

IoT2016 week2

2016/9/20

周君哲

器材清單

1. Intel Edison with arduino breakout board
2. Micro USB cable * 2
3. Touch pad
4. RGB led
5. Light sensor
6. Male to male cable * 3
7. Male to female cable * 7

Intel Edison

- ▶ Intel(R) Atom(TM) CPU U1000 @ 500MHz
- ▶ cpu cores : 2

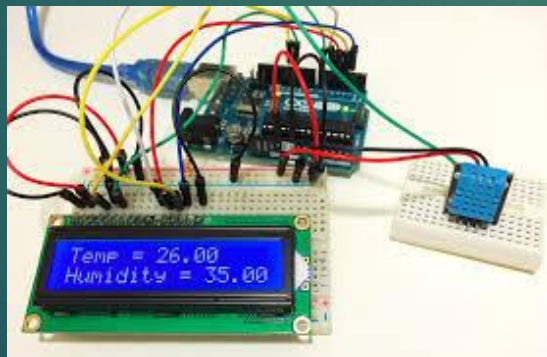


Sensor

- ▶ Digital:



- ▶ Analog:

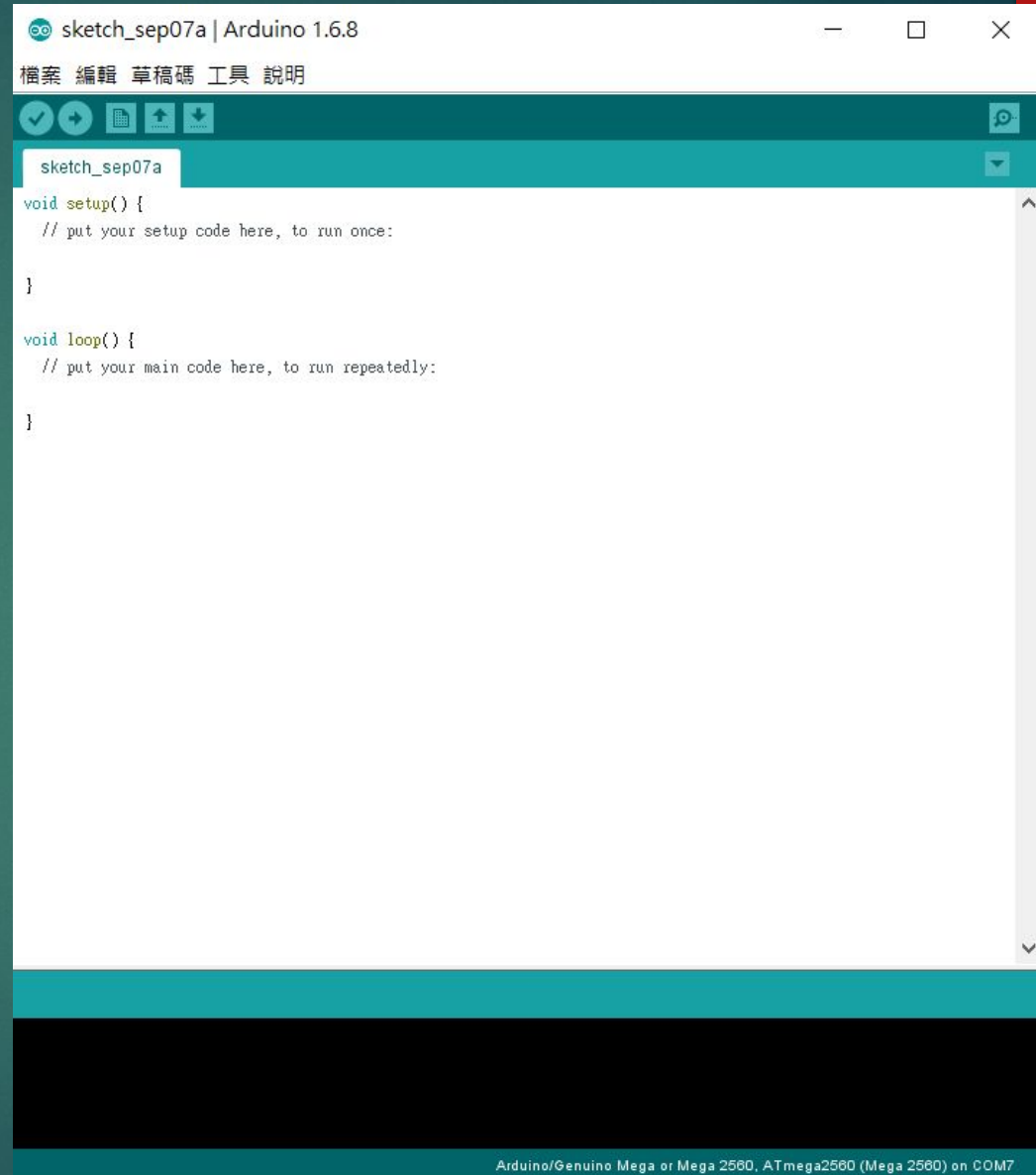


Actuator

- ▶ Digital:



Arduino IDE



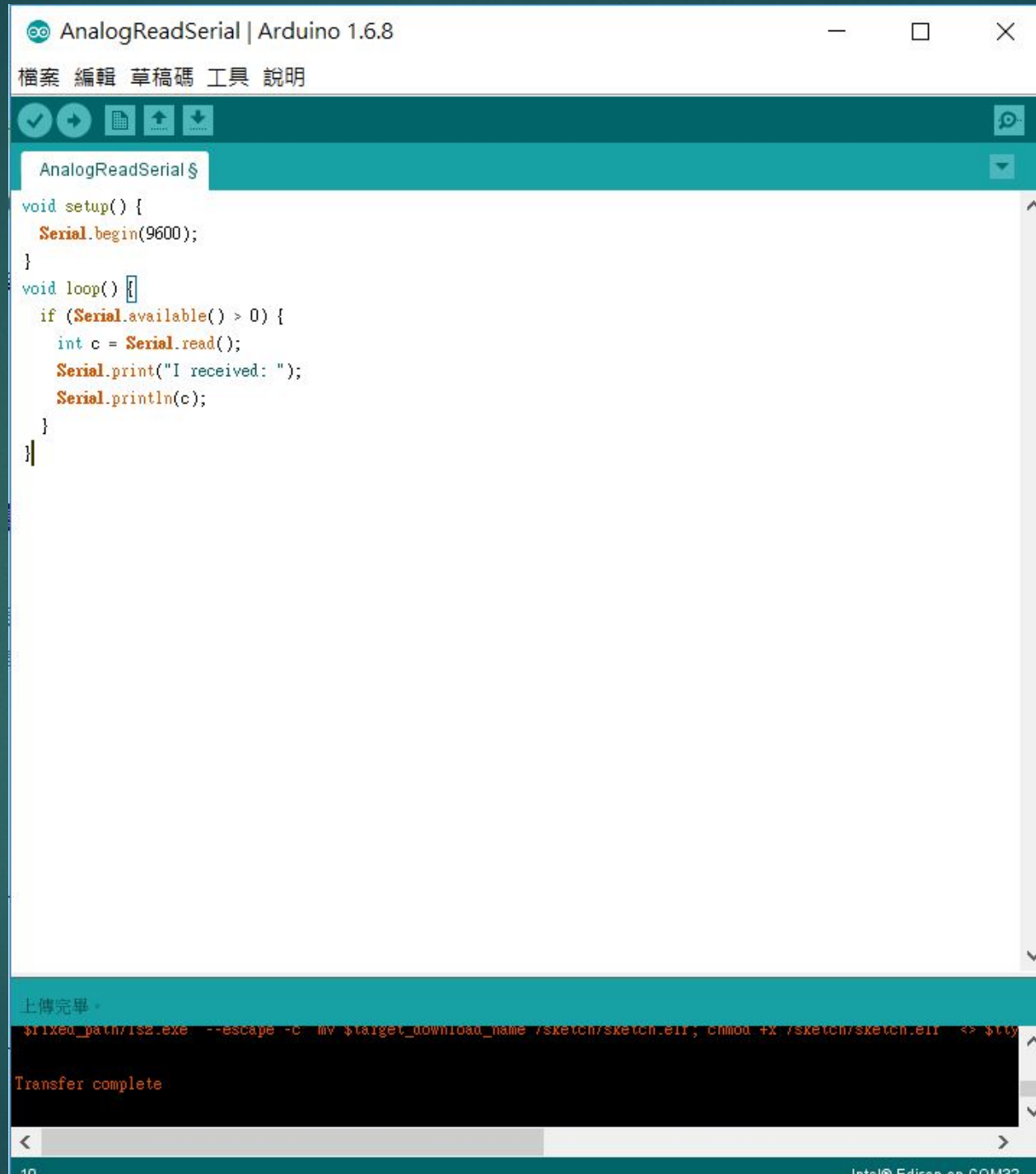
Arduino Program

```
void setup() {  
  // put your setup code here, to run once:  
  
}  
  
void loop() {  
  // put your main code here, to run repeatedly:  
  
}
```

