Experiment 2

Blink an LED in the Arduino hardware using Matlab Simulink

Objective:

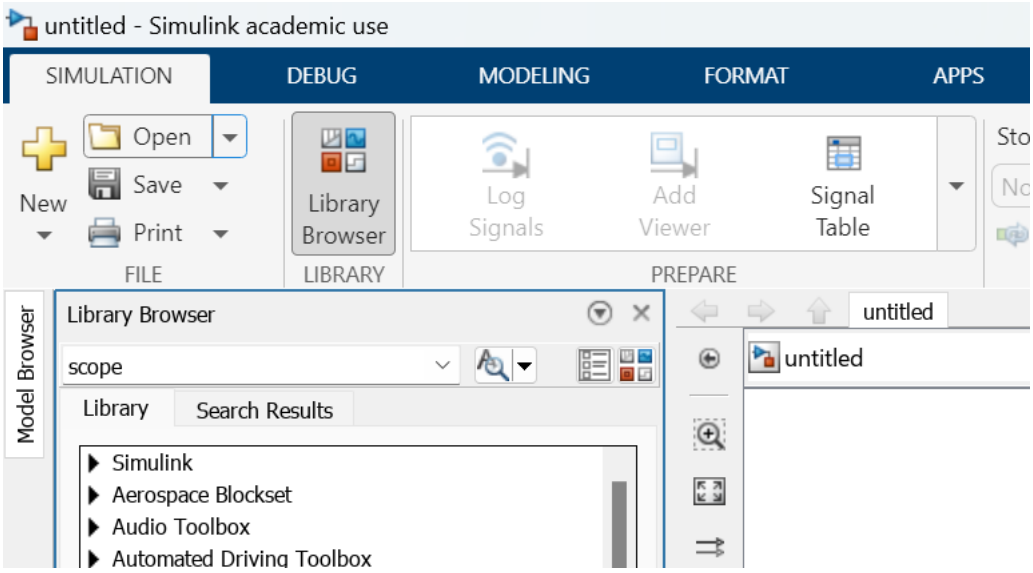
To build and simulate a model for blinking an LED using Matlab Simulink interfaced with Arduino hardware.

Setup Required:

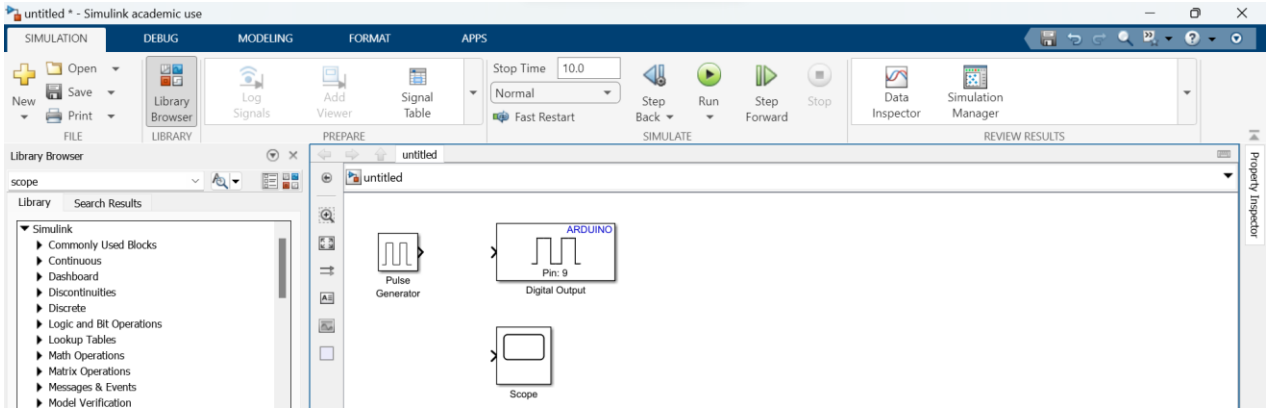
- Matlab software
- Arduino Uno with USB cable – 1 No.
- Breadboard – 1 No.
- Resistor – 220 ohm – 1No.
- LED – 1 No.
- Jumper wires – few Nos.

