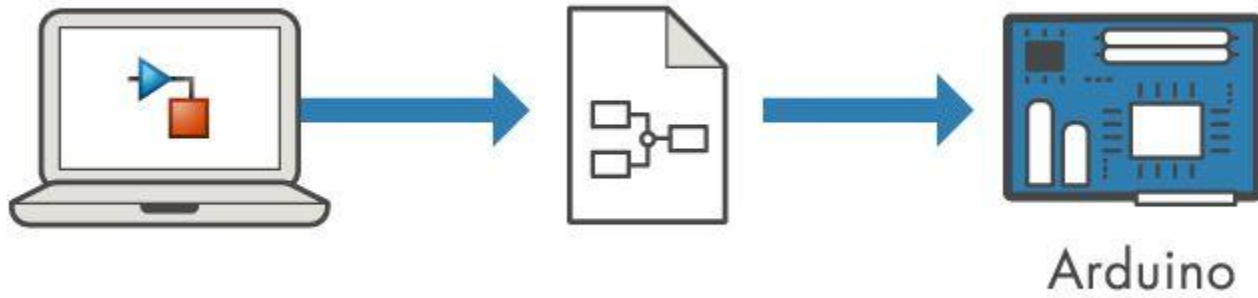


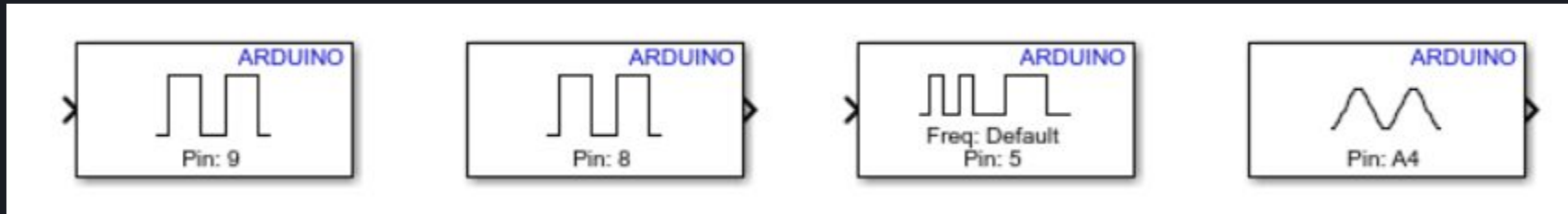
Arduino Simulink Interface Module



Arduino Simulink Interface Module

Blocks

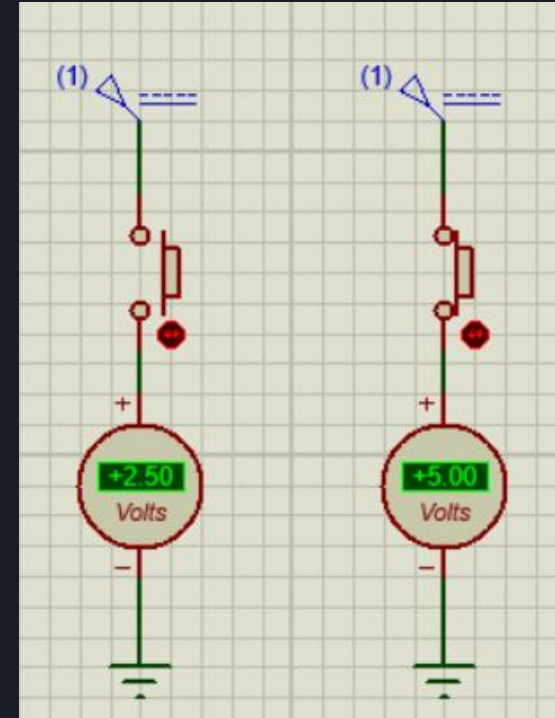
- Digital Input, Output, PWM, Analog



Arduino Simulink Interface Module

Application

- Read Digital Signal
 - Pull-up and pull-down resistors are used in digital circuits.
 - They ensure stable input states and prevent floating inputs.
 - They facilitate interfacing with switches and buttons.
 - Pull-up and pull-down resistors improve noise immunity.
 - They provide known voltage levels to input pins, ensuring reliable circuit operation.

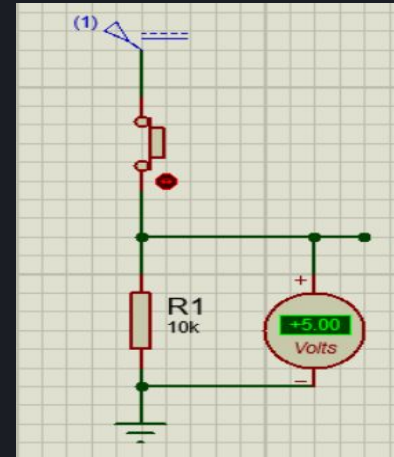
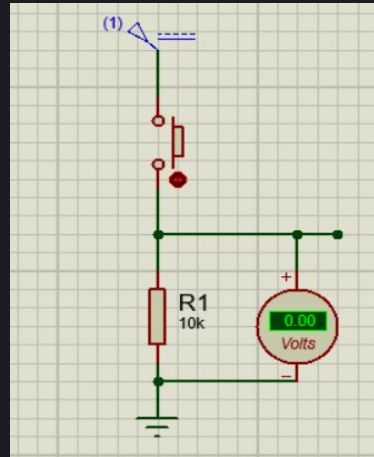


Arduino Simulink Interface Module

Application

- Read Digital Signal

A pull-down resistor is used in digital circuits to ensure that an input signal settles at a predictable LOW state when no external input is present. It connects the input pin to ground, providing a path for current flow when a switch or button is not pressed. This prevents floating inputs and ensures reliable behavior. Pull-down resistors typically have values between 10k ohms to 100k ohms.