Serial Read Write

```
void setup() {  
  Serial.begin(9600);  
}  
void loop() {  
  if (Serial.available() > 0) {  
    int c = Serial.read();  
    Serial.print("I received: ");  
    Serial.println(c);  
  }  
}
```


Coding



The screenshot shows the Arduino IDE interface. The title bar reads "AnalogReadSerial | Arduino 1.6.8". The menu bar includes "檔案", "編輯", "草稿碼", "工具", and "說明". The toolbar contains icons for saving, undo, redo, and other editing functions. The main text area displays the following C++ code:

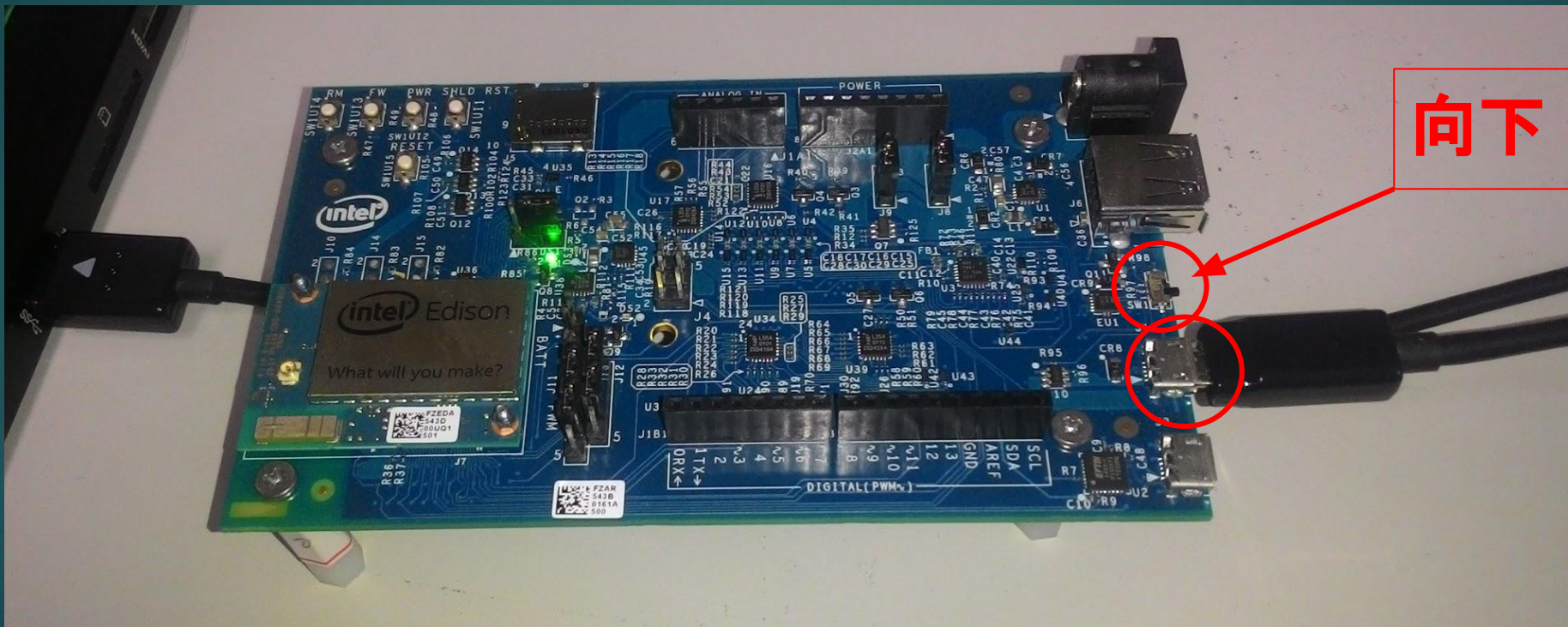
```
void setup() {  
  Serial.begin(9600);  
}  
void loop() {  
  if (Serial.available() > 0) {  
    int c = Serial.read();  
    Serial.print("I received: ");  
    Serial.println(c);  
  }  
}
```