Procedure:

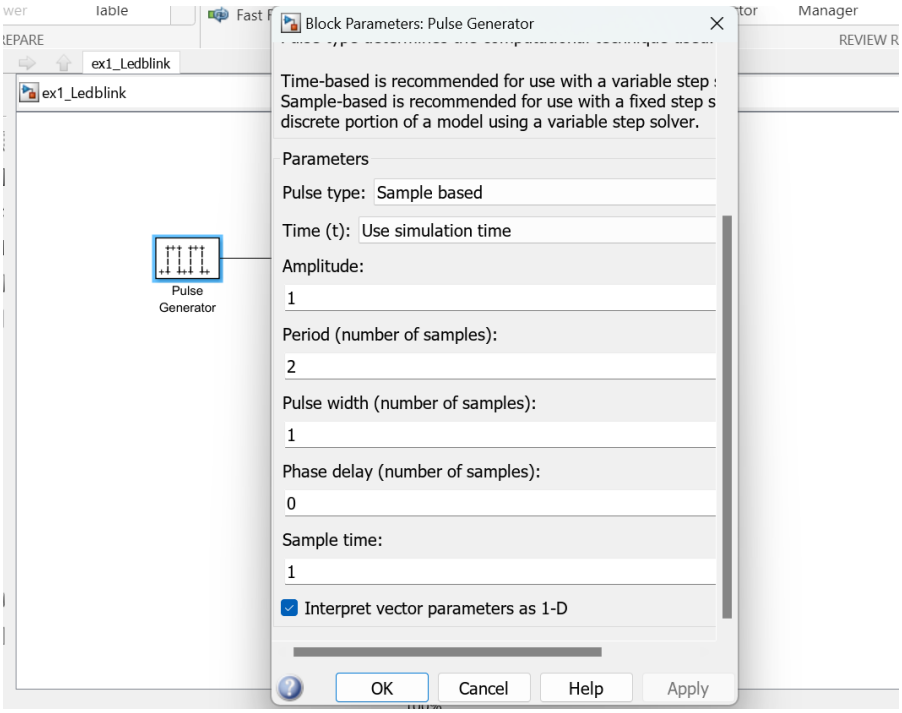
Go to Matlab -→ Simulink -→ open Blank Model, as shown below. Open the Simulink library browser.



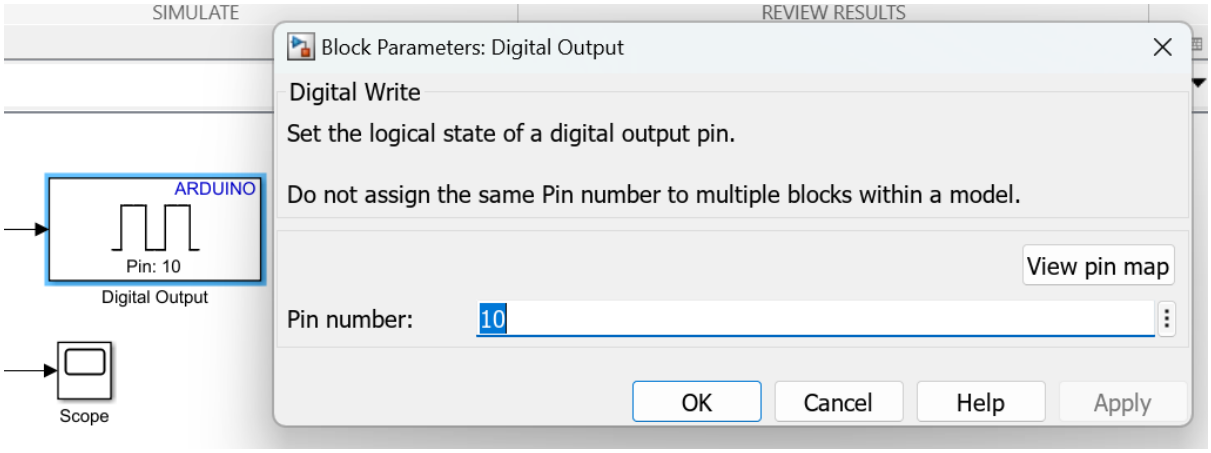
From the library browser go to sources -→drag and drop pulse generator block in the blank model, Simulink support package for Arduino -→common -→digital output block, drag and drop into the blank model and from the Simulink -→sink-→scope block, drag and drop into the model.



