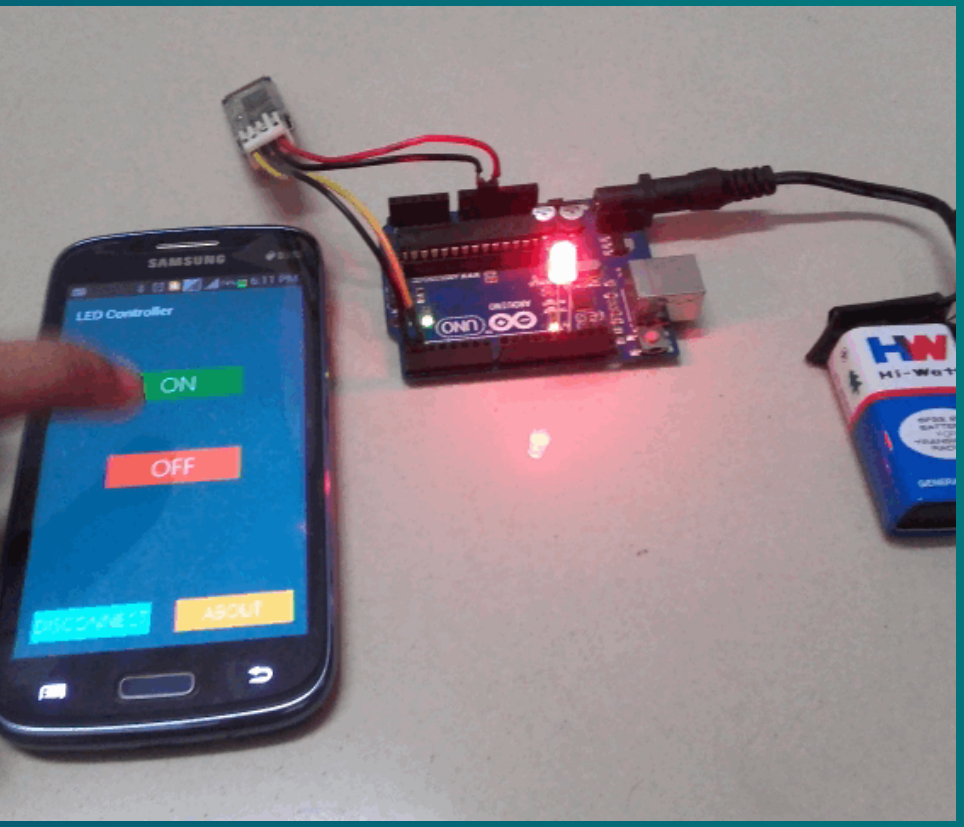
Internet Of Things



Bluetooth Connectivity

Go wireless!

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Bluetooth is a standard wire-replacement communications protocol primarily designed for low-power consumption, with a short range based on low-cost transceiver microchips in each device using using short-wavelength UHF radio waves in the ISM band from 2.4 to 2.485 GHz.

Invented by telecom vendor Ericsson in 1994, it was originally conceived as a wireless alternative to RS-232 data cables. The latest bluetooth technology module, Bluetooth 5, officially unveiled during a media event in London (UK) on June 16th, 2016.

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Bluetooth Classic HC-05

Bluetooth protocal: Bluetooth v2.0 + EDR
Frequency: 2.4GHz ISM band
Modulation: GFSK
Emission power: ≤4dBm, Class 2
Sensitivity: ≤-84dBm at 0.1% BER
Speed Asynchronous: 2.1 Mbps (Max)
Speed Synchronous: 1 Mbps
Security: Authentication & encryption
Profiles: Bluetooth serial port
Power supply: +3.3 VDC 50 mA
Working temperature: -20 ~ +75 Centigrade
Dimension: 26.9 mm x 13 mm x 2.2 mm

