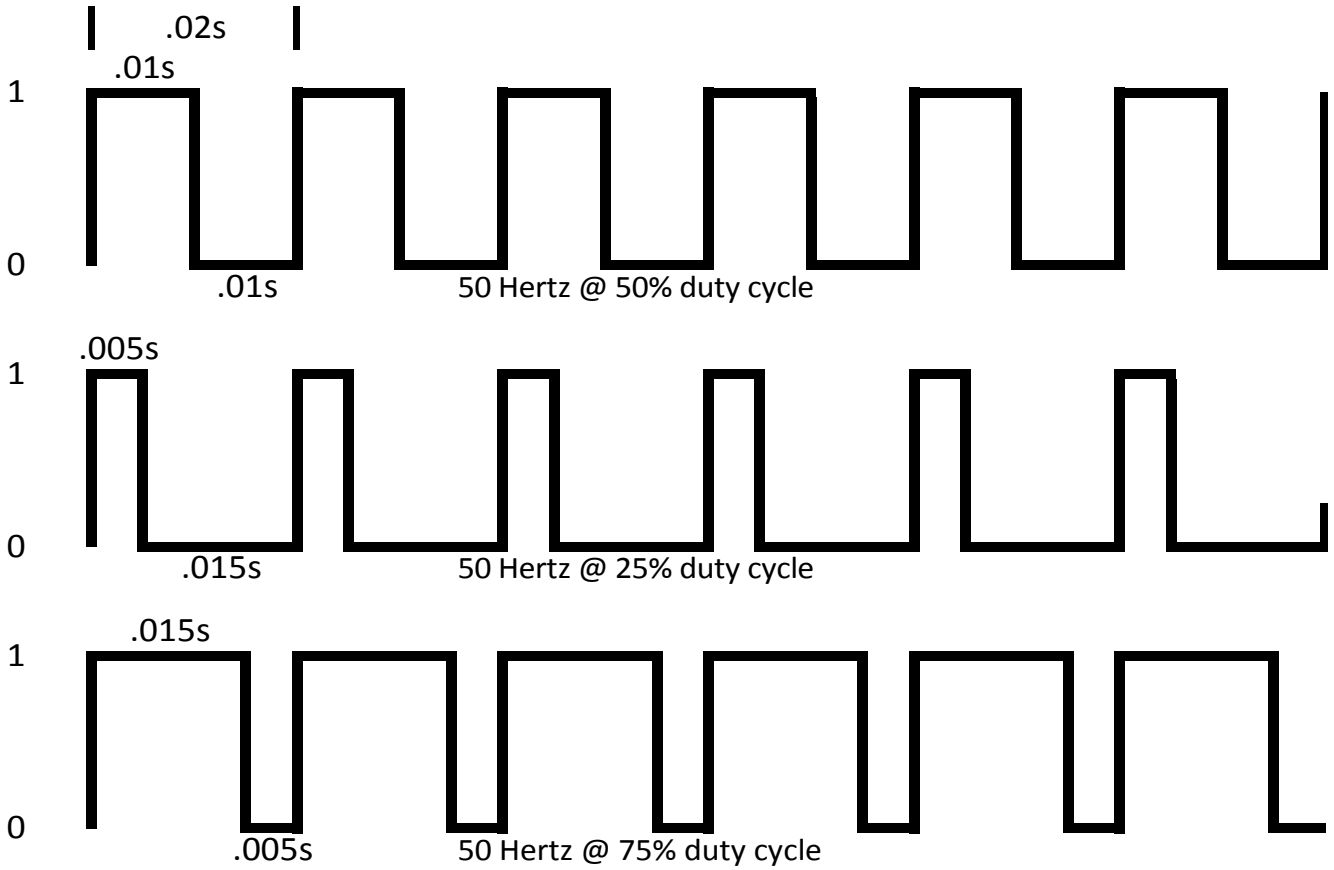
Pulse Width Modulation PWM 6/3/19

Pulse width modulation is the method used to dim lights and control the speed of motors by switching the power on and off for different lengths of time very quickly.

If we turn on an LED for .5 second and then off for .5 second, then the LED is said to have a duty cycle of 50%. It is "active" for 50% of one cycle. The frequency in this case is 1 hertz, one cycle a second.



If we speed up the time, eg increase the frequency, we can no longer detect the individual pulses, however the duty cycle stays the same and we perceive the result as a "dimming" effect. If we then change the percentage of "ontime" to "offtime", we can vary the "dimming" effect.



With a lower duty cycle, the dimmer the LED, or the slower the motor, becomes.

The momentum of a DC motor means that with a PWM signal, the result is a slowing down of the motor. Motors tend to use low frequencies (50hz - 400 hz) and light dimmers can operate at higher frequencies (100hz - 1khz +).