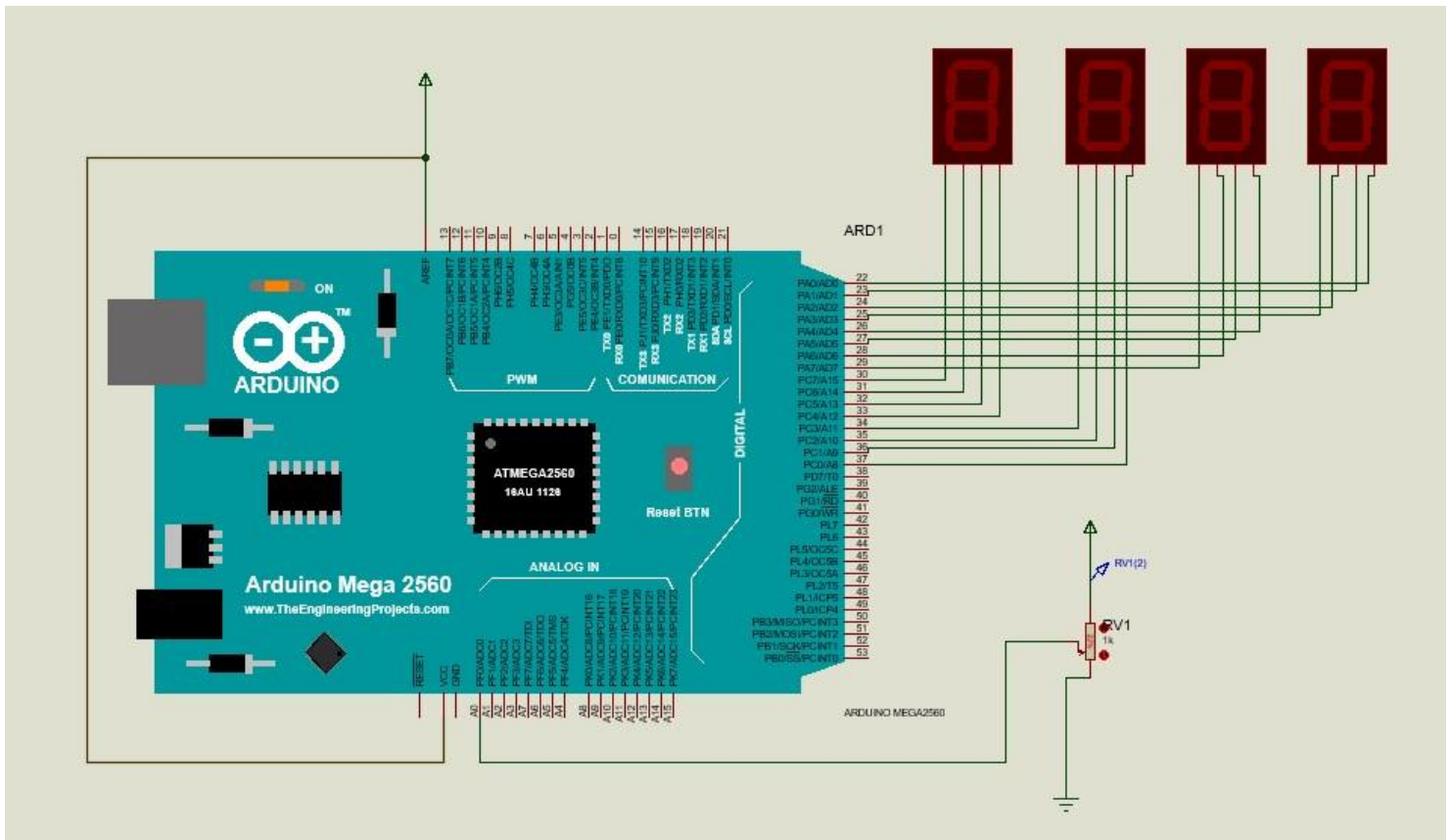


Objective:

In this lab, you will learn how to configure and use the Analog-to-Digital Converter (ADC) on the ATmega2560 microcontroller. You will write code to read an analog input, convert it to a digital value, and display that value on a set of LEDs or a 7-segment display connected to the microcontroller. Use the given space to write your code, then compile the full code in Atmel Studio and simulate it in Proteus.

Proteus Circuit Design:



Functions You Need to Write:

1. main() Function:

The main() function is the entry point of the program. It initializes the hardware and ADC, enters an infinite loop where it reads the ADC value, displays it, and waits for 1 second before repeating.

```

int main(void)
{
    int adcValue;

    // Initialize hardware and ADC
    initHardware();
    initADC();

    while (1)
    {
        // Read ADC value from channel 0
        adcValue = readADC(0);

        // Display the ADC value
        display(adcValue);

        // Delay for 1 second
        _delay_ms(1000);
    }

    return 0;
}

```

2. initHardware () Function:

This function sets up the ports as output ports. These ports will be used to display the ADC results.



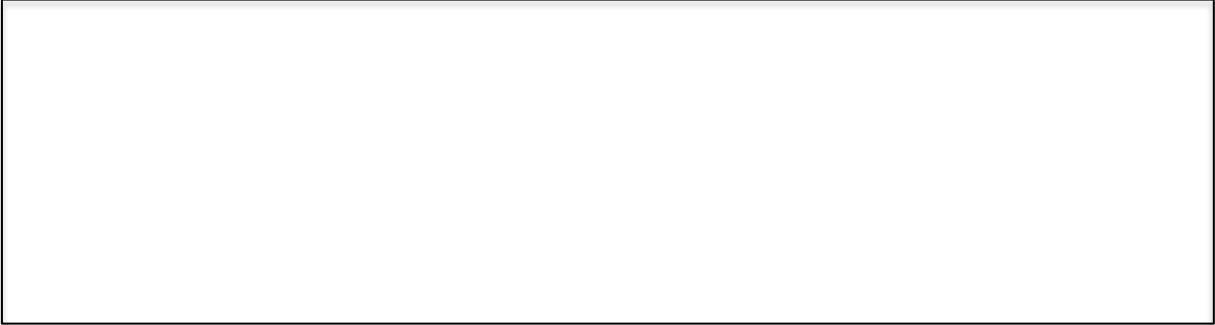
3. initADC () Function:

This function configures the ADC by enabling it and setting the appropriate pre-scaler.



4. readADC () Function:

This function reads the ADC value from the specified ADC channel. It selects the channel, starts the conversion, waits for it to complete, and then returns the digital value.

**5. display () Function:**

This function takes the ADC value, splits it into thousands, hundreds, tens, and ones digits, and then displays these digits on PORTA and PORTC.