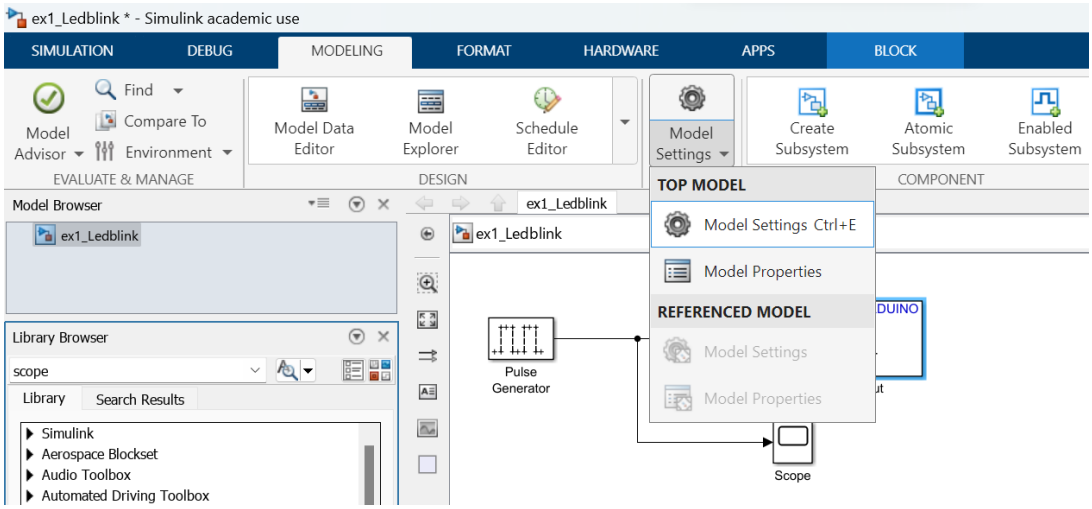
Connect the blocks as shown below and double click the pulse generator to change the parameters as follows.



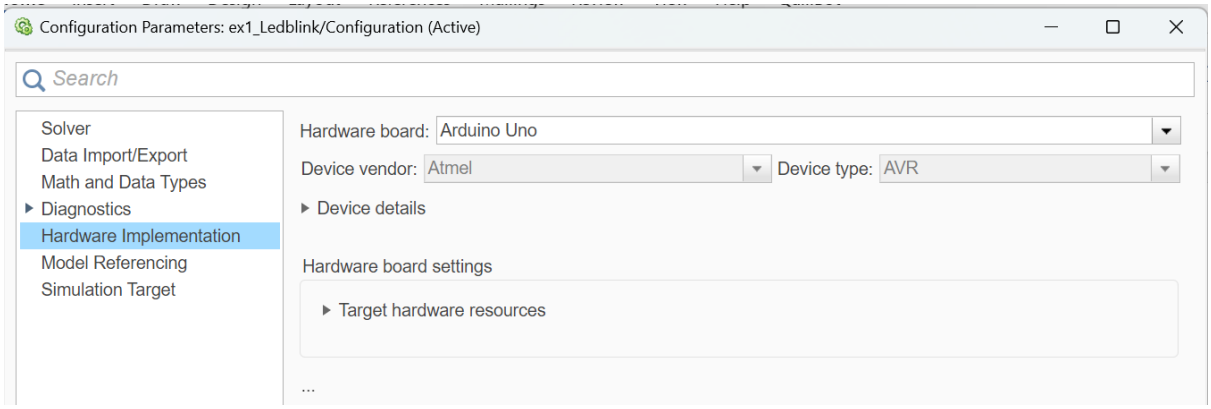
Double click the digital output block and set the pin to which pin you will connect the LED in the Arduino UNO. So here the pin is set to 10 as we use LED in 10th pin in the Arduino.