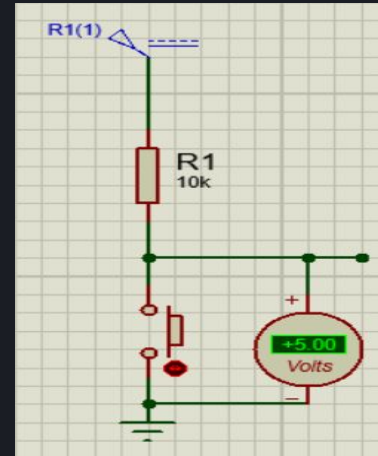


Arduino Simulink Interface Module

Application

- Read Digital Signal

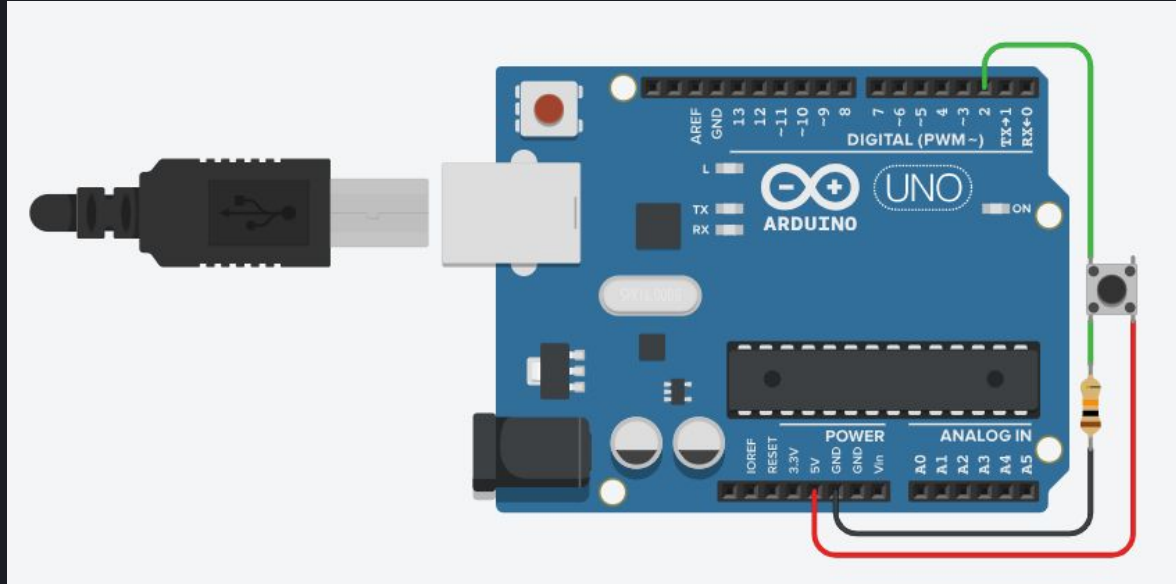
A pull-up resistor is used in digital circuits to ensure that an input signal settles at a predictable HIGH state when no external input is present. It connects the input pin to a voltage supply, providing a path for current flow when a switch or button is not pressed. This prevents floating inputs and ensures reliable behavior. Pull-up resistors typically have values between 10k ohms to 100k ohms.



