Developing Algorithm for Connectivity of ESP32 with WiFi or Bluetooth

Agenda:

Bluetooth device has to turn on automatically when there is no wifi in the desired location, and it has to connect to the wifi during the absence of the Bluetooth connectivity to the same device.

Approach:

Before developing the desired code, I would be verifying the connectivity of the Bluetooth and the wifi by glowing the onboard led and check if the final code is matching the three checklists first- If Bluetooth is available connect to it, second-if wifi is available connect to it, third – if both Bluetooth and the wifi is available connect the wifi and the disconnect the Bluetooth, for satisfying the requirements of the code.

Code for verifying the Connectivity of the Wifi:

```
#include <WiFi.h>

#define WIFI_SSID "moto g32_8989"

#define WIFI_PASSWORD "imironman"

const int LED_PIN = 2;  // Built-in LED pin on ESP32

void setup() {

    pinMode(LED_PIN, OUTPUT);

    digitalWrite(LED_PIN, LOW);  // Initially turn off the LED

    Serial.begin(115200);

    Serial.print("Connecting to WiFi...");

    WiFi.begin(WIFI_SSID, WIFI_PASSWORD)

    // Infinite attempts to connect to WiFi

    while (WiFi.status() != WL_CONNECTED) {

        delay(500);

        Serial.print(".");

    }

    Serial.println("");

    Serial.println("WiFi connected.");

    Serial.print("IP Address: ");

    Serial.println(WiFi.localIP());
```
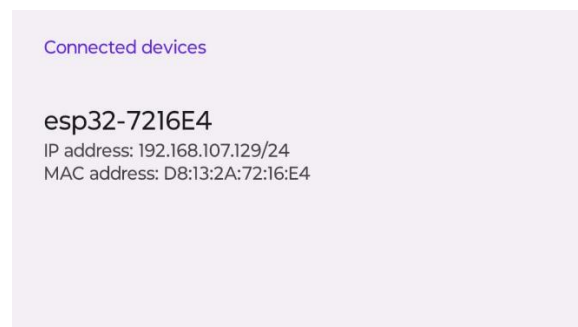
```
    digitalWrite(LED_PIN, HIGH);  // Turn on the LED when connected

}

void loop() {

    // Continuously check the WiFi connection status and update the LED

  if (WiFi.status() == WL_CONNECTED) {

      digitalWrite(LED_PIN, HIGH);  // Turn on the LED when connected

    } else {

      digitalWrite(LED_PIN, LOW);  // Turn off the LED when disconnected

    }

    delay(10000);  // Check every 10 seconds

}
```

OUTPUT:


```
Connected devices

esp32-7216E4
IP address: 192.168.107.129/24
MAC address: D8:13:2A:72:16:E4
```

Code for verifying the connectivity of the Bluetooth:

```
#include "BluetoothSerial.h"

String device_name = "moto";

// Check if Bluetooth is available

#if !defined(CONFIG_BT_ENABLED) || !defined(CONFIG_BLUEDROID_ENABLED)

#error Bluetooth is not enabled! Please run make menuconfig to and enable it

#endif

// Check Serial Port Profile

#if !defined(CONFIG_BT_SPP_ENABLED)

#error Serial Port Profile for Bluetooth is not available or not enabled. It is only available for the
ESP32 chip.

#endif

BluetoothSerial SerialBT;
```

```
const int ledPin = 2;  // Built-in LED pin

void setup() {

Serial.begin(115200);

SerialBT.begin(device_name);  // Bluetooth device name

  // SerialBT.deleteAllBondedDevices(); // Uncomment this to delete paired devices; Must be called after begin

pinMode(ledPin, OUTPUT);

  digitalWrite(ledPin, LOW);  // Ensure the LED is off initially

  Serial.printf("The device with name \"%s\" is started.\nNow you can pair it with Bluetooth!\n", device_name.c_str());

}

void loop() {

 if (Serial.available()) {

   SerialBT.write(Serial.read());

 }

 if (SerialBT.available()) {

   Serial.write(SerialBT.read());

 }

 if (SerialBT.hasClient()) {

   digitalWrite(ledPin, HIGH);  // Turn on the LED if connected

 } else {

   digitalWrite(ledPin, LOW);  // Turn off the LED if not connected

 }

 delay(20);

}
```
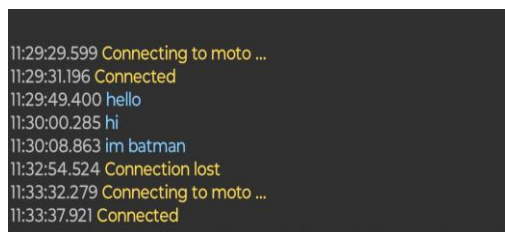
OUTPUT:

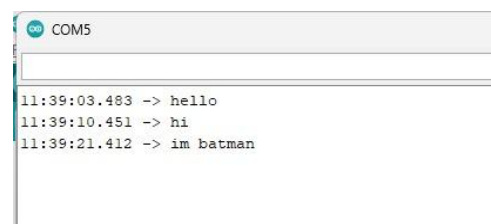Transmitted Message: Received Message:


```
11:29:29.599 Connecting to moto ...
11:29:31.196 Connected
11:29:49.400 hello
11:30:00.285 hi
11:30:08.863 im batman
11:32:54.524 Connection lost
11:33:32.279 Connecting to moto ...
11:33:37.921 Connected
```



```
COM5

11:39:03.483 -> hello
11:39:10.451 -> hi
11:39:21.412 -> im batman
```

Final Code:

```
#include <WiFi.h>

#include "BluetoothSerial.h"

#define WIFI_SSID "motowifi"

#define WIFI_PASSWORD "imironman"

//const int LED_PIN = 2;

String device_name = "moto";

bool i=false;

#if !defined(CONFIG_BT_ENABLED) || !defined(CONFIG_BLUEDROID_ENABLED)

#error Bluetooth is not enabled! Please run make menuconfig to and enable it

#endif

// Check Serial Port Profile

#if !defined(CONFIG_BT_SPP_ENABLED)

#error Serial Port Profile for Bluetooth is not available or not enabled. It is only available for the
ESP32 chip.

#endif

BluetoothSerial SerialBT;

void wifi_reinit() {

  // Check if WiFi is not connected

  if (WiFi.status() != WL_CONNECTED) {

    Serial.print("Reinitializing WiFi...");

    WiFi.begin(WIFI_SSID, WIFI_PASSWORD);

    Serial.println("WiFi Reinitialized");

  } else {

    Serial.println("WiFi is already connected");

  }

}

void bluetooth_reinit() {

  // Check if Bluetooth is not initialized or has no active client

  if (!SerialBT.isReady() || !SerialBT.hasClient()) {
```

```arduino
    Serial.print("Reinitializing Bluetooth...");

    SerialBT.begin(device_name);

    Serial.println("Bluetooth Reinitialized");

  } else {

    Serial.println("Bluetooth is already initialized and connected");

  }

}

void setup(){

  Serial.begin(115200);

//  pinMode(LED_PIN,OUTPUT);

  //digitalWrite(LED_PIN,LOW);

  Serial.print("Connecting to WiFi...");

  WiFi.begin(WIFI_SSID, WIFI_PASSWORD);

  while (WiFi.status() != WL_CONNECTED) {

  delay(500);

  Serial.print(".");

  }

  Serial.println("");

  Serial.println("WiFi connected.");

  Serial.print("IP Address: ");

  Serial.println(WiFi.localIP());

  SerialBT.begin(device_name);

}

void loop() {

  // Check the availability of WiFi and Bluetooth

  bool wifiAvailable = (WiFi.status() == WL_CONNECTED);

  bool btAvailable = SerialBT.hasClient(); // Check if Bluetooth is connected

  // Debugging outputs

  Serial.print("WiFi Available: ");

  Serial.println(wifiAvailable);

  Serial.print("Bluetooth Available: ");
```

```
    Serial.println(btAvailable);


if (wifiAvailable && btAvailable) {
  // Case 1: Both WiFi and Bluetooth are available
  Serial.println("Both WiFi and Bluetooth are connected");
  SerialBT.end();
  Serial.println("WiFi is connected, bluetooth is disconnected, turning on led...");
 // digitalWrite(LED_PIN, HIGH);  // Turn on LED
} else if (wifiAvailable){
  // Case 2: Either WiFi or Bluetooth is not available
  Serial.println("Only wifi is detected in this proximity and the device is connected to it");
  //digitalWrite(LED_PIN, LOW);  // Turn off LED
}
else if(btAvailable){
  Serial.println("Only bluetooth is detected in this proximity and the device is connected to it");
}
else if (!wifiAvailable && !btAvailable){
  Serial.println("No Connectivity...reinitializing");
  wifi_reinit();
  bluetooth_reinit();
  //Wait for 5 seconds for re-initialization again
  delay(5000);
  i=true;
 if(i){
  Serial.println("No connectivity..check you device had enough range to connect");
}
}
//else if(i){
  //Serial.println("No connectivity..check you device had enough range to connect");
//}
```

```
  delay(1000);  // Check every second

}
```

