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**BANGLADESH UNIVERSITY OF  
BUSINESS AND TECHNOLOGY**

**Lab Report on**

Control LED Using MIT App Inventor and Bluetooth

Course Code: CSE 426

Course Title: IoT Lab

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## Lab report no: 3

### Introduction:

#### ESP32 - Bluetooth Communication

Arduino and any Bluetooth device like HC-05 communicate over Serial Communication. ESP32, which already has a Bluetooth Controller, also has a similar communication between the main Xtensa Processor and the Bluetooth Controller. What this means is that after receiving data from a Bluetooth device wirelessly, the Bluetooth controller in ESP32 transfers this data to ESP32's Processor over serial communication. Similarly, in order to send data over Bluetooth, the Processor of ESP32 transmits data to the Bluetooth Controller using the serial interface. This information along with a dedicated 'BluetoothSerial' library use to transmit and receive data. The BluetoothSerial library works similar to the Serial library but it is just within ESP32. Some of the frequently used functions offered by BluetoothSerial library are:

- begin()
- available()
- write()
- read()

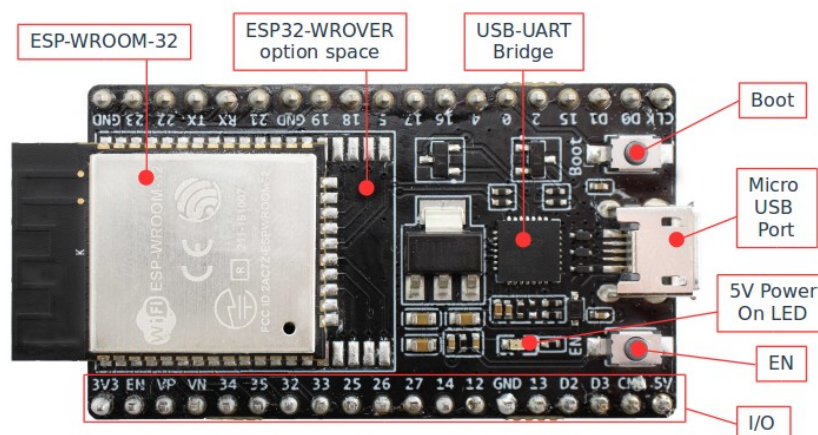


Figure 1: ESP 32 Node MCU

## MIT App Inventor

MIT App Inventor is a web application integrated development environment originally provided by Google and now maintained by the Massachusetts Institute of Technology (MIT). It uses a graphical user interface (GUI) very similar to the programming languages Scratch (programming language) and the StarLogo, which allows users to drag and drop visual objects to create an application that can run on Android devices, while an App-Inventor Companion that works on iOS running devices are still under development.