Arduino Simulink Interface Module

Application

- Read Digital Signal

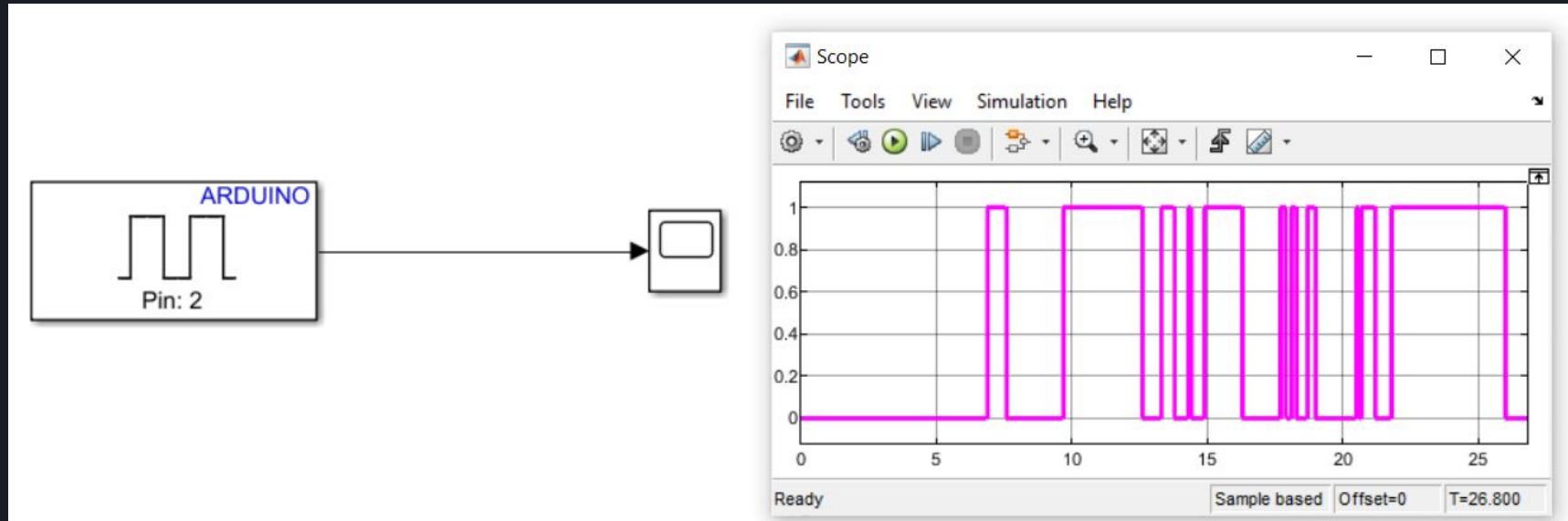


Model-Based Development Program

Arduino Simulink Interface Module

Application

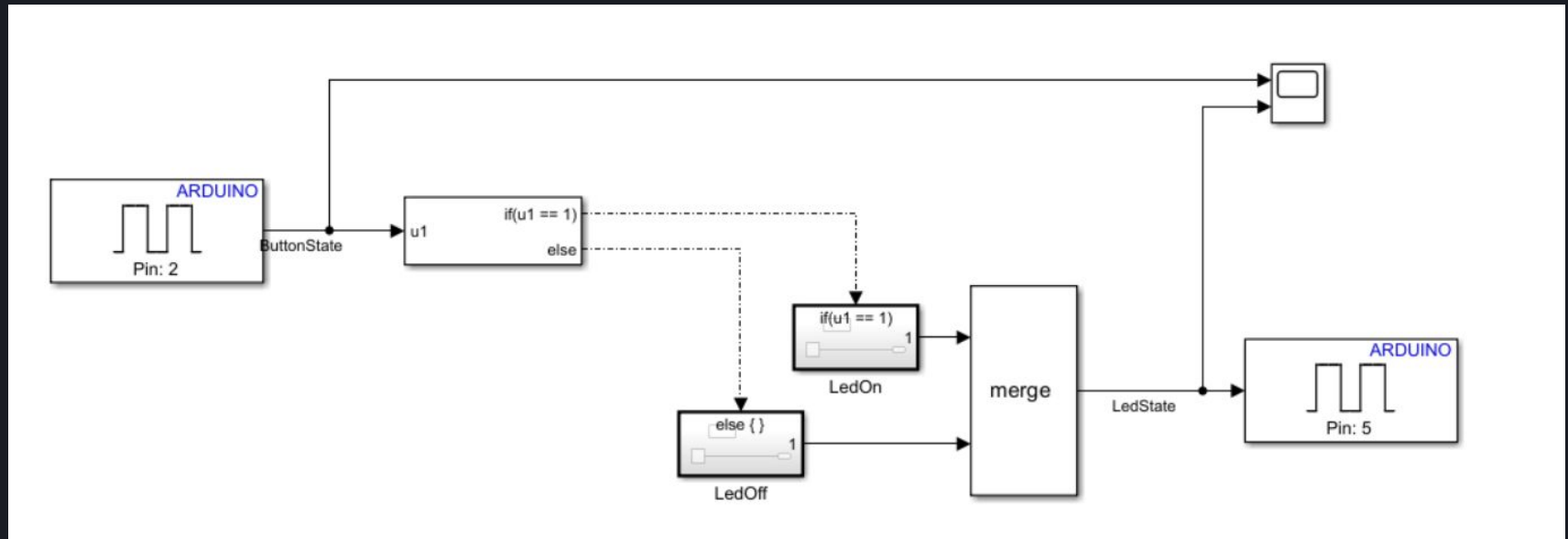
- Read Digital Signal



Arduino Simulink Interface Module

Applications on Digital Input/Output

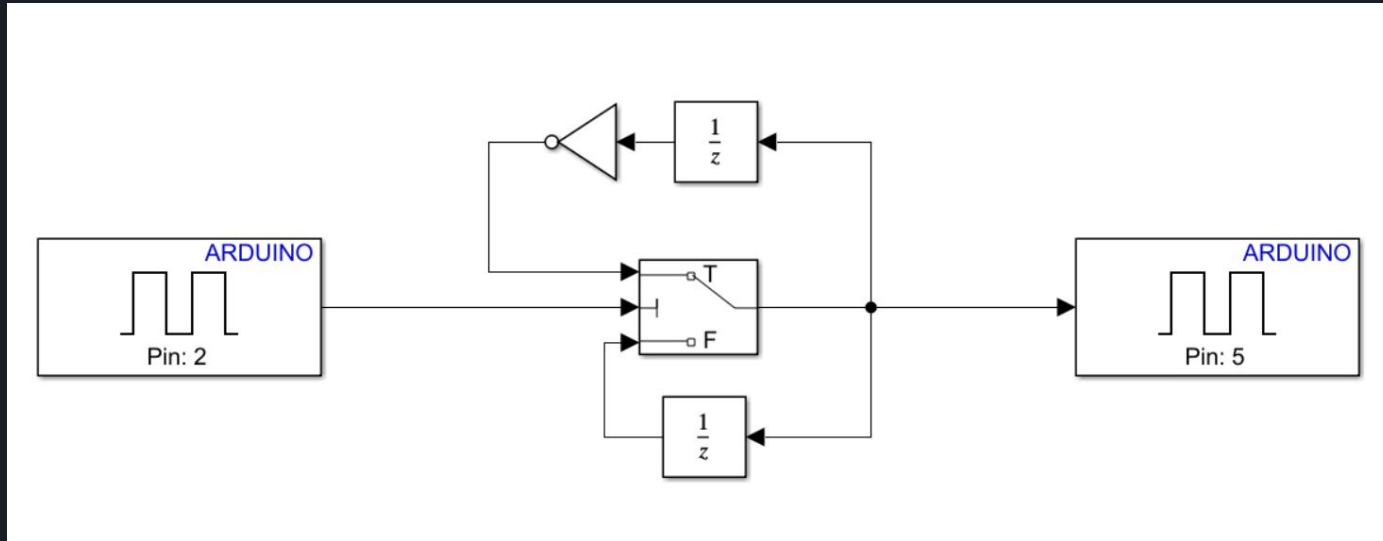
- ON/OFF Using Push Button



Arduino Simulink Interface Module

Applications on Digital Input/Output

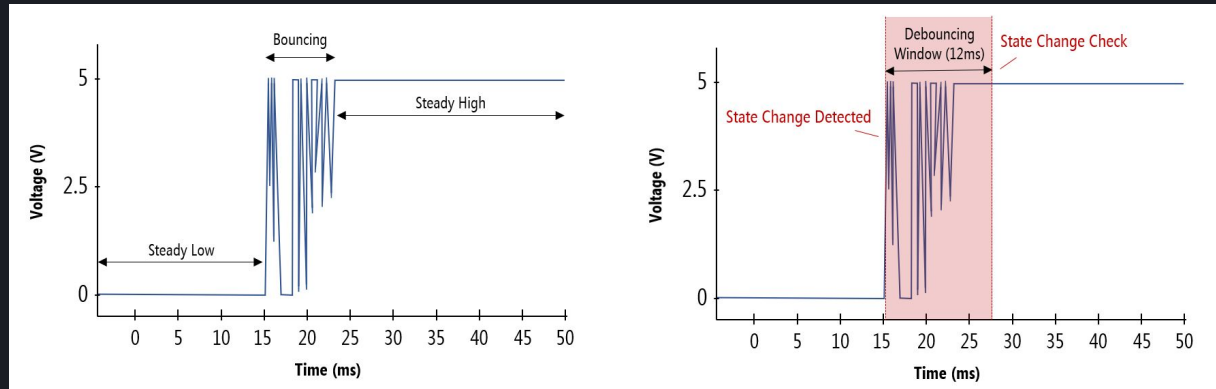
- Toggle Led Using Push Button