Save the model as ex1 _ ledblink and go Modelling tab -→ model setting -→



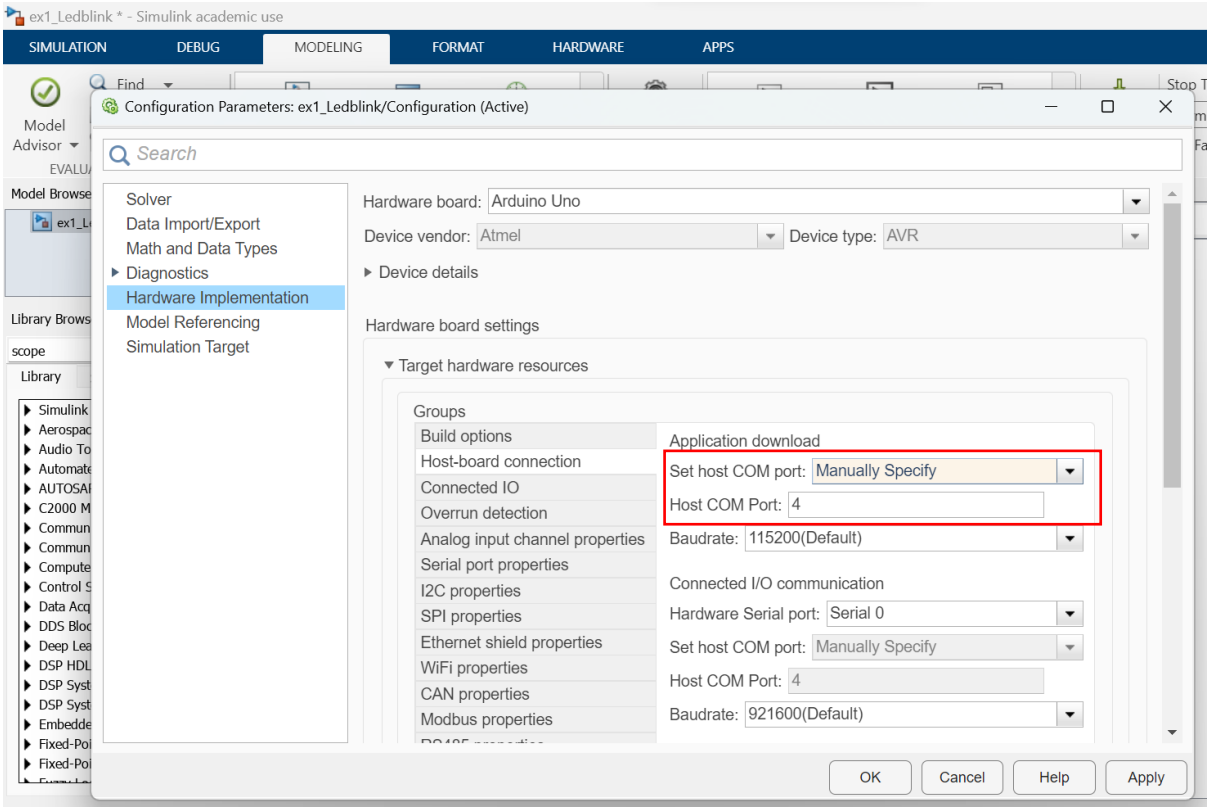
Configure the parameters for the hardware. Select the hardware as Arduino Uno in the hardware board as shown below.