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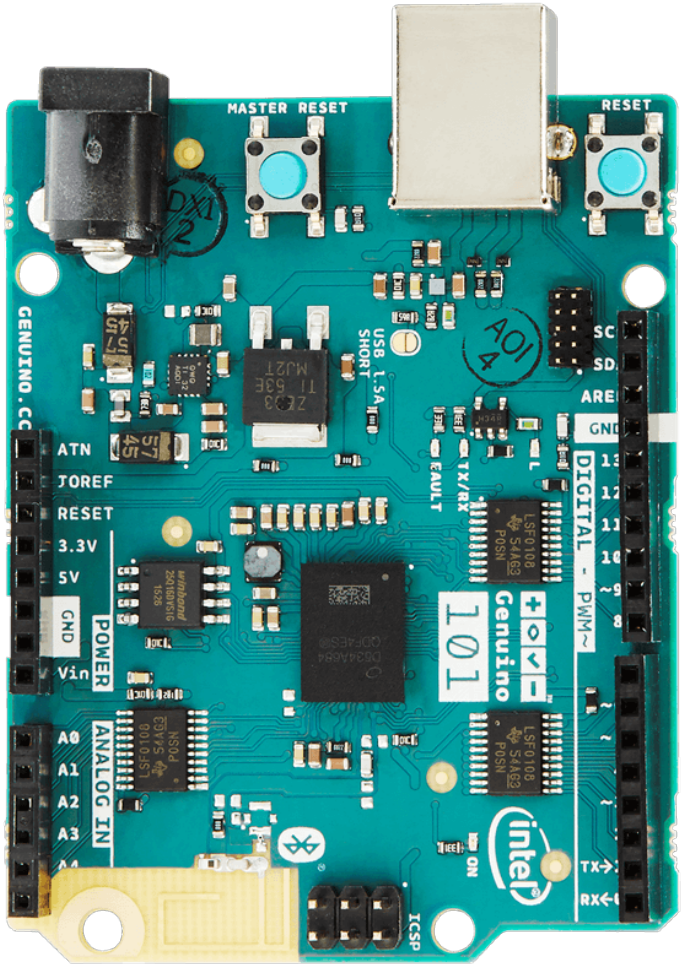
Arduino 101 Bluetooth Low Energy



Microcontroller: Intel Curie
Operating Voltage: 3.3V (5V I/O)
Input Voltage: 7-12V
Digital I/O: Pins14
PWM Digital I/O: Pins 4
Analog Input: Pins 6
DC Current per Pin: 20 mA
Flash Memory: 196 kB
SRAM: 24 kB
Clock Speed: 32MHz
Features: Bluetooth LE, 6-axis accel/gyro
Length: 68.6 mm
Width: 53.4 mm
Weight: 34 gr

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Arduino & Bluetooth

1. AT Commands
2. Arduino Serial Communication
3. Android MIT App Inventor

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AT Commands

AT commands are instructions used to control a modem or wireless communication module such as bluetooth device. AT is the abbreviation of ATtention, and every command line starts with "AT" or "at". That's why it commands are called AT commands.

```
AT+NAME=Lin01      // change name to “Lin01”
AT+ADDR?           // view MAC Address
AT+PSWD?           // view password, default = 1234
AT+PSWD=9876       // change password to = 9876
```

https://www.itead.cc/wiki/Serial_Port_Bluetooth_Module_(Master/Slave)_:_HC-05

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Setting BT HC-05

```
#include <SoftwareSerial.h>
SoftwareSerial btSerial(2, 3); // RX | TX

void setup() {
  Serial.begin(9600);
  Serial.println("Enter AT commands:");
  btSerial.begin(38400);
  // HC-05 default baudrate in AT commands
}

void loop() {
  if (btSerial.available())
     Serial.write(btSerial.read());
  if (Serial.available())
     btSerial.write(Serial.read());
}
```