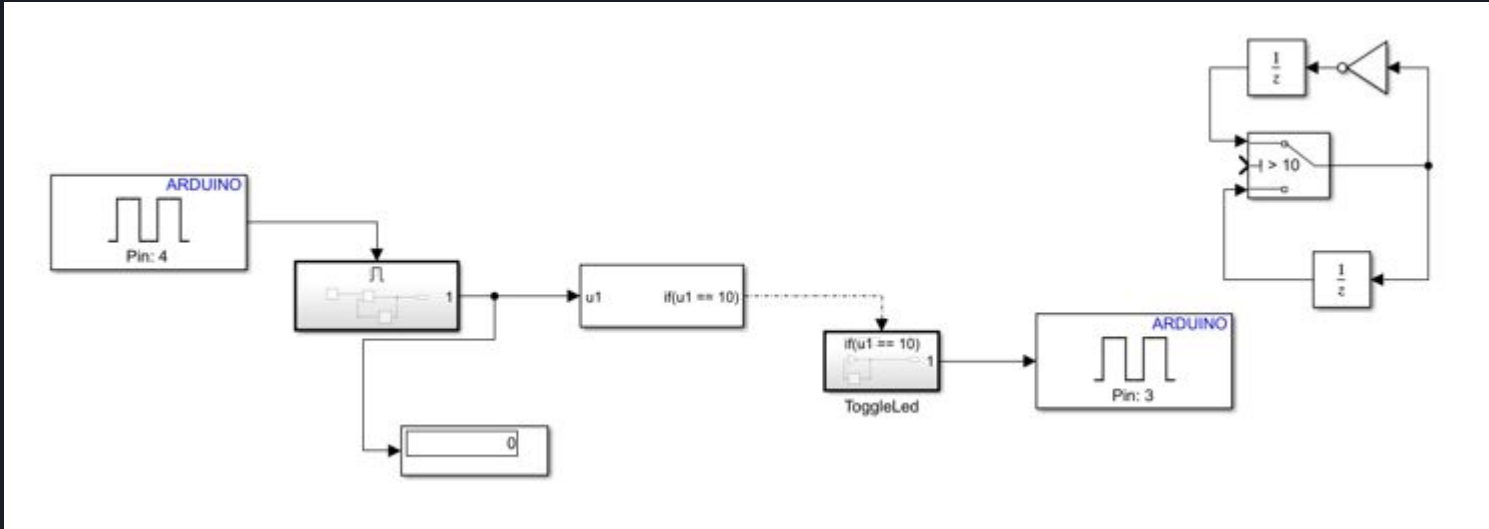
Arduino Simulink Interface Module

Application

- Read Digital Signal
 - Debouncing is a technique used to remove or reduce the effects of mechanical bouncing from switches or buttons.
 - Mechanical bouncing occurs when switch contacts rapidly transition between open and closed states.
 - Debouncing prevents false triggers and erratic behavior in digital circuits.
 - It can be implemented using hardware components or software algorithms.
 - Debouncing ensures accurate and reliable input detection in electronic devices.