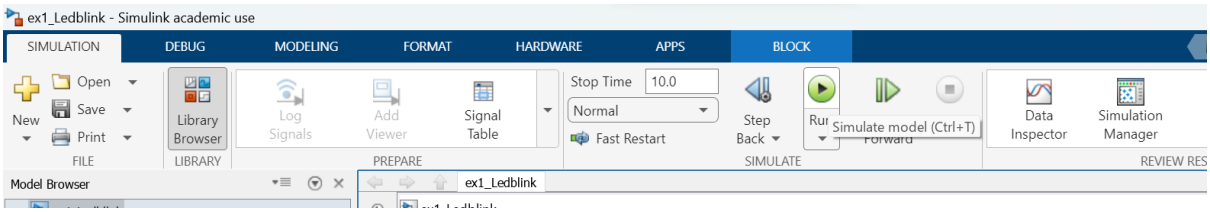
Under hardware board settings, specify the COM port number, at this time the hardware i.e. Arduino uno must be connected with the laptop using a usb cable. Check the port number in the command window using the following command.

>> a = arduino

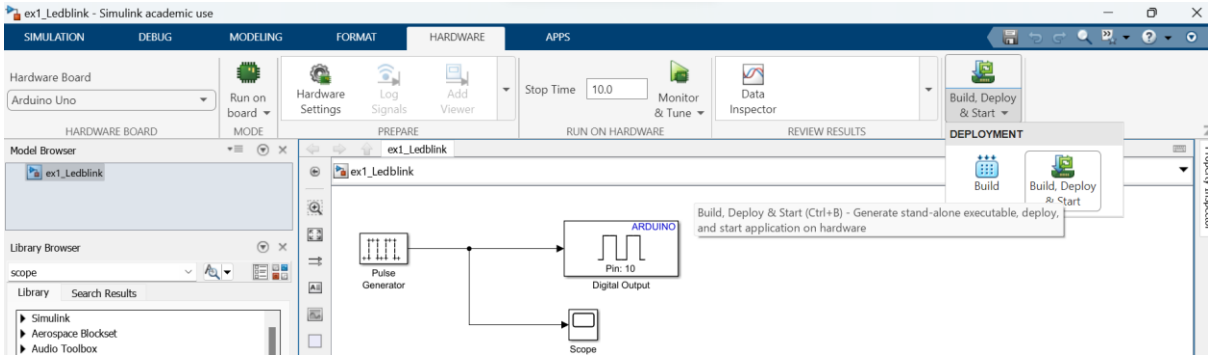
```
Arduino Uno detected.
This device is ready for use with MATLAB Support Package for Arduino Hardwar
This device is ready for use with Simulink Support Package for Arduino Hardw

>> a=arduino
Updating server code on board Uno (COM4). This may take a few minutes.

a =

  arduino with properties:

                Port: 'COM4'
               Board: 'Uno'
       AvailablePins: {'D2-D13', 'A0-A5'}
  AvailableDigitalPins: {'D2-D13', 'A0-A5'}
      AvailablePWMPins: {'D3', 'D5-D6', 'D9-D11'}
   AvailableAnalogPins: {'A0-A5'}
    AvailableI2CBusIDs: [0]
             Libraries: {'I2C', 'SPI', 'Servo'}
Show all properties
```



Give apply and OK. Save the model. Go to simulation tab and simulate the model.