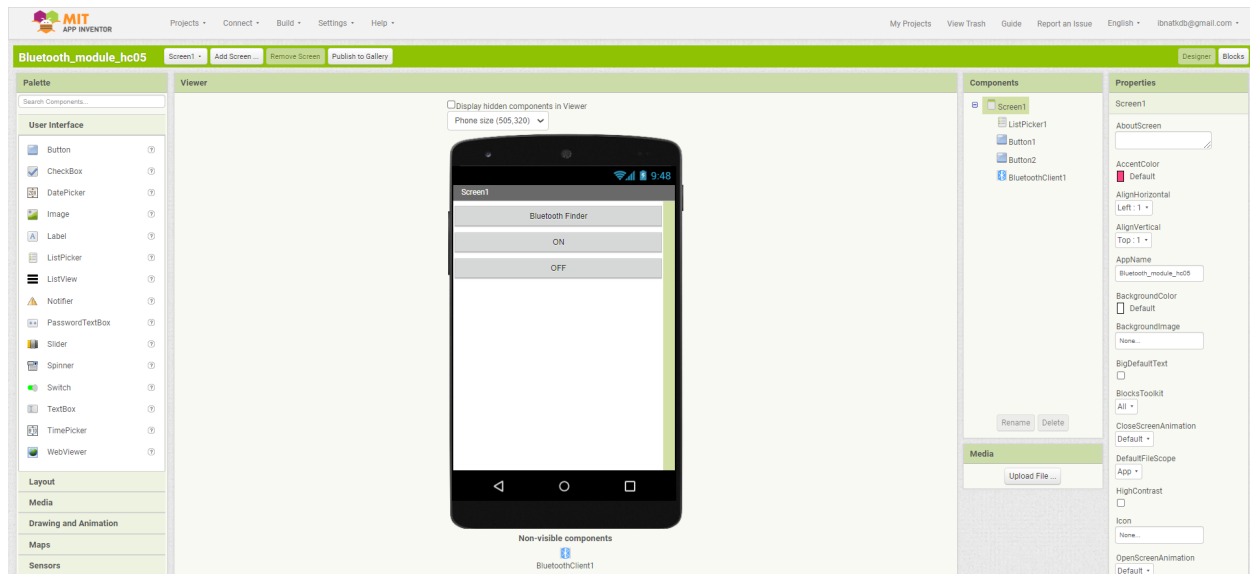


Figure 2: UI design of our App

### **Tools/ Component Required:**

1. ESP32 module
2. USB Cable
3. LED
4. Breadboard
5. Jumper wires
6. Resistor
7. Arduino IDE
8. MIT App Inventor

### Circuit diagram:

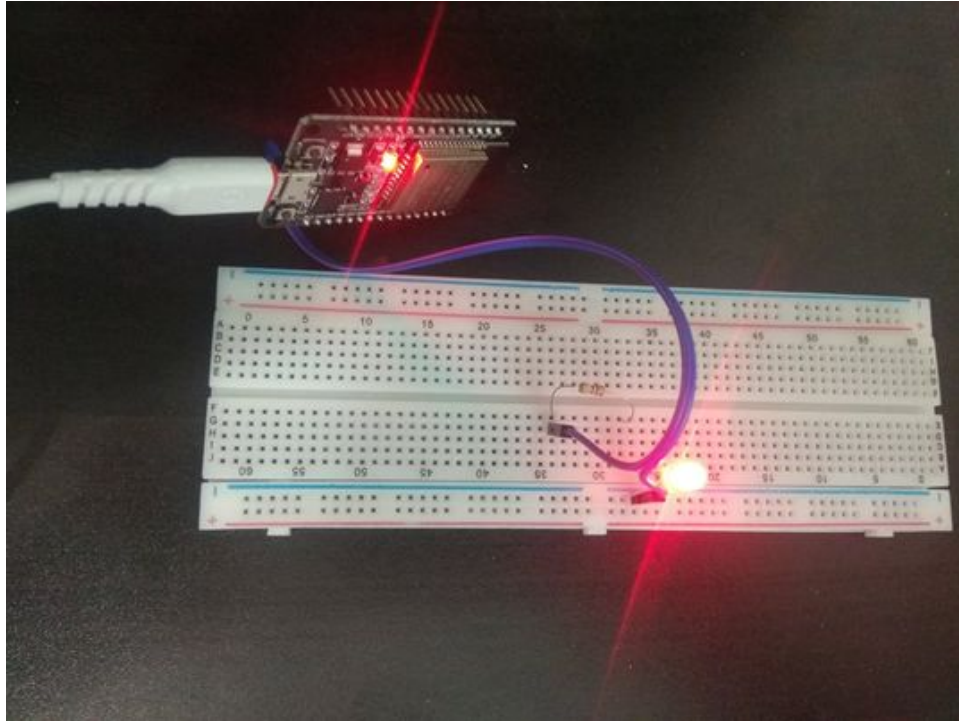


Figure 3: Circuit for Controlling LED Using MIT App Inventor and Bluetooth

### Code:

#### Code: ESP32 - Bluetooth Communication

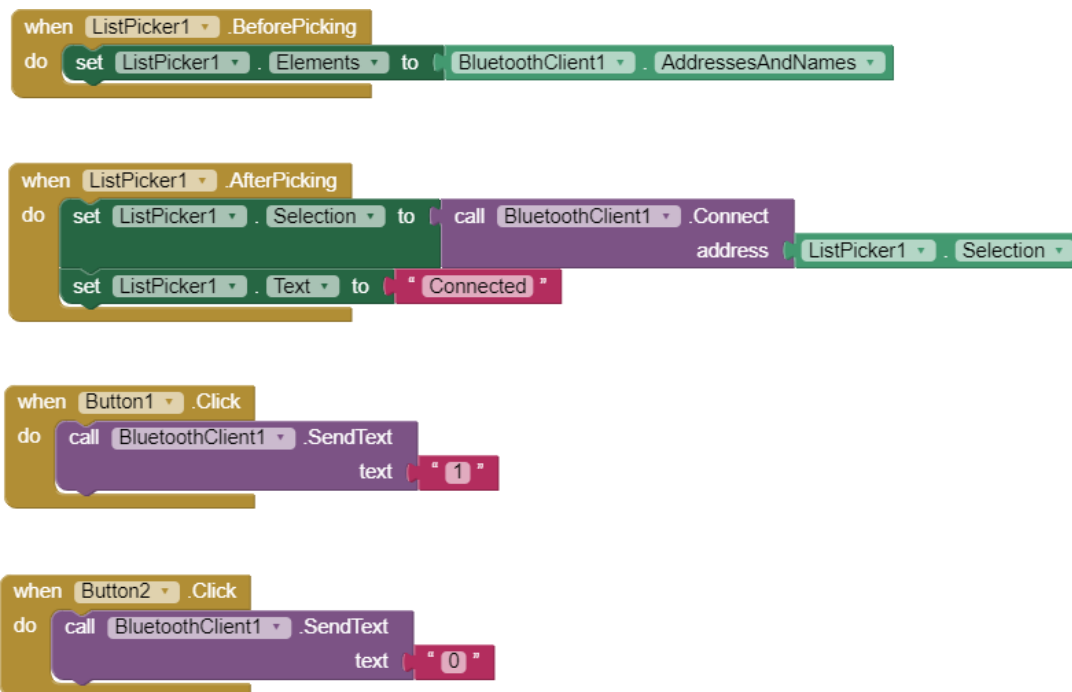
```
#include "BluetoothSerial.h"
#if !defined(CONFIG_BT_ENABLED) || !defined(CONFIG_BLUEDROID_ENABLED)
#error Bluetooth is not enabled! Please run `make menuconfig` to and enable it
#endif
#define LED 18
BluetoothSerial SerialBT;
void setup() {
  Serial.begin(115200);
  pinMode(LED, OUTPUT);
  digitalWrite(LED, LOW);
  SerialBT.begin("ESP32_LED");
  Serial.println("Bluetooth Started! Ready to pair..."); }
void loop() {
```

```

char c;
if (SerialBT.available()) {
c = SerialBT.read();
Serial.write(c);}
if (c == '1')
digitalWrite (LED, HIGH);
if (c == '0')
digitalWrite (LED, LOW);
delay(20); }

```

### Block code



### **Conclusion:**

In lab class seven we got to know about how to use MIT App Inventor and also about Bluetooth Module. And that knowledge helped us to do this lab task. This lab task helped us to understand and gain more knowledge on the use of MIT App Inventor and Bluetooth Module. Hence, it is teamwork so we worked as a team to complete this lab task. We did face some problems during doing this task and we find the solutions from different websites and Youtube tutorials. In the end, we have successfully found the output as we wanted.