Read

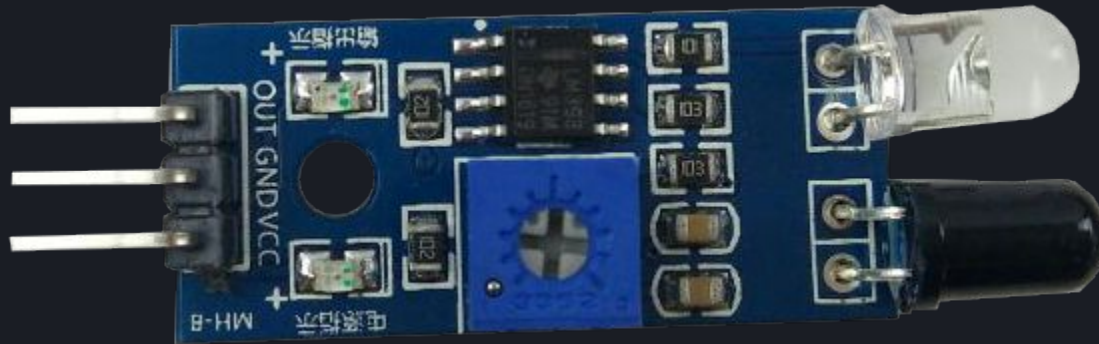


Arduino Simulink Interface Module

Applications on Digital Input/Output

- Read Signal From IR Sensor

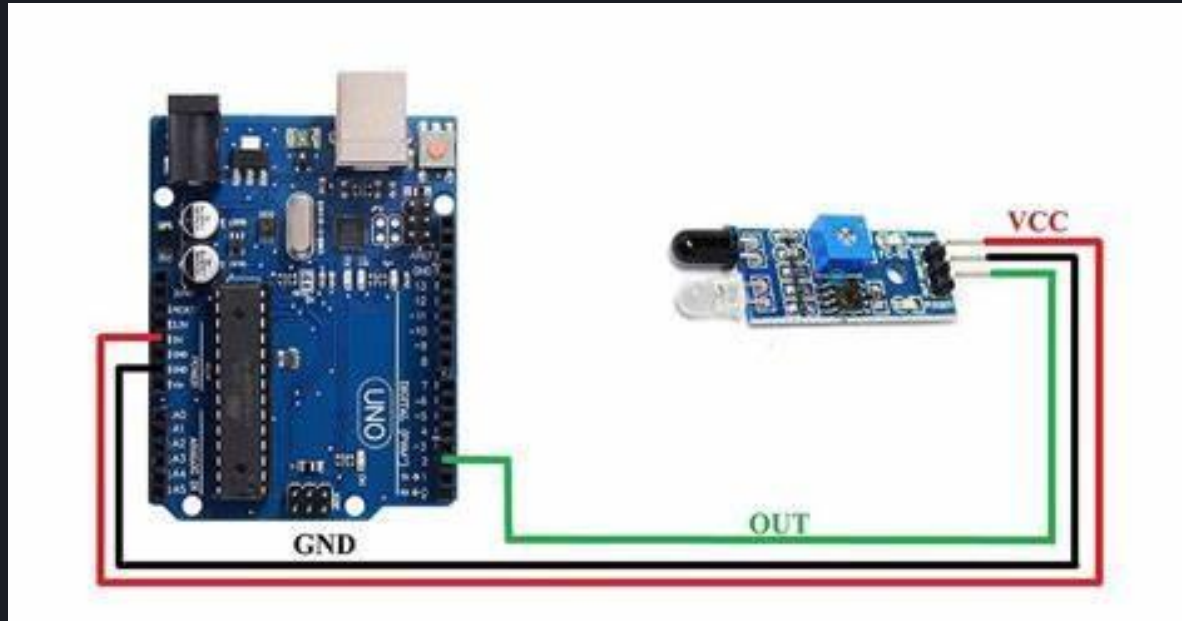
An Infrared (IR) sensor detects infrared radiation emitted by objects. It consists of an emitter and a detector. Types include passive and active sensors. Applications include proximity sensing, motion detection, temperature measurement, and remote control. They offer non-contact operation, sensitivity, and fast response times.



Arduino Simulink Interface Module

Applications on Digital Input/Output

- Read Signal From IR Sensor

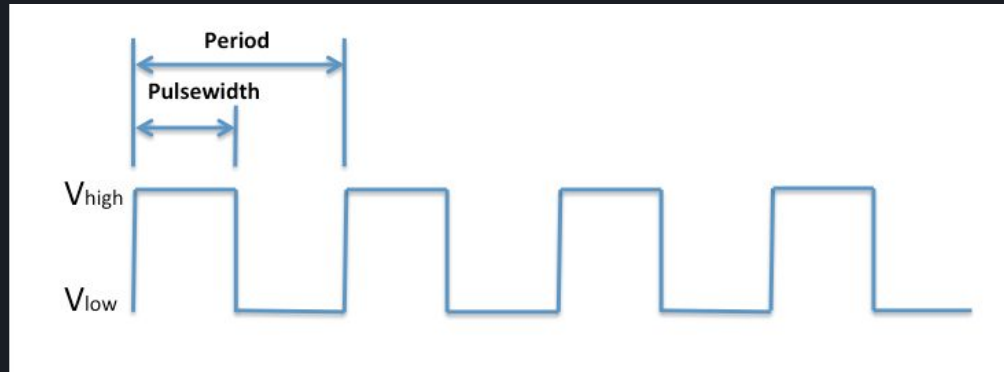


Arduino Simulink Interface Module

Applications on Digital Input/Output

- Pulse Width Modulation (PWM)

Pulse Width Modulation (PWM) is a technique used in electronics to generate analog-like signals using digital means. In PWM, a digital signal of fixed frequency is modulated to vary the duty cycle, or the proportion of time the signal is high (ON), within each period. This variation in duty cycle allows the average voltage or power delivered by the signal to be controlled, effectively simulating an analog voltage or signal.