Below the code editor is the serial monitor window, which shows the message "上傳完畢" (Upload complete) and the command prompt output:

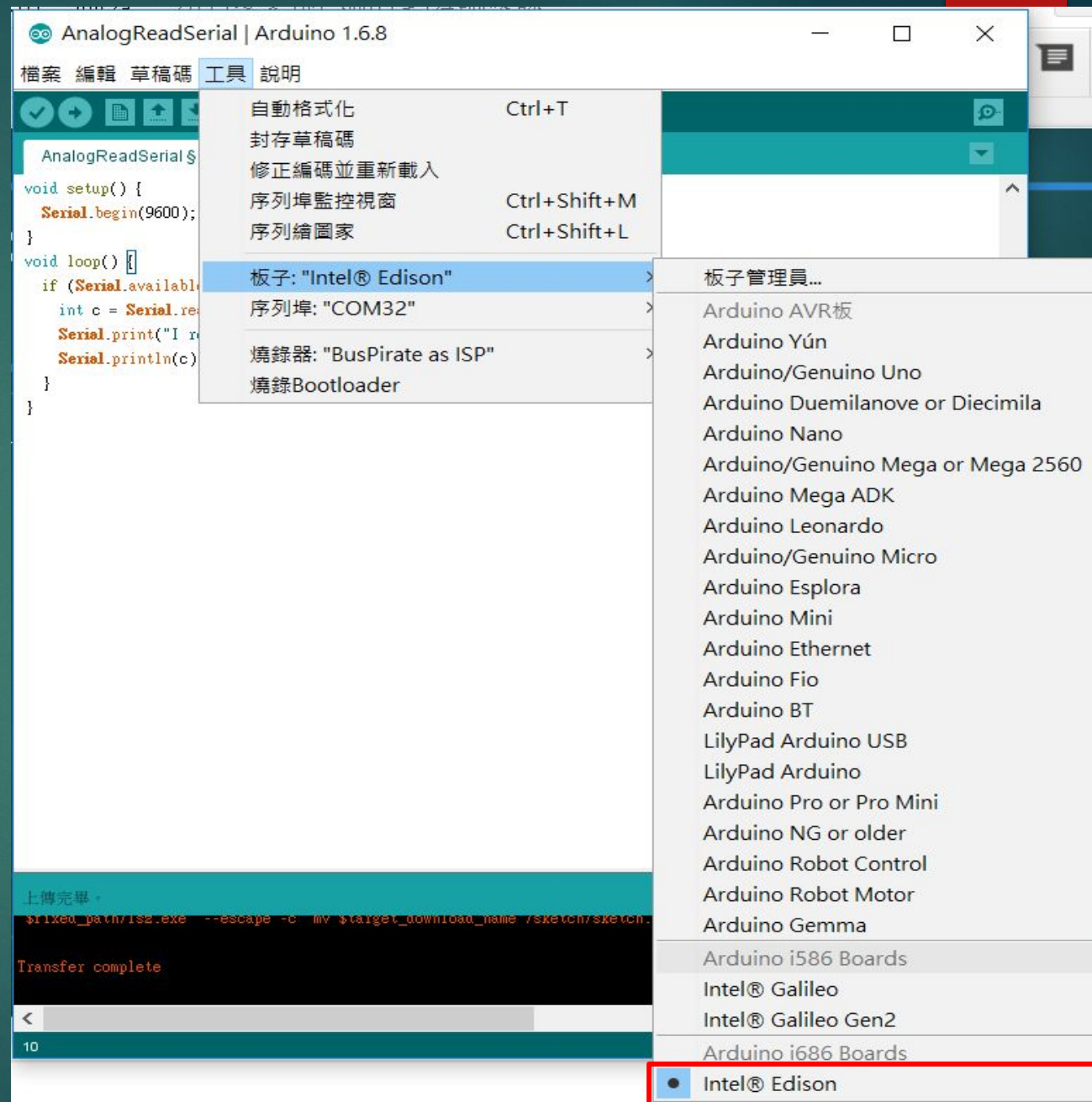
```
$fixed_path/ls2.exe --escape -c mv $target_download_name /sketch/sketch.elf; chmod +x /sketch/sketch.elf -> $tty
```

