POST-LAB IOT Projects using Python (CSE 4110) ASSIGNMENT

Date:

Experiment – 9

Aim of the Experiment:

Wireless Communication and Automation with Raspberry Pi and Micropython: Creating a Multi-Protocol IoT System.

Objective:

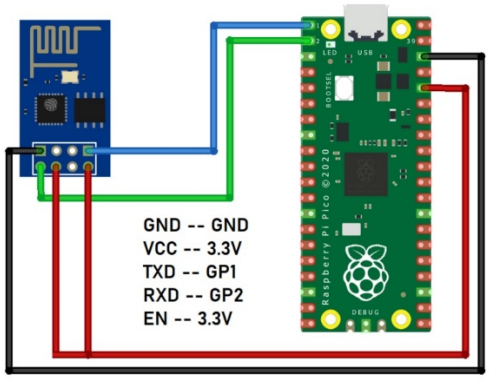
1) Familiarization with **wifi module**, important **terminologies** for IOT, **Bluetooth Module**, **Bluetooth Terminal application** etc.
2) Implementation of Interfacing of **ESP8266 WiFi Module** with Raspberry Pi Pico and display the temperature in local server.
3) Implementation of **Controlling an LED from a Smartphone Using Wi-Fi**.
4) Implementation of **Control an LED from the Android application using Bluetooth wireless communication.**

Components/Equipment/items Required:

Sl No.	Name of the Component/Equipment	Specification	Quantity
1	Raspberry Pi Pico	RP2040 microcontroller chip, 125MHz	1
2	Raspberry Pi Pico cable	USB Type A to Micro-B	1
3	Resistors (carbon type)	¼ watt (330Ω)	1
4	WiFi Module	ESP01	1
5	Bluetooth Module	HC05	1
6	LED	5mm	1
7	Breadboard	840 Tie points	1
8	Jumper Wire	----------	As per requirement

Circuit/Schematic Diagram:

Objective 2



(Figure 1: Circuit diagram for implementation of Interfacing of ESP8266 WiFi Module with Raspberry Pi Pico and display the temperature in local server.)

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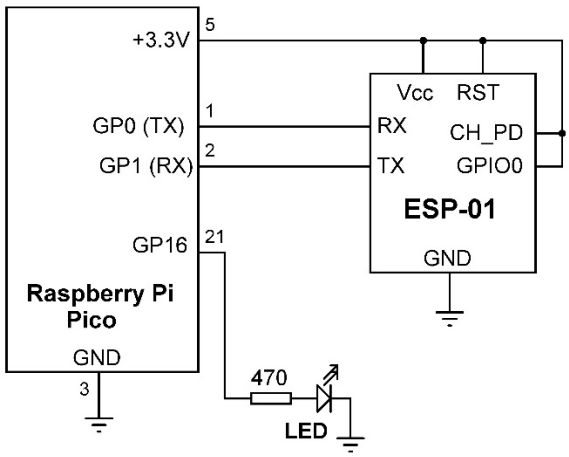
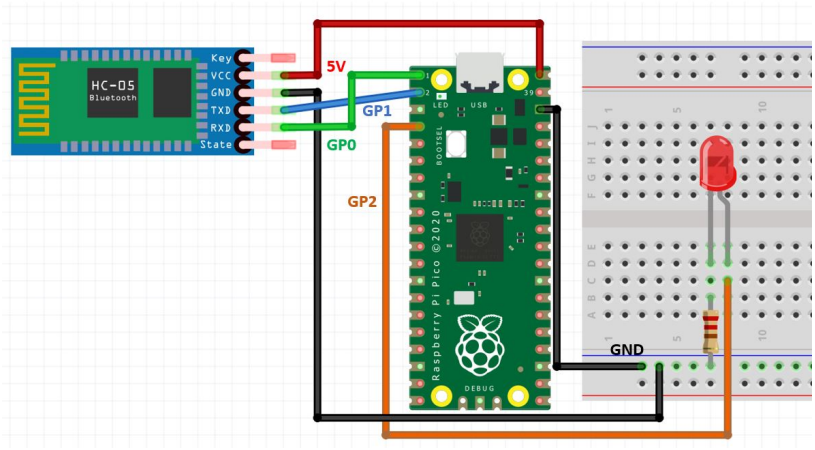
Objective 3



(Figure 2: Circuit diagram for implementation of Controlling an LED from a Smartphone Using Wi-Fi.)

