College of Science and Computer Engineering

Department of Computer Science & Artificial Intelligence

CCAI 436

Advanced Topics in Artificial Intelligence

Lab#4

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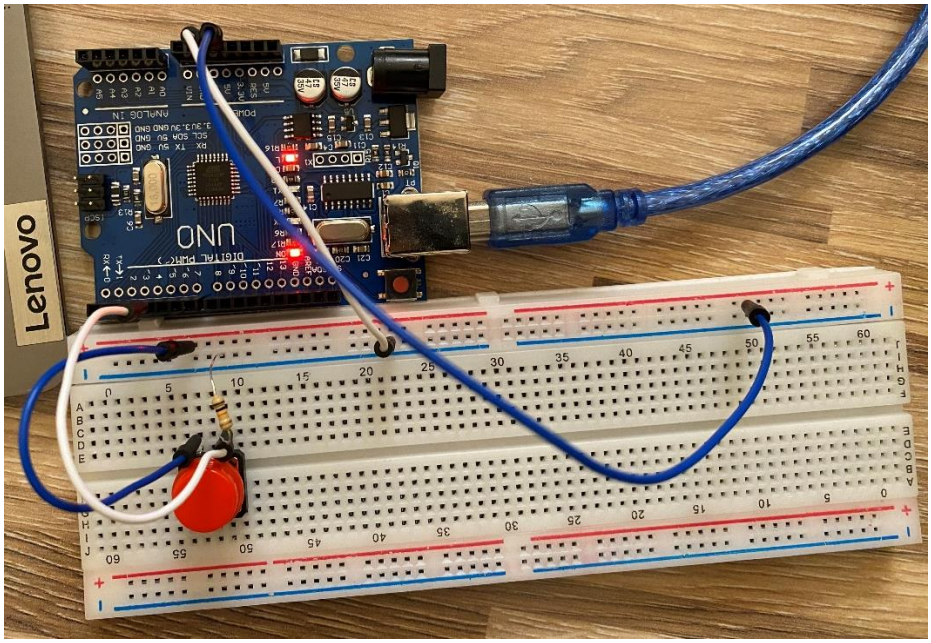
Lab work -hardware-



- ***output***

LAB4.ino

```
1   //Repeatedly reads the state of a push button connected on pin 4.
2   //If the button is pressed, it displays the message "Push Button Pressed".
3   int buttonState;  // variable for reading the pushbutton status
4
5   void setup() {
6     // initialize the push button pin (pin 4) as an input:
7     pinMode(4, INPUT);
8     // initialize and start the serial port:
9     Serial.begin(9600);
10  }
11
12  void loop() {
13    // read the state of the push button value:
14    buttonState = digitalRead(4);
15    // check if the pushbutton is pressed, then display the message:
16    if (buttonState == HIGH) {
```

Output Serial Monitor ×

Message (Enter to send message to 'Arduino Uno' on 'COM3')

```
14:21:48.423 -> Push Button Pressed
14:21:48.456 -> Push Button Pressed
14:21:48.456 -> Push Button Pressed
14:21:48.489 -> Push Button Pressed
14:21:48.523 -> Push Button Pressed
14:21:48.523 -> Push Button Pressed
14:21:48.554 -> Push Button Pressed
14:21:48.554 -> Push Button Pressed
```

- *Code:*

```
//Repeatedly reads the state of a push button connected on pin 4.
//If the button is pressed, it displays the message "Push Button Pressed".
int buttonState;  // variable for reading the pushbutton status

void setup() {
  // initialize the push button pin (pin 4) as an input:
  pinMode(4, INPUT);
  // initialize and start the serial port:
  Serial.begin(9600);
}

void loop() {
  // read the state of the push button value:
  buttonState = digitalRead(4);
  // check if the pushbutton is pressed, then display the message:
  if (buttonState == HIGH) {
    Serial.println("Push Button Pressed");
  }
```

Lab task -software-

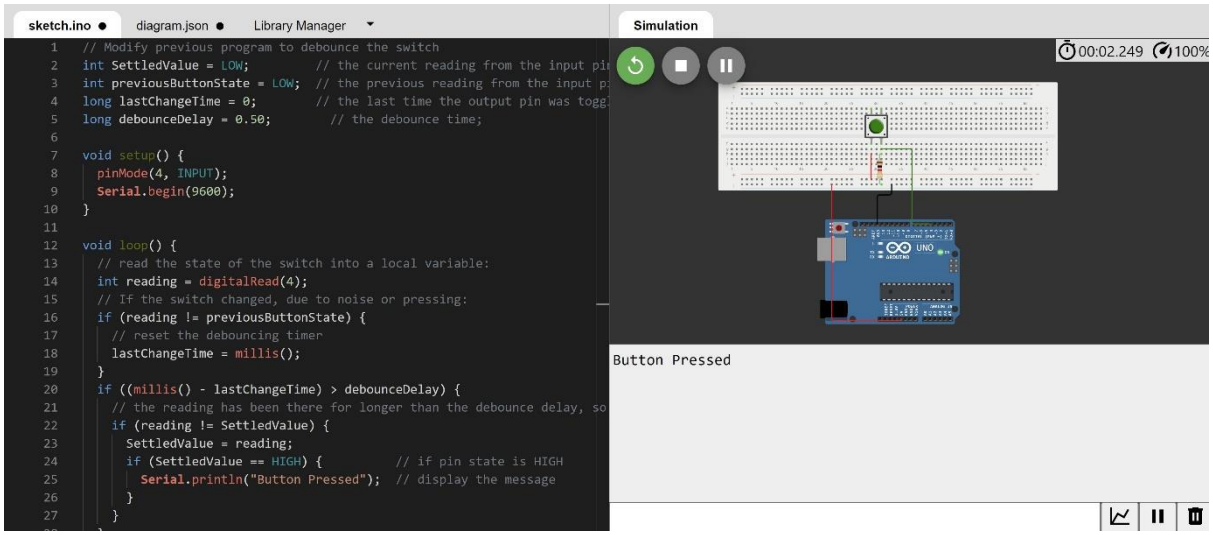
- **Exercise 4.1**

Modify Program 4.1 to solve the switch bounce problem using software debounce method discussed in class. Emulate your program to verify the debounce method.

```
// Modify previous program to debounce the switch
int SettledValue = LOW;          // the current reading from the input pin
int previousButtonState = LOW;   // the previous reading from the input pin
long lastChangeTime = 0;         // the last time the output pin was toggled
long debounceDelay = 0.50;         // the debounce time;

void setup() {
  pinMode(4, INPUT);
  Serial.begin(9600);
}

void loop() {
  // read the state of the switch into a local variable:
  int reading = digitalRead(4);
  // If the switch changed, due to noise or pressing:
  if (reading != previousButtonState) {
    // reset the debouncing timer
    lastChangeTime = millis();
  }
  if ((millis() - lastChangeTime) > debounceDelay) {
    // the reading has been there for longer than the debounce delay, so take
it
    if (reading != SettledValue) {
      SettledValue = reading;
      if (SettledValue == HIGH) {          // if pin state is HIGH
        Serial.println("Button Pressed");  // display the message
      }
    }
  }
  // save the reading
  previousButtonState = SettledValue;
}
```



- *Code link:* [Lab 4 task]