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The three interfaces that I will be comparing are PWM, UART, and GPIO. PWM, or pulse-width modulation allows for controlling the power and amplitude of an electrical signal. Pulse-width modulation (PWM) allows for control of the power and amplitude of an electrical signal using a timer. Universal Asynchronous Receiver-Transmitter (UART) allows for the exchange of serial data between two devices, one of which can be input from a user. General-Purpose Input/Output (GPIO) is the most commonly user microprocessor component that allows for the inputs and outputs to be programmed.

Each of these peripheral interfaces have their unique uses and are better suited in different situations. PWM is the best choice for systems that use time to control signals and signal strength, like a crosswalk light operated by showing a green light for 10 seconds, switch to a blinking red light for 5 seconds, and showing a solid red light until a signal is sent and the cycle starts again. UART is the best choice if a specific input is needed, like receiving an OFF signal from a user to turn a light off, and ON to turn a light on. The peripheral that has the widest net of use is GPIO since the inputs and outputs of the pins can be programmed. Their biggest downside to GPIO is that it cannot supply a significant current to outputs, but since a buffer can be added to supply the necessary current, I would pick GPIO if I had to select just one.

That being said, after using GPIO and UART together in the UART2 echo example, I think that using the interfaces together is the best way to program embedded systems.

References

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