Pulse Width Modulation

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What is PWM?

A way of displaying an analog signal to a digital device

Uses duty cycles of periodic square waves to determine values

For Arduino, PWM pulses at 5 Volts

“Duty Cycle” is a term referring to the percentage of time that the arduino is emitting High. At 50% duty cycle the arduino is mimicking a 2.5V DC source.

Can also approximate AC functions such as a sin wave by varying the duty cycle over the function’s value.
How is a PWM Signal Produced?

Arduino digital logic is very good at sending High (5V) and Low (0V).

If we tell the arduino to emit High and then Low intermittent over some time interval, and then average the value of voltage over that time interval, we can mimic a simple DC signal whose values is this average voltage.

We can also get more complex: we can vary the duty cycle over time to create mimic AC signals.
What Uses PWM?

Arduino: command is analogwrite(value) where value is 0 <= val <= 255

Logic for controlling Servos

Motors

LEDs to give different brightness of RGB light to create other colors

Primitive Digital to Analog Converter, (most include filters to smooth signal)
Sources

- https://acroname.com/articles/description-pulse-width-modulation
- https://www.analogictips.com/pulse-width-modulation-pwm/