Objective 4



(Figure 3: Circuit diagram for implementation of Control an LED from the Android application using Bluetooth wireless communication.)

Observation:

Objective 2

(Figure 4: Simulation based electronic circuit for implementation of Interfacing of ESP8266 WiFi Module with Raspberry Pi Pico and display the temperature in local server.)

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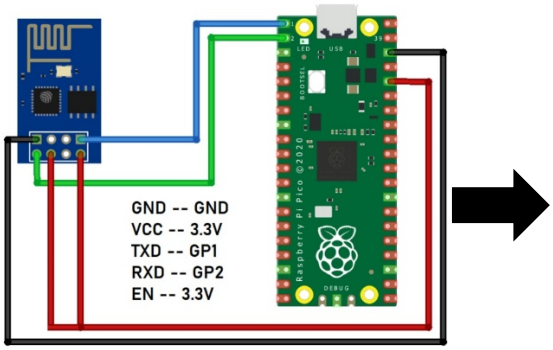

Figure 5: (Breadboard Schematic representation of an electronic circuit for implementation of Interfacing of ESP8266 WiFi Module with Raspberry Pi Pico and display the temperature in local server.)

Figure 6: (Hardware implementation based electronic circuit for implementation of Interfacing of ESP8266 WiFi Module with Raspberry Pi Pico and display the temperature in local server)

Objective 3

(Figure 7: Simulation based electronic circuit for implementation of implementation of Controlling an LED from a Smartphone Using Wi-Fi)

Figure 8: (Hardware implementation based electronic circuit for implementation of implementation of Controlling an LED from a Smartphone Using Wi-Fi)

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Experiment – 9

Objective 4

Figure 9: (Simulation based Implementation of Control an LED from the Android application using Bluetooth wireless communication)

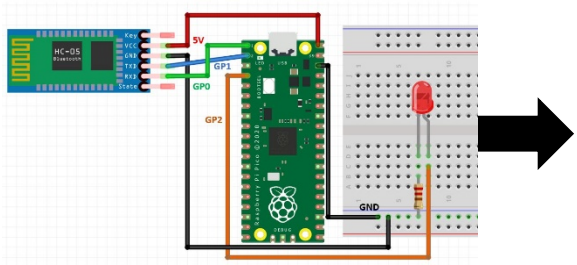

Figure 10: (Breadboard Schematic representation of an electronic circuit for implementation of Control an LED from the Android application using Bluetooth wireless communication)

Figure 11: (Hardware implementation based electronic circuit for implementation of Control an LED from the Android application using Bluetooth wireless communication)

Codes:

Objective 2

```
print("Hello, Pi Pico!")
print("This is Experiment - 9 and Objective - 2")
print("Name:                          ; Registration No.:                ")
print("Objective : 2  Implementation of Interfacing of ESP8266 WiFi Module with
Raspberry Pi Pico and display the temperature in local server.")
```

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Experiment – 9

Objective 3

```
print("Hello, Pi Pico!")
print("This is Experiment - 9 and Objective - 3")
print("Name:                          ; Registration No.:                ")
print("Objective : 3  Implementation of implementation of Controlling an LED
from a Smartphone Using Wi-Fi.")
```

Objective 4

```
print("Hello, Pi Pico!")
print("This is Experiment - 8 and Objective - 4")
print("Name:                          ; Registration No.:                ")
print("Objective : 4    Implementation of Control an LED from the Android
application using Bluetooth wireless communication.")
```

Conclusion:

Precautions:

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Experiment – 9

Post Experiment Questionnaire:

Answer all the Questions in brief with some appropriate examples.

1) The Raspberry Pi Pico is connected to an ESP01 wifi module through the UART interface. Write a Micropython program to connect to a wifi network using the ESP01 module.
2) The Raspberry Pi Pico is connected to an HC-05 Bluetooth module through the UART interface. Write a Micropython program to connect to a remote Bluetooth device using the HC-05 module.
3) Write a Micropython program to send a GET request to a web server using the ESP01 wifi module and receive the response on the Raspberry Pi Pico.
4) Write a Micropython program to send a message to a remote Bluetooth device using the HC-05 module.

Name of the Student
Registration No
Semester
Branch, Section