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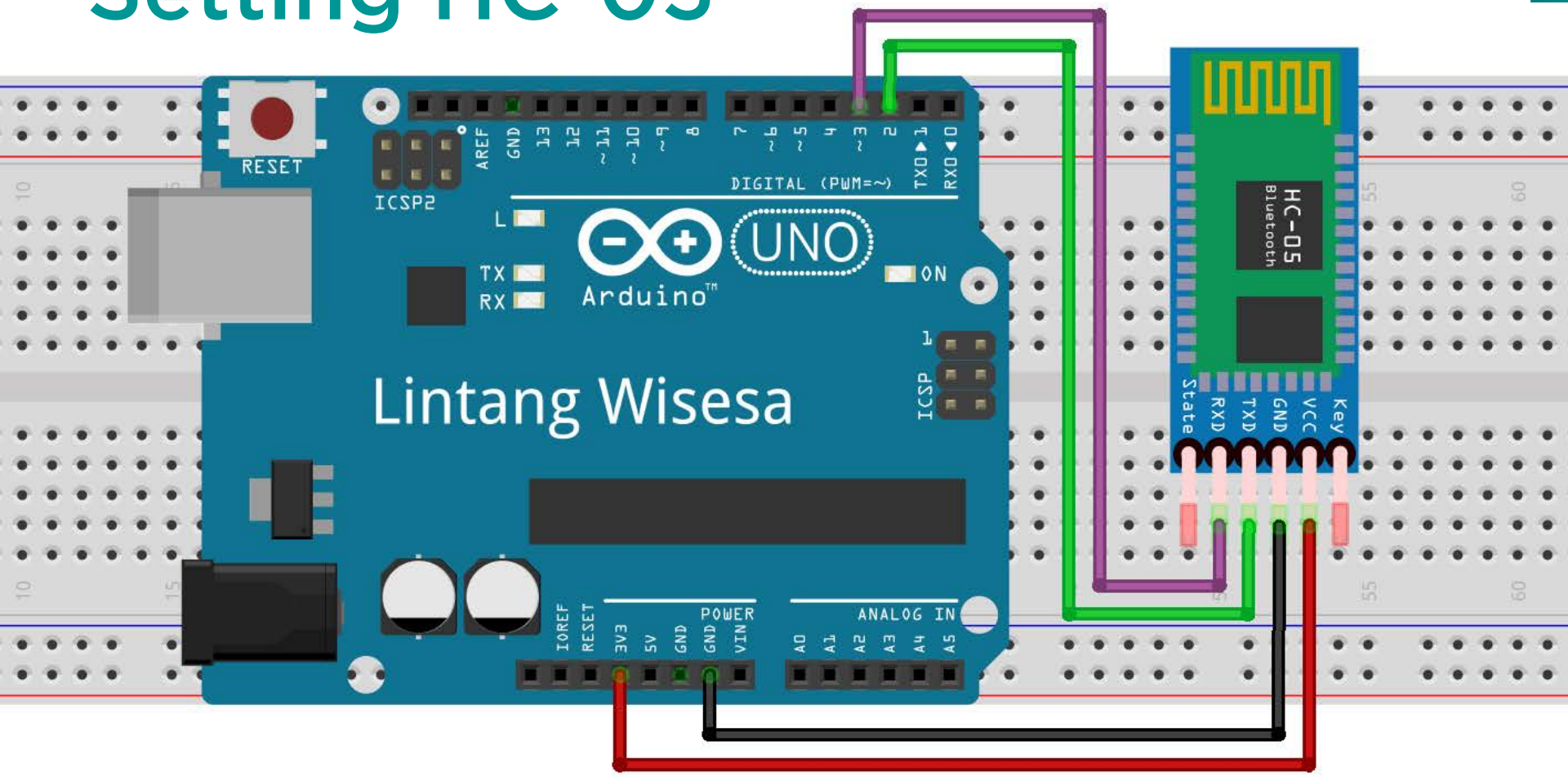
Setting HC-05



- Untuk masuk mode AT, saat memasang VCC ke 3.3v sembari tekan & tahan tombol reset kecil di HC-05.
- Tanda sudah masuk mode AT: HC-05 blink lambat tiap 2 detik & AT command dapat diakses via serial monitor (Both NL&CR).

Setting Bluetooth HC-05

Open Serial Monitor & Access AT Command

```
AT                  // test AT command, respond = “OK”
AT+ADDR?            // view MAC Address
AT+PSWD?            // view password, default = 1234

AT+NAME=Lin01       // change name to “Lin01”
AT+PSWD=9876        // change password to = 9876
```

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BlueTerm

pymasde.es Communication

1,285

3+

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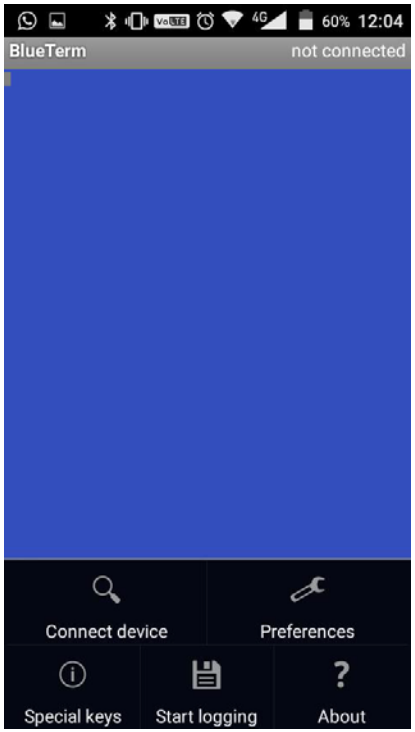
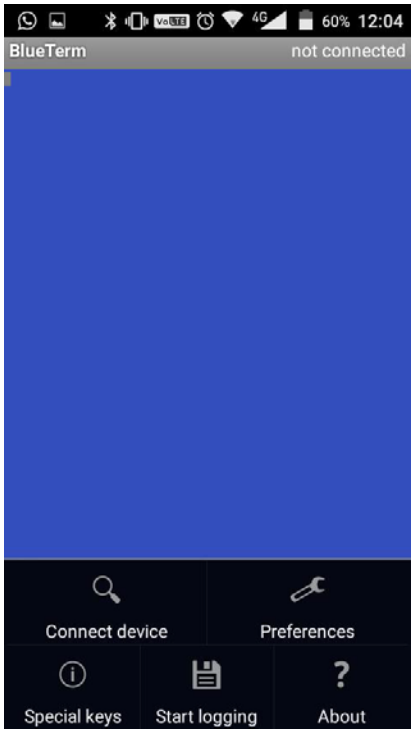