The serial monitor also displays "Transfer complete". The status bar at the bottom indicates "Intel® Edison on COM32".

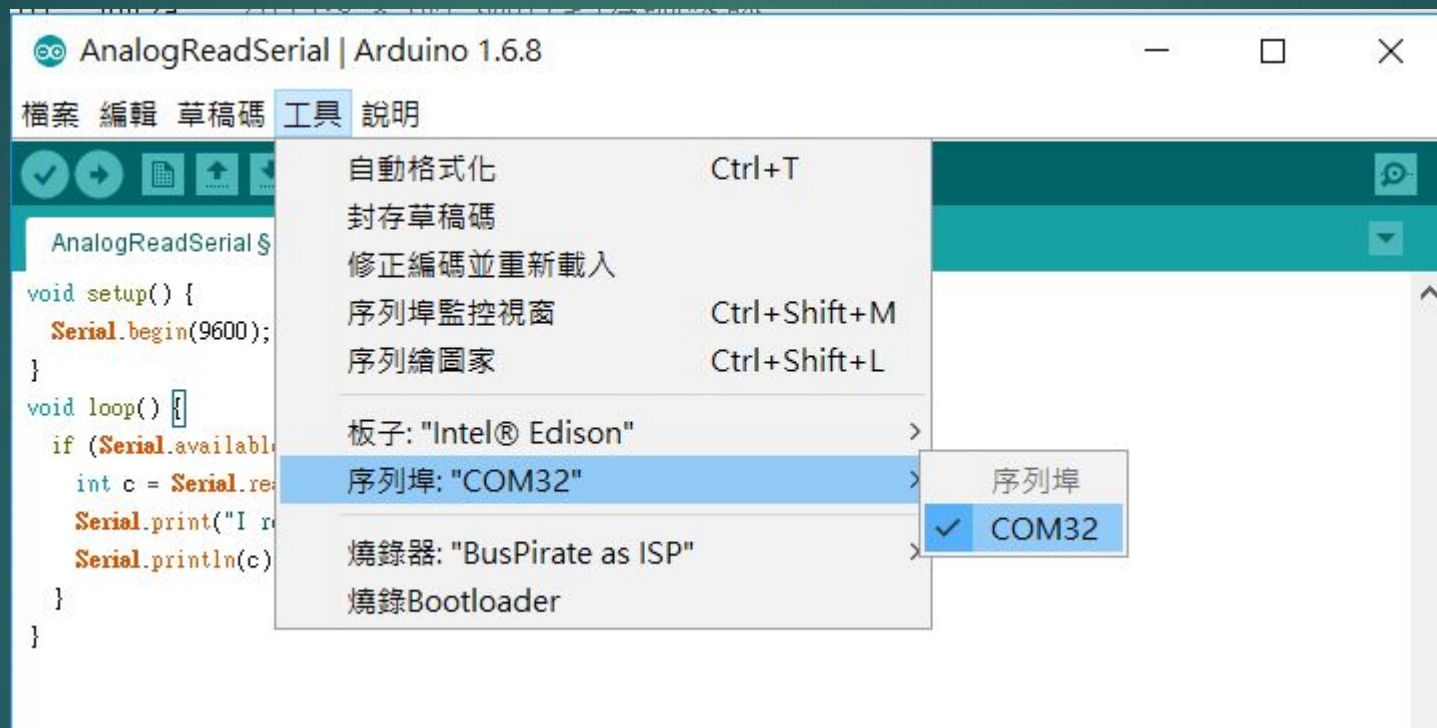
Connect to Device



Choice the Device