You are expected to get a output like this.

23:45:38.694 -> ……………

23:45:45.695 -> WiFi connected.

23:45:45.695 -> IP Address: 192.168.107.129

23:45:46.121 -> WiFi Available: 1

23:45:46.121 -> Bluetooth Available: 0

23:45:46.121 -> Only wifi is detected in this proximity and the device is connected to it

23:45:47.102 -> WiFi Available: 1

23:45:47.102 -> Bluetooth Available: 0

23:45:47.102 -> Only wifi is detected in this proximity and the device is connected to it

23:45:48.092 -> WiFi Available: 1

23:45:48.092 -> Bluetooth Available: 0

23:45:48.139 -> Only wifi is detected in this proximity and the device is connected to it

23:45:49.130 -> WiFi Available: 1

23:45:49.130 -> Bluetooth Available: 0

23:45:49.130 -> Only wifi is detected in this proximity and the device is connected to it

23:45:50.121 -> WiFi Available: 1

23:45:50.121 -> Bluetooth Available: 0

23:45:50.121 -> Only wifi is detected in this proximity and the device is connected to it

23:45:51.112 -> WiFi Available: 1

23:45:51.112 -> Bluetooth Available: 0

23:45:51.112 -> Only wifi is detected in this proximity and the device is connected to it

23:45:52.105 -> WiFi Available: 1

23:45:52.105 -> Bluetooth Available: 0

23:45:52.105 -> Only wifi is detected in this proximity and the device is connected to it

23:45:53.099 -> WiFi Available: 1

23:45:53.099 -> Bluetooth Available: 0

23:45:53.099 -> Only wifi is detected in this proximity and the device is connected to it

23:45:54.090 -> WiFi Available: 1

23:45:54.090 -> Bluetooth Available: 0

23:45:54.138 -> Only wifi is detected in this proximity and the device is connected to it

23:45:55.131 -> WiFi Available: 1

23:45:55.131 -> Bluetooth Available: 0

23:45:55.131 -> Only wifi is detected in this proximity and the device is connected to it

23:45:56.112 -> WiFi Available: 1

23:45:56.112 -> Bluetooth Available: 0

23:45:56.112 -> Only wifi is detected in this proximity and the device is connected to it

23:45:57.102 -> WiFi Available: 1

23:45:57.102 -> Bluetooth Available: 0

23:45:57.102 -> Only wifi is detected in this proximity and the device is connected to it

23:45:58.094 -> WiFi Available: 1

23:45:58.094 -> Bluetooth Available: 0

23:45:58.094 -> Only wifi is detected in this proximity and the device is connected to it

23:45:59.132 -> WiFi Available: 1

23:45:59.132 -> Bluetooth Available: 0

23:45:59.132 -> Only wifi is detected in this proximity and the device is connected to it

