Experiment 3.2

Name: Rajdeep Jaiswal **UID:20BCS2761**
Branch: B.E-CSE **Section/Group:902/B**
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Subject Name: IOT Lab **Subject Code:20CSP-358**

Aim: Real Time application of controlling actuators through Bluetooth application using Arduino.

Components Required:

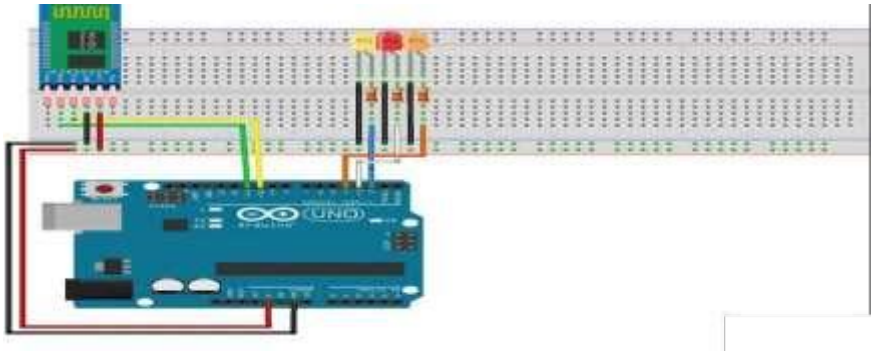
8 Male/Male Jumper Wires
1 HC-05 Bluetooth Module
1 (5 mm) LED: Red
1 Arduino UNO 1 Resistor
1k ohm

Apps and platforms: 1
Arduino IDE
1 MIT App Inventor

Step 1 Here is what you need to control Led's with Bluetooth:

- Arduino
- HC-05 Bluetooth module
- Solder less breadboard
- 3 Led's
- 3 220Ω resistors
- Wires
- Most importantly your phone and a downloaded Bluetooth app (Arduino Bluetooth Controller, which offers many different features)

Step 2: Circuit



Bluetooth module connection:

- Connect the BT module's Rx pin to pin 11 on the Arduino
- Connect the BT module's Tx pin to pin 10 on the Arduino
- Connect up the Gnd and Vcc (5v) to the Arduino

Led's connection

- Connect all the cathodes (short pin) of the led to Gnd
- Connect each anode to a 220Ω resistor
- Connect a resistor to Arduino pin 2,3 and 4

If the led on the Bluetooth Module is blinking quickly then it is ready to pair to your phone, if not then check your connections

Code:

```
const int LED = 5; char switchstate; void
setup() {//Here the code only runs once. Serial.begin(9600);
pinMode(LED, OUTPUT); } void loop() {//This code repeats.
      This    is      our     main    code.
while(Serial.available()>0){
//code to be executed only when Serial.available()>0  switchstate
= Serial.read();
Serial.print(switchstate); Serial.print("\ "); delay(15);  if(switchstate ==
'1'){//Checking if the value from app is '1' digitalWrite(5, HIGH);
} else if(switchstate == '0'){//Else, if the vaue from app is '0', digitalWrite(5,
LOW);//Write the component on pin 5(LED) low.
} }}
```

1. **Hardware configurations:**

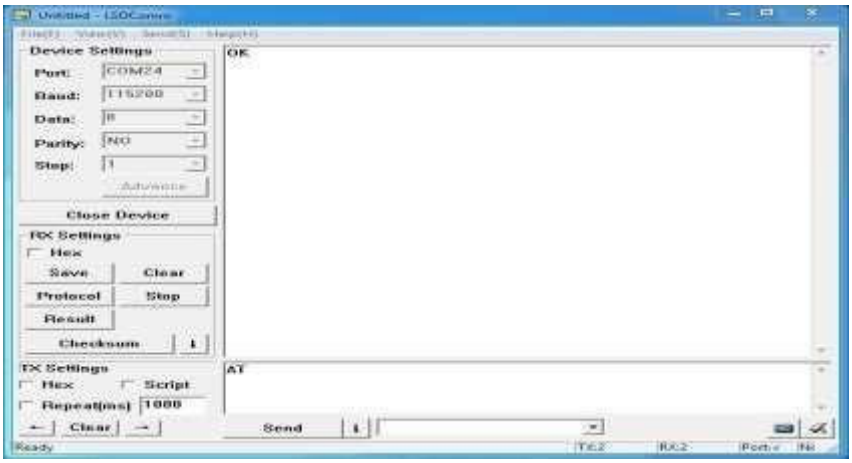
Step 1: Connect the Grove – Blueseeed – Dual model (HM13) to a Grove port on the Grove – Base Shield via the Grove cable

Step 2: Plug Grove – Base Shield into your Arduino board **Step 3:** Connect your Arduino to PC via USB cable

Step 1: Open a serial terminal and set Baud Rate: 115200, Databits: 8, Stopbits: 1, and no flow control like above

Step 2: Send "AT" to Bluetooth with the serial terminal to check if you receive an "OK" The Bluetooth only respond AT commands either when: No connection is set up All commands were seen as string and sent out

*You can distinguish the above status in step 2 through LED indications.



We used two Bluetooth that were connected with the PC, with one set as central while the other as Peripheral. Several seconds later, they find each other, and the LED stops flashing connected!

