Electronic Basics #2

The necessary voltage to operate green LED light is 3.2 volts. By decreasing the supply voltage of LED the brightness will be decreased. If we use fixed voltage like 3,4,5... volts.

There are some problems like if high power LEDs are used, these waste electricity. On the other hand, if we want to use resistance in high power equipment, we have to use large, beautiful and expensive resistors to accept high current which is not user friendly.

How PWM Controls LED Brightness:

- Rapid Switching: The PWM pin rapidly switches between HIGH and LOW states.

- Duty Cycle: The percentage of time the signal stays HIGH in one cycle determines the LED brightness.

- 100% duty cycle → LED is fully ON.

- 50% duty cycle → LED appears half as bright.

- 0% duty cycle → LED is OFF.

- Human Eye Perception: Because the switching happens very fast (typically above 1kHz), our eyes perceive it as a smooth brightness change rather than flickering.

Since you're working on Arduino projects, PWM is perfect for controlling LED brightness smoothly.