Arduino Simulink Interface Module

Applications on Digital Input/Output

- Pulse Width Modulation (PWM)
 - Fixed Frequency Signal: A digital signal with a fixed frequency is generated, typically by a microcontroller or a specialized PWM generator circuit.
 - Duty Cycle Variation: The duty cycle of the signal is varied by changing the duration of time the signal is ON (high) within each period. This is achieved by controlling the duration of the pulse width.
 - Average Voltage or Power Control: By adjusting the duty cycle, the average voltage or power delivered by the PWM signal can be controlled. A higher duty cycle results in a higher average voltage or power, while a lower duty cycle results in a lower average voltage or power.

Arduino Simulink Interface Module

Applications

- Pulse Width Modulation (PWM)

Applications:

- PWM is widely used in various applications such as motor speed control, LED brightness control, audio signal generation, and power regulation.
- For example, in motor speed control, the PWM signal is used to control the speed of a motor by varying the average voltage supplied to it.

Advantages:

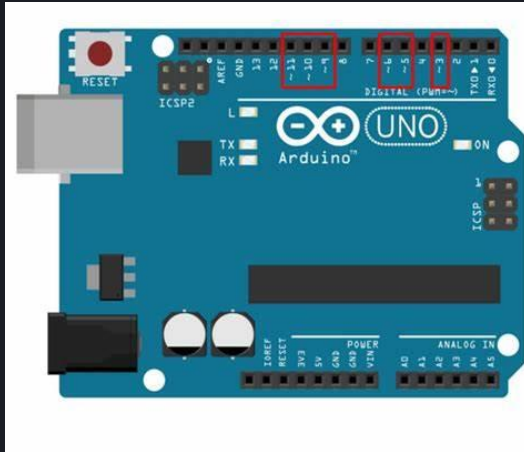
- PWM offers several advantages, including efficient use of power, precise control of average voltage or power, and compatibility with digital control systems.
- It allows the simulation of analog signals using digital components, eliminating the need for dedicated analog circuits in many applications.

Arduino Simulink Interface Module

Applications on Digital Input/Output

- Pulse Width Modulation (PWM)

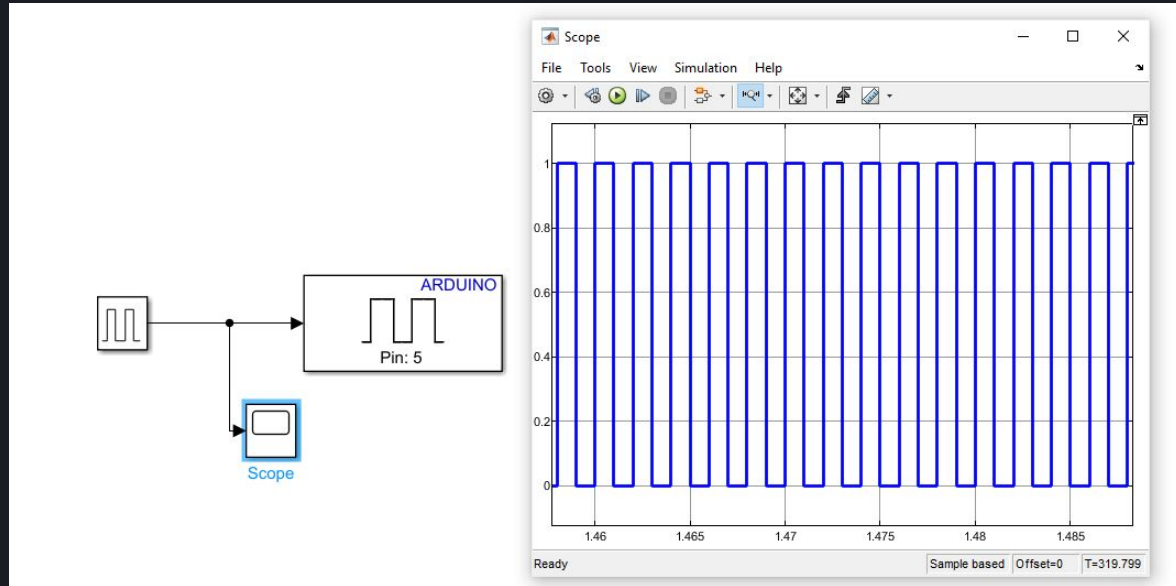
Overall, PWM is a versatile and widely used technique in electronics for generating analog-like signals with digital components, enabling precise control and efficient use of power in various applications.