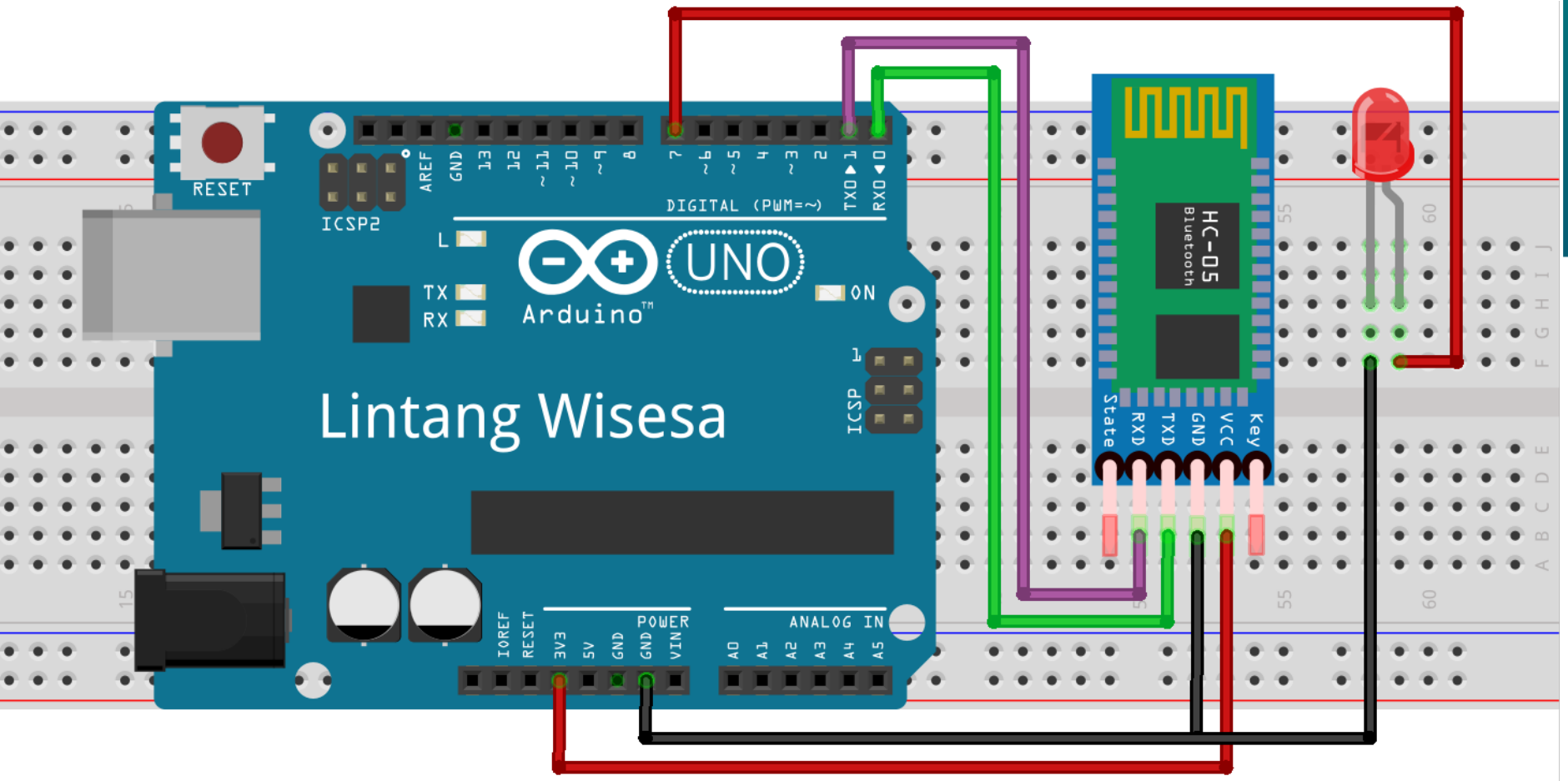
Bluetooth Control & Monitor

```
int led = 7; char input;

void setup () {
  pinMode (led,OUTPUT);
  Serial.begin(9600);
  Serial.println("Komunikasi Serial BT");}

void loop () {
  if (Serial.available()) {
    input = Serial.read();
    if (input == 'a' || input == 'A')
       {digitalWrite(led, HIGH);
       Serial.println("LED Hidup");}
    if (input == 's' || input == 'S')
       {digitalWrite(led, LOW);
       Serial.println("LED Mati");}
}}
```