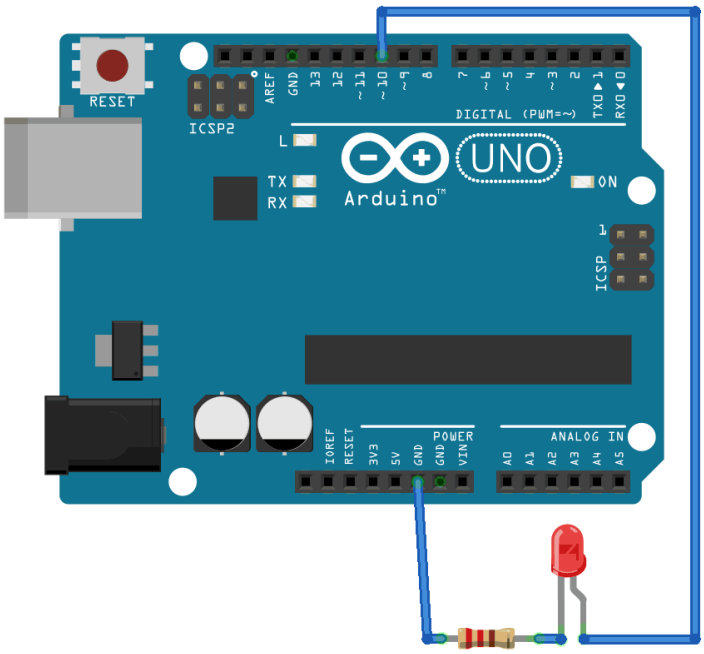


Do the connections as shown in the schematic diagram shown below. Go to Hardware tab -→click build deploy and start.

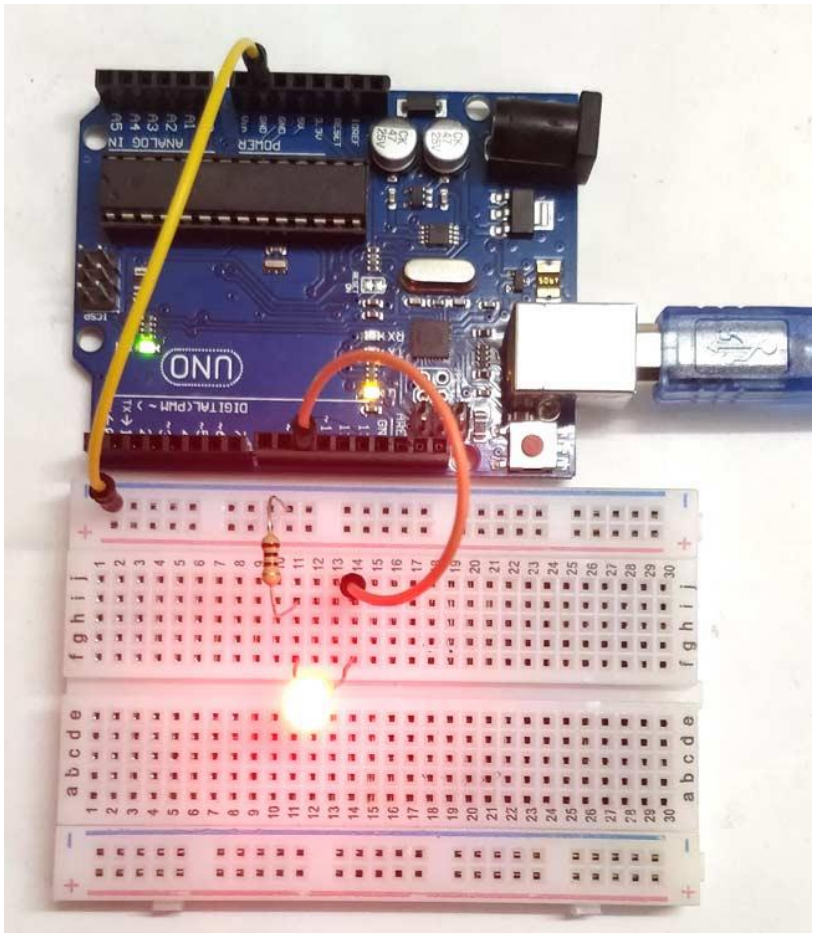


YouTube video for the procedure: https://www.youtube.com/watch?v=urgbc7WlWi8

Schematic Diagram:



The LED will start to blink for every 2 seconds and the graph in the scope can be viewed where the pulse varies from ON – OFF – ON with respect to the LED blinking on the board.



Conclusion:

Thus, a Matlab Simulink model was built and simulated to blink a led by interfacing with an Arduino Uno board.