Arduino Simulink Interface Module

Applications on Digital Input/Output

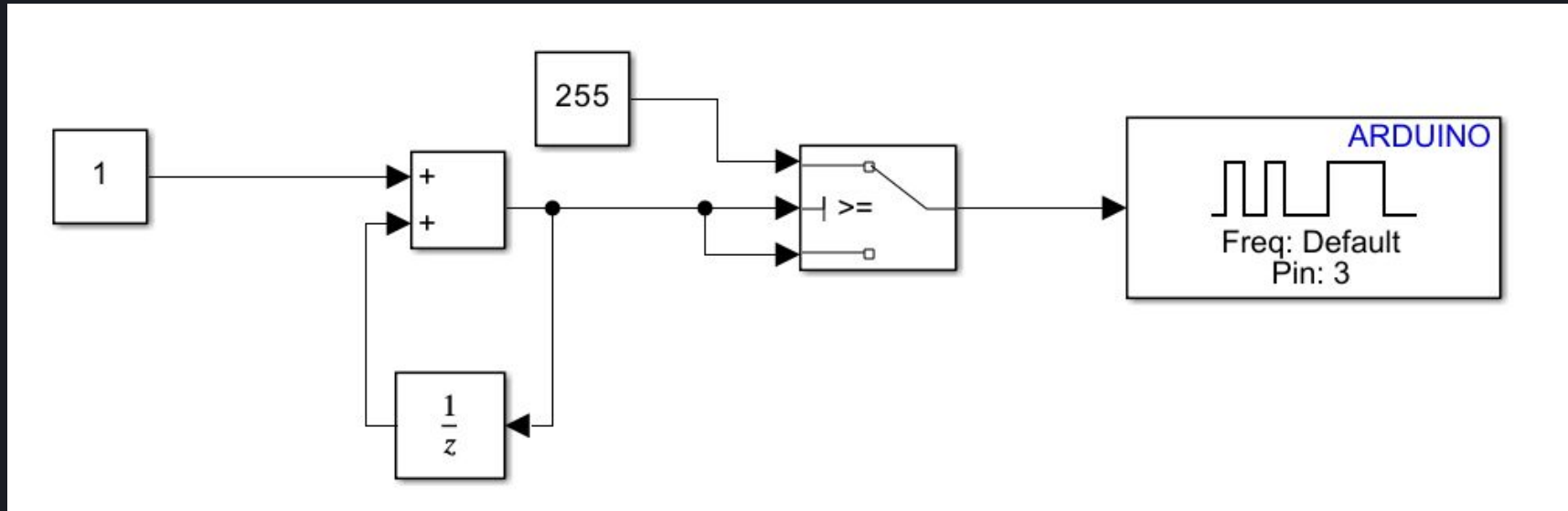
- Pulse Width Modulation (PWM)



Arduino Simulink Interface Module

Applications on Digital Input/Output

- Pulse Width Modulation (PWM)



Arduino Simulink Interface Module

Applications on Digital Input/Output

- Control Servo Motor

A servo motor is a type of motor that is controlled with high precision to achieve specific angular positions. Here's an explanation of how servo motors work and their characteristics:

Working Principle:

- Servo motors contain a small DC motor, a gear train, a position sensor (such as a potentiometer), and control electronics.
- The position sensor provides feedback to the control electronics, allowing the motor to accurately maintain or move to a desired position.
- The control electronics compare the desired position (input signal) with the current position (feedback signal) and adjust the motor's speed and direction to minimize the difference between them.

Arduino Simulink Interface Module

Applications on Digital Input/Output

- Control Servo Motor

Characteristics:

- Precision Control: Servo motors offer precise control over angular position, making them suitable for applications requiring accurate positioning, such as robotics, CNC machines, and camera gimbals.
- Continuous Rotation: While traditional servo motors are designed for limited-range motion (typically 180 degrees), continuous rotation servo motors are modified to rotate continuously in either direction.
- Torque: Servo motors provide a relatively high torque output compared to their size, allowing them to move loads efficiently.
- Feedback Mechanism: The inclusion of a position sensor enables servo motors to provide closed-loop control, ensuring accurate positioning even in the presence of external disturbances.
- Ease of Use: Servo motors are easy to control and integrate into electronic systems, often requiring only a PWM (Pulse Width Modulation) signal to specify the desired position.

Arduino Simulink Interface Module

Applications on Digital Input/Output

- Control Servo Motor

Applications:

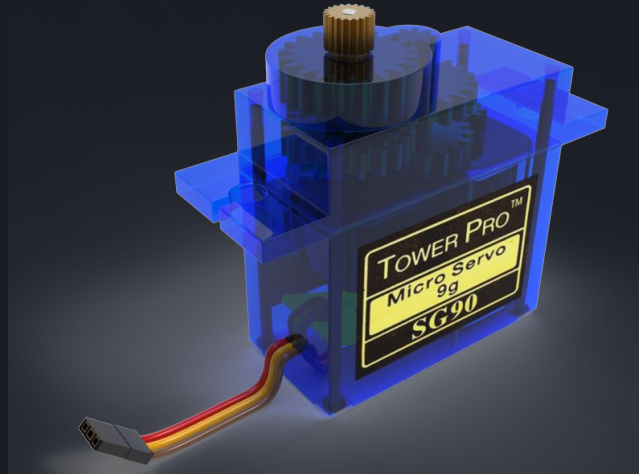
- Robotics: Servo motors are commonly used in robotic arms, grippers, and joints to precisely control the movement of robotic components.
- Remote-Controlled Vehicles: Servo motors are used in RC cars, boats, airplanes, and drones to control steering, throttle, and other mechanisms.
- Automation: Servo motors are employed in industrial automation systems for tasks such as conveyor belt control, robotic assembly, and packaging.
- Model Making: Servo motors are popular in hobbyist and educational projects, such as model trains, airplanes, and robotic kits, due to their precision and ease of control.