Bluetooth Control & Monitor



fritzing

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Android MIT App Inventor

1. Click *ai2.appinventor.mit.edu*
2. Design your app's interface
3. Code your app with block

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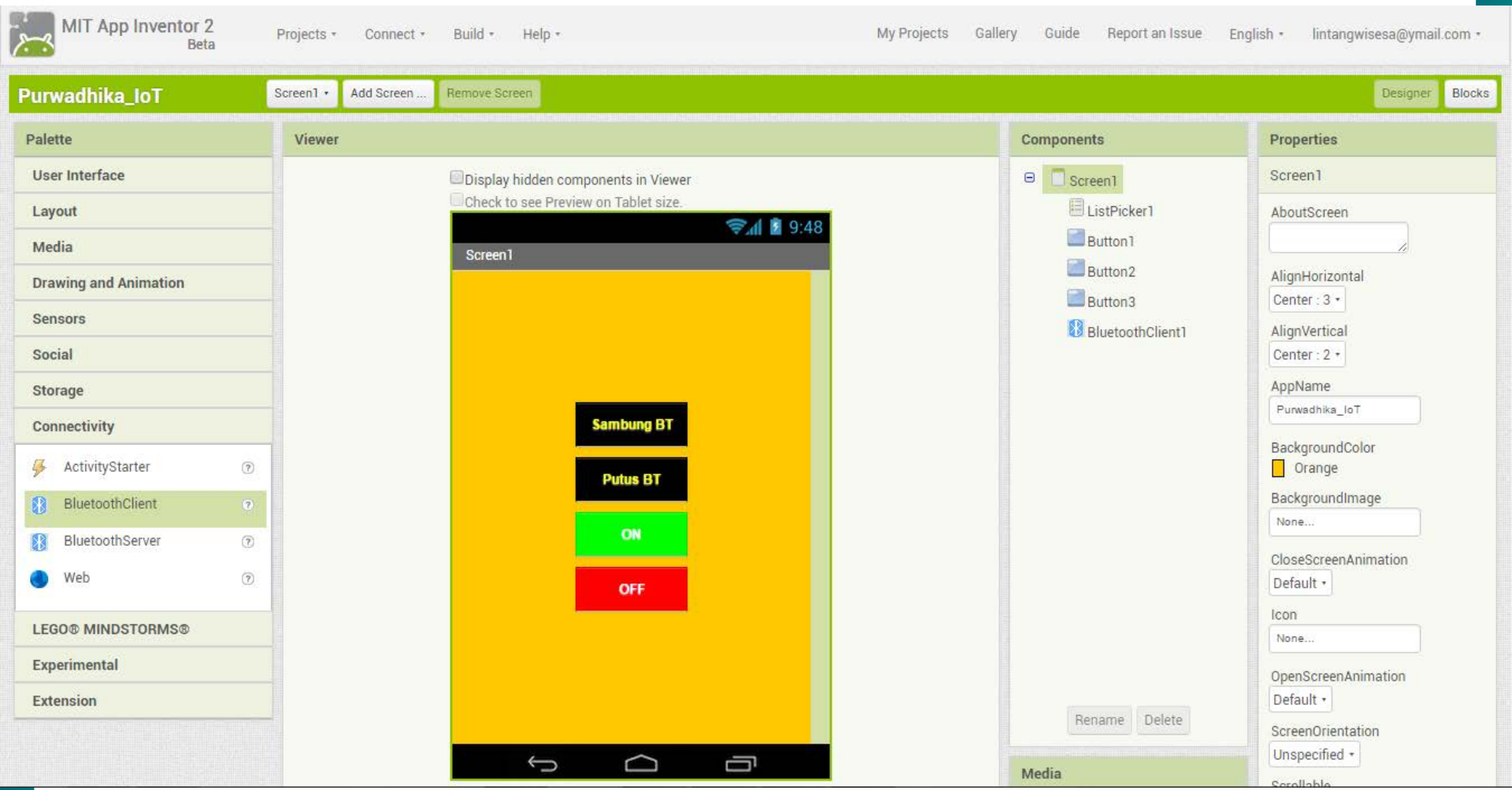