23:46:00.125 -> WiFi Available: 1

23:46:00.125 -> Bluetooth Available: 0

23:46:00.125 -> Only wifi is detected in this proximity and the device is connected to it

23:46:01.119 -> WiFi Available: 1

23:46:01.119 -> Bluetooth Available: 0

23:46:01.119 -> Only wifi is detected in this proximity and the device is connected to it

23:46:02.113 -> WiFi Available: 1

23:46:02.113 -> Bluetooth Available: 0

23:46:02.113 -> Only wifi is detected in this proximity and the device is connected to it

23:46:03.106 -> WiFi Available: 1

23:46:03.106 -> Bluetooth Available: 1

23:46:03.106 -> Both WiFi and Bluetooth are connected

23:46:04.243 -> WiFi is connected, bluetooth is disconnected, turning on led...

23:46:05.234 -> WiFi Available: 1

23:46:05.234 -> Bluetooth Available: 0

23:46:05.234 -> Only wifi is detected in this proximity and the device is connected to it

23:46:06.272 -> WiFi Available: 1

23:46:06.272 -> Bluetooth Available: 0

23:46:06.272 -> Only wifi is detected in this proximity and the device is connected to it

23:46:07.262 -> WiFi Available: 1

23:46:07.262 -> Bluetooth Available: 0

23:46:07.262 -> Only wifi is detected in this proximity and the device is connected to it

23:46:08.252 -> WiFi Available: 1

23:46:08.252 -> Bluetooth Available: 0

23:46:08.252 -> Only wifi is detected in this proximity and the device is connected to it

23:46:09.245 -> WiFi Available: 1

23:46:09.245 -> Bluetooth Available: 0

23:46:09.245 -> Only wifi is detected in this proximity and the device is connected to it

23:46:10.273 -> WiFi Available: 1

23:46:10.273 -> Bluetooth Available: 0

23:46:10.273 -> Only wifi is detected in this proximity and the device is connected to it

23:46:11.264 -> WiFi Available: 1

23:46:11.264 -> Bluetooth Available: 0

23:46:11.264 -> Only wifi is detected in this proximity and the device is connected to it

23:46:12.254 -> WiFi Available: 1

23:46:12.254 -> Bluetooth Available: 0

23:46:12.254 -> Only wifi is detected in this proximity and the device is connected to it

23:46:13.244 -> WiFi Available: 0

23:46:13.244 -> Bluetooth Available: 0

23:46:13.244 -> No Connectivity...reinitializing

23:46:13.244 -> Reinitializing WiFi...WiFi Reinitialized

23:46:13.433 -> Reinitializing Bluetooth...Bluetooth Reinitialized

23:46:18.833 -> No connectivity..check you device had enough range to connect

23:46:19.827 -> WiFi Available: 0

23:46:19.827 -> Bluetooth Available: 0

23:46:19.827 -> No Connectivity...reinitializing

23:46:19.827 -> Reinitializing WiFi...WiFi Reinitialized

23:46:20.112 -> Reinitializing Bluetooth...Bluetooth Reinitialized

23:46:25.073 -> No connectivity..check you device had enough range to connect

23:46:26.109 -> WiFi Available: 1

23:46:26.109 -> Bluetooth Available: 0

23:46:26.109 -> Only wifi is detected in this proximity and the device is connected to it

23:46:27.096 -> WiFi Available: 1

23:46:27.096 -> Bluetooth Available: 0

23:46:27.096 -> Only wifi is detected in this proximity and the device is connected to it