Arduino Simulink Interface Module

Applications on Digital Input/Output

- Control Servo Motor

Overall, servo motors are versatile devices that offer precise control over angular position, making them indispensable in a wide range of applications requiring accurate motion control.

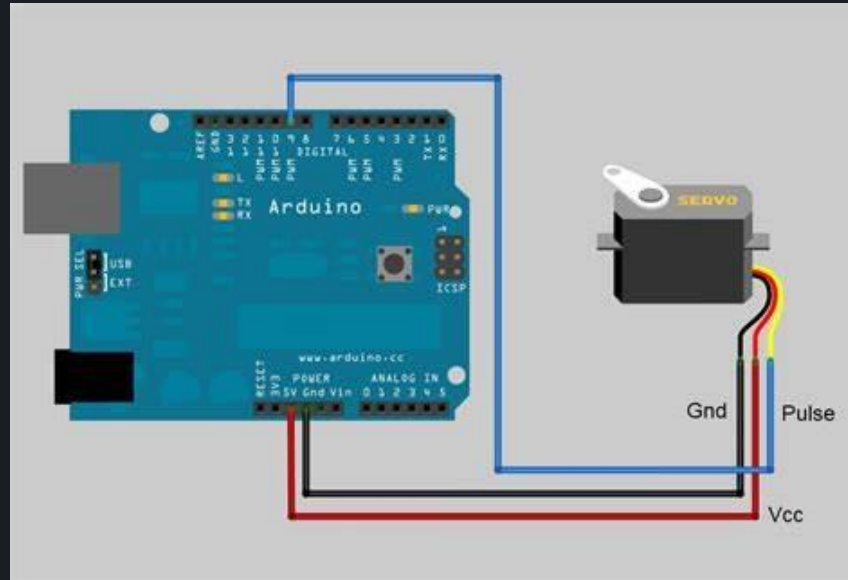


Model-Based Development Program

Arduino Simulink Interface Module

Applications on Digital Input/Output

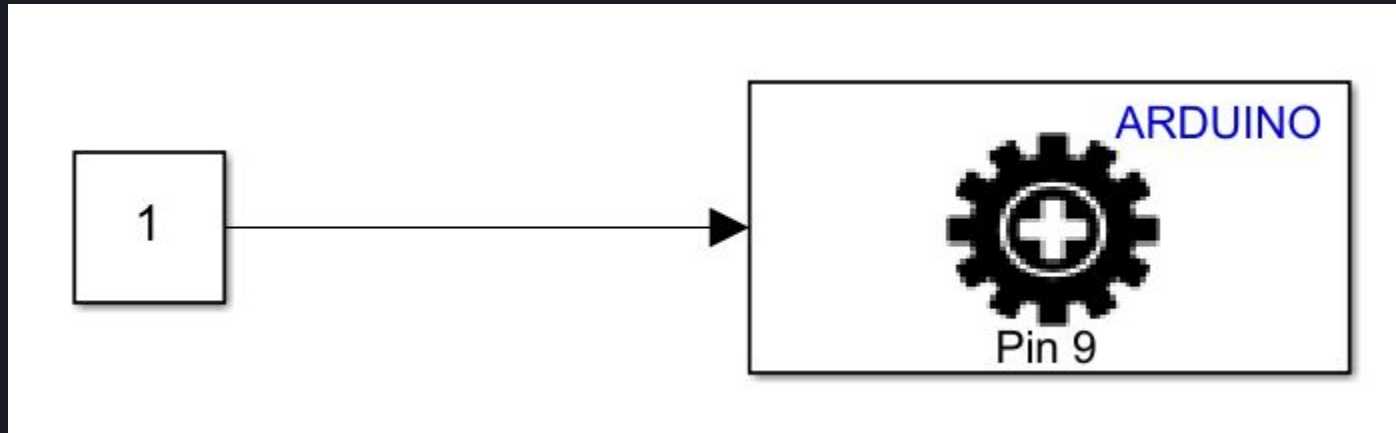
- Control Servo Motor



Arduino Simulink Interface Module

Applications on Digital Input/Output

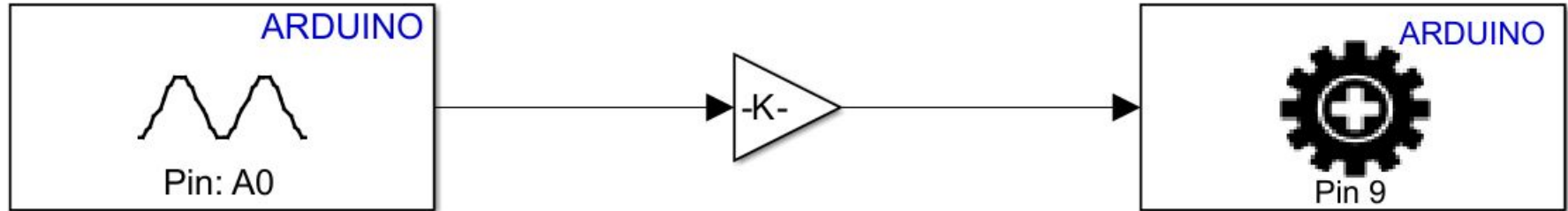
- Control Servo Motor



Arduino Simulink Interface Module

Applications on Digital Input/Output

- Control Servo Motor



Arduino Simulink Interface Module

Applications on Digital Input/Output

- Control Servo Motor