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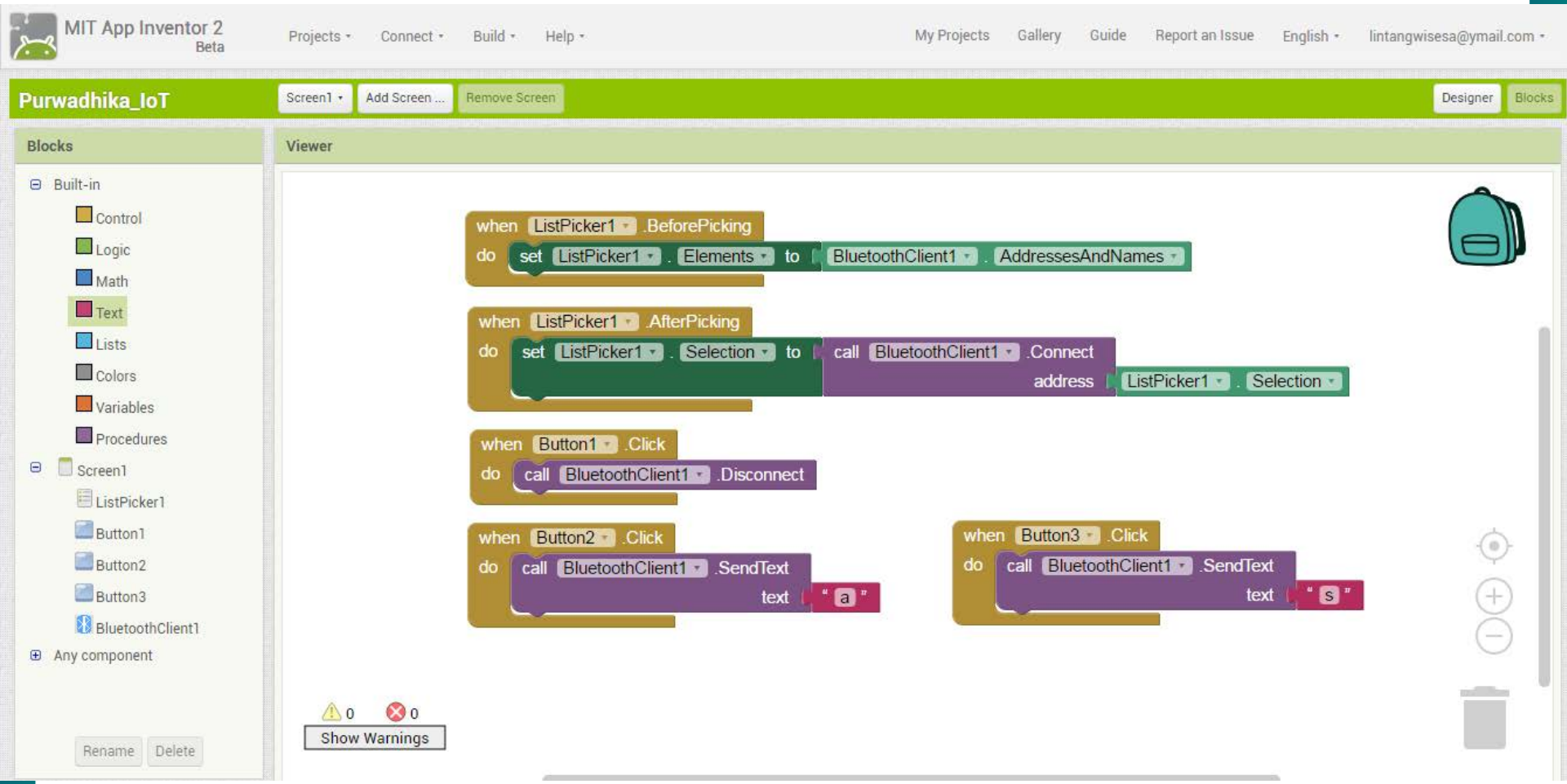

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MIT AI2 Companion

MIT Center for Mobile Learning Education

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