2. How to pair Arduino Bluetooth Module with iPhone and Andriod

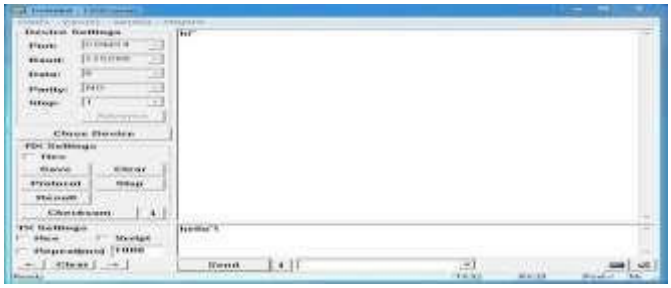
Step 1: Power the Bluetooth and configure it as a Peripheral role

Step 2: Search Light Blue in the App Store and install it **Step 3:** Launch the app, and connect to "HM-13-BLE

Step 4: Touch on properties and hit "listen for notifications" to enable data receiving There's a "Hex" key on the top right under properties to change data format as well

Step 5: Hit "Write new value" and write some words to start sending data to the PC

With the serial terminal, you can transfer data from the PC to iPhone as well:



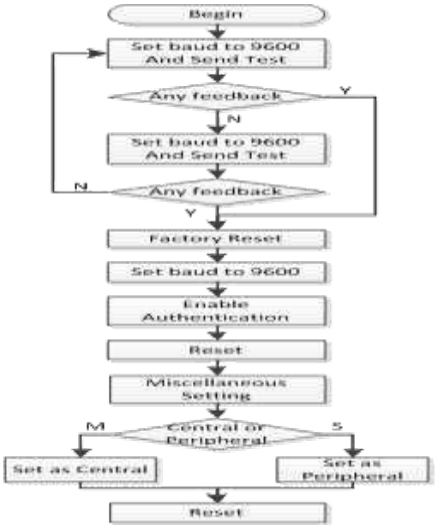
Bluetooth Data transmission guide between two Arduino boards

Step 1: Set up the connection mentioned in the hardware configurations section

Step 2: Assign the Bluetooth to the Central role by modifying the text to "#define MASTER 1"

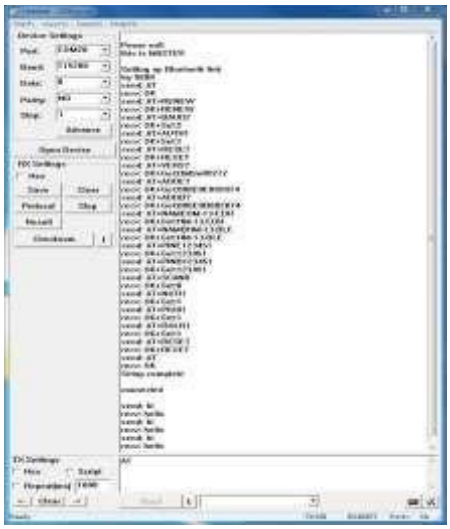
The program of Central and Peripheral use the same code but there's a difference in the micro define at the beginning of the program

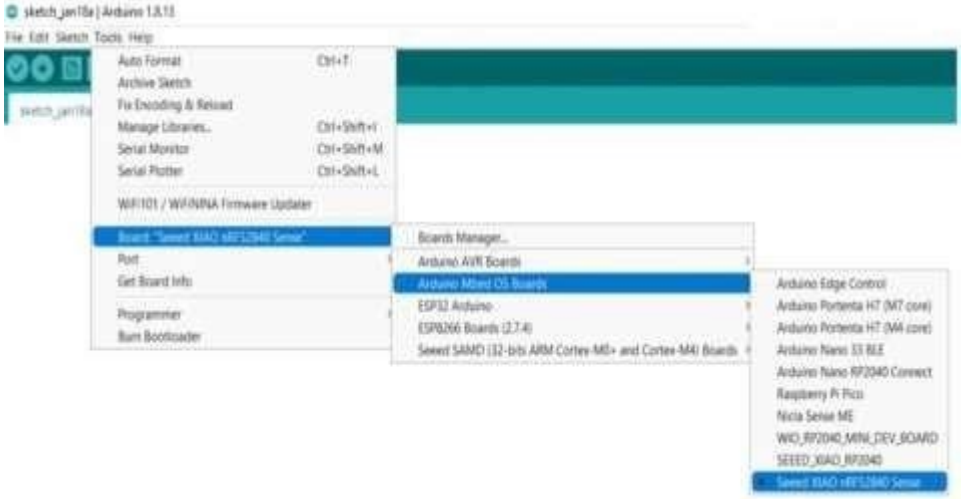
Step 3: Follow the flow chart below for initialization of the program



Step 4: Download the test code and open HM-13_SW.ino with Arduino IDE, compile and download to Arduino Uno

Step 5: After the program is downloaded, open two serial terminal windows and wait for the Bluetooth connection

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File Edit Sketch Tools Help
Auto Format Ctrl+T
Archive Sketch
Fix Encoding & Reload
Manage Libraries... Ctrl+Shift+I
Serial Monitor Ctrl+Shift+M
Serial Plotter Ctrl+Shift+L
WiFi101 / WiFiNINA Firmware Updater
Board: "Seeed XIAO nRF52840 Sense"
Port
Get Board Info
Programmer
Burn Bootloader
Boards Manager...
Arduino AVR Boards
Arduino Mbed OS Boards
ESP32 Arduino
ESP8266 Boards (2.7.4)
Seeed SAMD (32-bits ARM Cortex-M0+ and Cortex-M4) Boards
Arduino Edge Control
Arduino Portenta H7 (M7 core)
Arduino Portenta H7 (M4 core)
Arduino Nano 33 BLE
Arduino Nano RP2040 Connect
Raspberry Pi Pico
Nicla Sense ME
WIO_RP2040_MINI_DEV_BOARD
SEEED_XIAO_RP2040
Seeed XIAO nRF52840 Sense