23:46:28.088 -> WiFi Available: 0

23:46:28.088 -> Bluetooth Available: 0

23:46:28.088 -> No Connectivity...reinitializing

23:46:28.088 -> Reinitializing WiFi...WiFi Reinitialized

23:46:28.088 -> Reinitializing Bluetooth...Bluetooth Reinitialized

23:46:33.099 -> No connectivity..check you device had enough range to connect

23:46:34.077 -> WiFi Available: 0

23:46:34.077 -> Bluetooth Available: 0

23:46:34.077 -> No Connectivity...reinitializing

23:46:34.125 -> Reinitializing WiFi...WiFi Reinitialized

23:46:34.125 -> Reinitializing Bluetooth...Bluetooth Reinitialized

23:46:39.086 -> No connectivity..check you device had enough range to connect

23:46:40.126 -> WiFi Available: 0

23:46:40.126 -> Bluetooth Available: 1

23:46:40.126 -> Only bluetooth is detected in this proximity and the device is connected to it

23:46:41.117 -> WiFi Available: 0

23:46:41.117 -> Bluetooth Available: 1

23:46:41.117 -> Only bluetooth is detected in this proximity and the device is connected to it

23:46:42.110 -> WiFi Available: 0

23:46:42.110 -> Bluetooth Available: 1

23:46:42.110 -> Only bluetooth is detected in this proximity and the device is connected to it

23:46:43.105 -> WiFi Available: 0

23:46:43.105 -> Bluetooth Available: 1

23:46:43.105 -> Only bluetooth is detected in this proximity and the device is connected to it

23:46:44.098 -> WiFi Available: 0

23:46:44.098 -> Bluetooth Available: 1

23:46:44.098 -> Only bluetooth is detected in this proximity and the device is connected to it

23:46:45.125 -> WiFi Available: 0

23:46:45.125 -> Bluetooth Available: 1

23:46:45.125 -> Only bluetooth is detected in this proximity and the device is connected to it

23:46:46.120 -> WiFi Available: 0

23:46:46.120 -> Bluetooth Available: 1

23:46:46.120 -> Only bluetooth is detected in this proximity and the device is connected to it

23:46:47.119 -> WiFi Available: 0

23:46:47.119 -> Bluetooth Available: 1

23:46:47.119 -> Only bluetooth is detected in this proximity and the device is connected to it

23:46:48.112 -> WiFi Available: 0

23:46:48.112 -> Bluetooth Available: 1

23:46:48.112 -> Only bluetooth is detected in this proximity and the device is connected to it

23:46:49.106 -> WiFi Available: 0

23:46:49.106 -> Bluetooth Available: 1

23:46:49.106 -> Only bluetooth is detected in this proximity and the device is connected to it

23:46:50.097 -> WiFi Available: 0

23:46:50.097 -> Bluetooth Available: 0

23:46:50.097 -> No Connectivity...reinitializing

23:46:50.097 -> Reinitializing WiFi...WiFi Reinitialized

23:46:50.097 -> Reinitializing Bluetooth...Bluetooth Reinitialized

23:46:55.103 -> No connectivity..check you device had enough range to connect

23:46:56.097 -> WiFi Available: 0

23:46:56.097 -> Bluetooth Available: 0

23:46:56.097 -> No Connectivity...reinitializing

23:46:56.097 -> Reinitializing WiFi...WiFi Reinitialized

23:46:56.144 -> Reinitializing Bluetooth...Bluetooth Reinitialized

23:47:01.101 -> No connectivity..check you device had enough range to connect

23:47:02.141 -> WiFi Available: 0

23:47:02.141 -> Bluetooth Available: 0

23:47:02.141 -> No Connectivity...reinitializing

23:47:02.141 -> Reinitializing WiFi...WiFi Reinitialized

23:47:02.141 -> Reinitializing Bluetooth...Bluetooth Reinitialized

Frequent Disconnection of Bluetooth over Wifi when both are in on state and wifi is connected

Connected devices

esp32-7216E4
IP address: 192.168.107.129/24
MAC address: D8:13:2A:72:16:E4

23:39:29.841 Connecting to moto ...
23:39:32.326 Connected
23:40:48.317 Connection lost
23:46:00.814 Connecting to moto ...
23:46:02.204 Connected
23:46:02.784 Connection lost
23:46:34.741 Connecting to moto ...
23:46:38.027 Connected
23:46:48.941 Connection lost