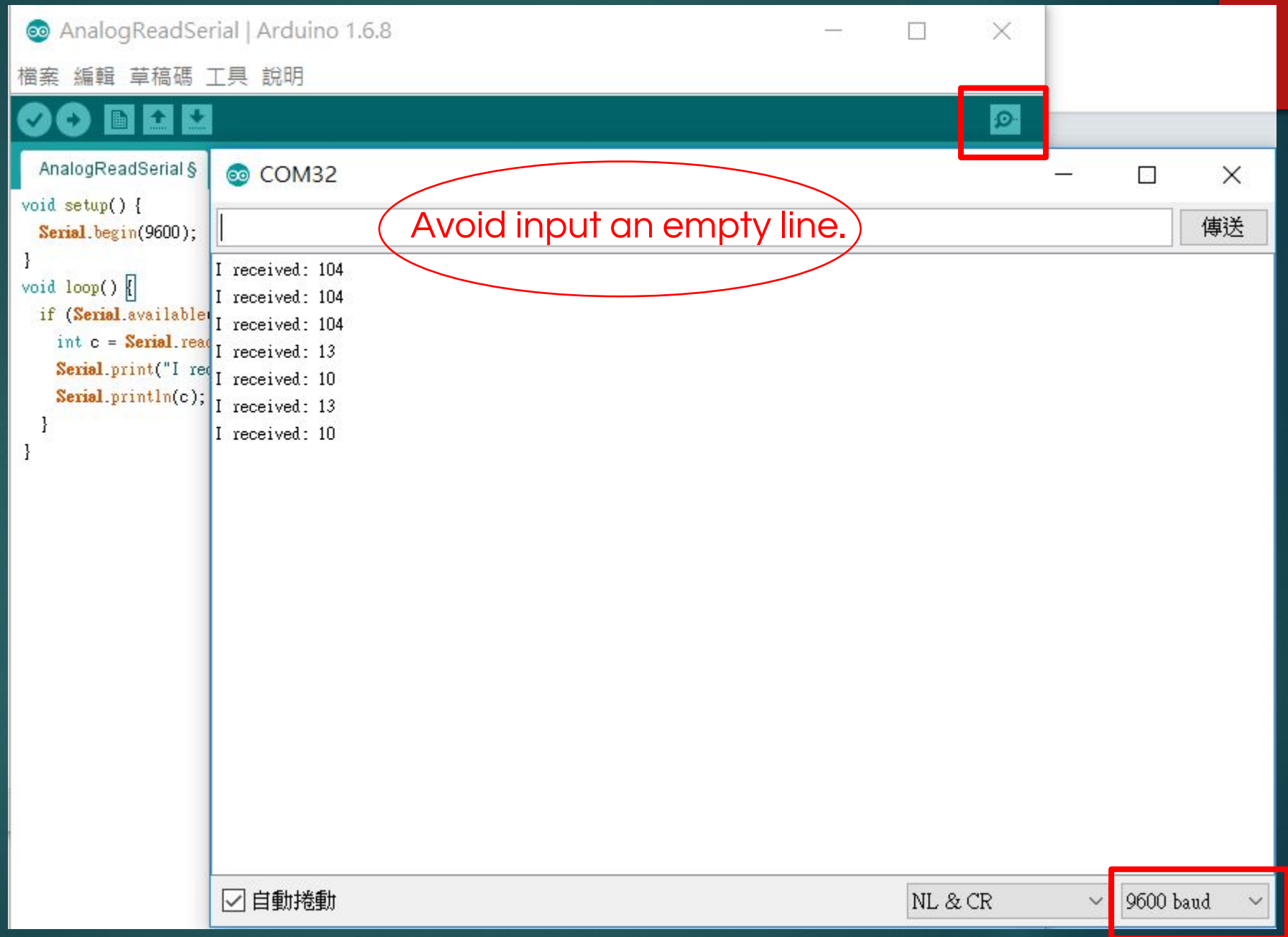
Choice the Port



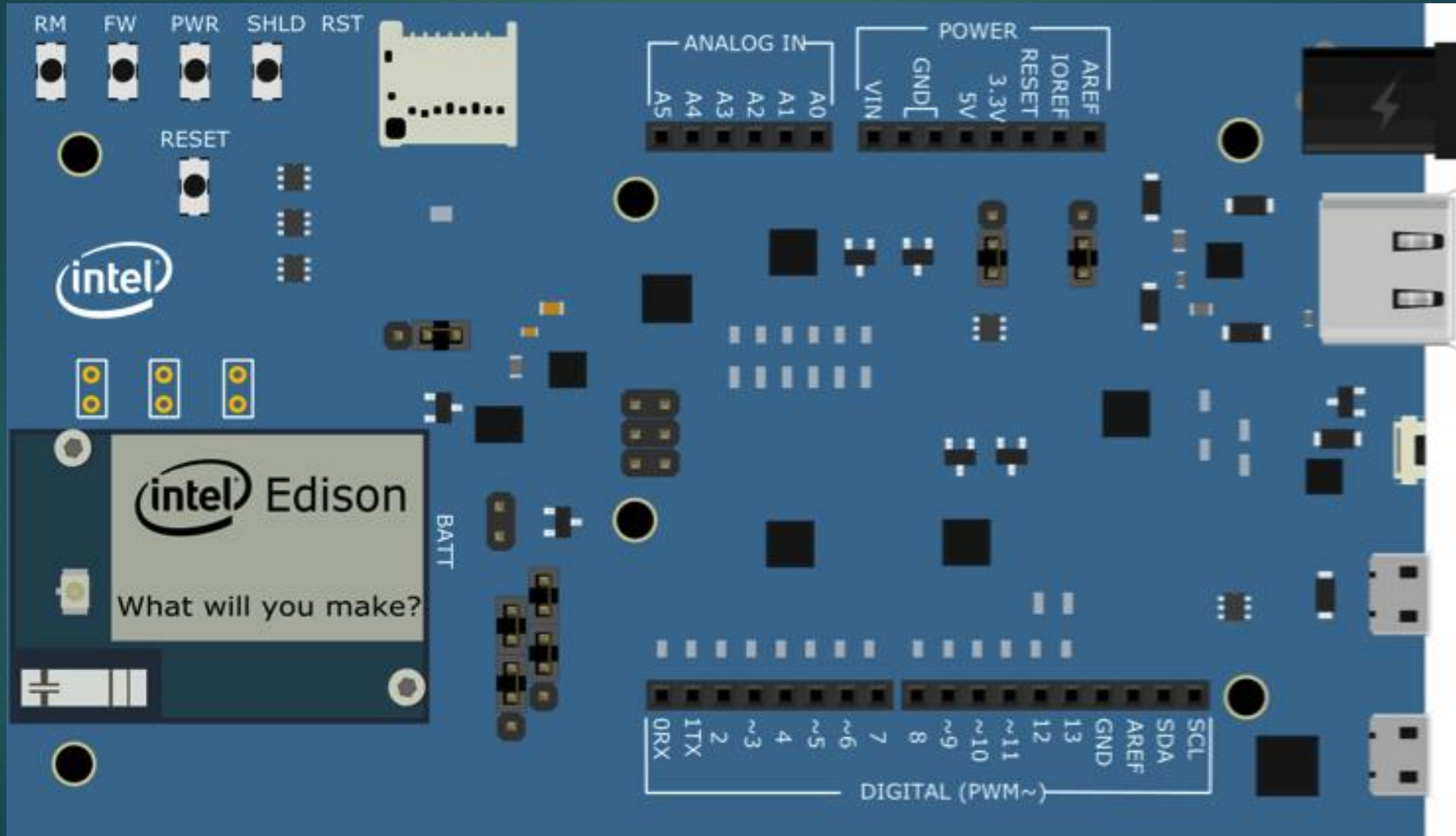
Upload to Device



Result

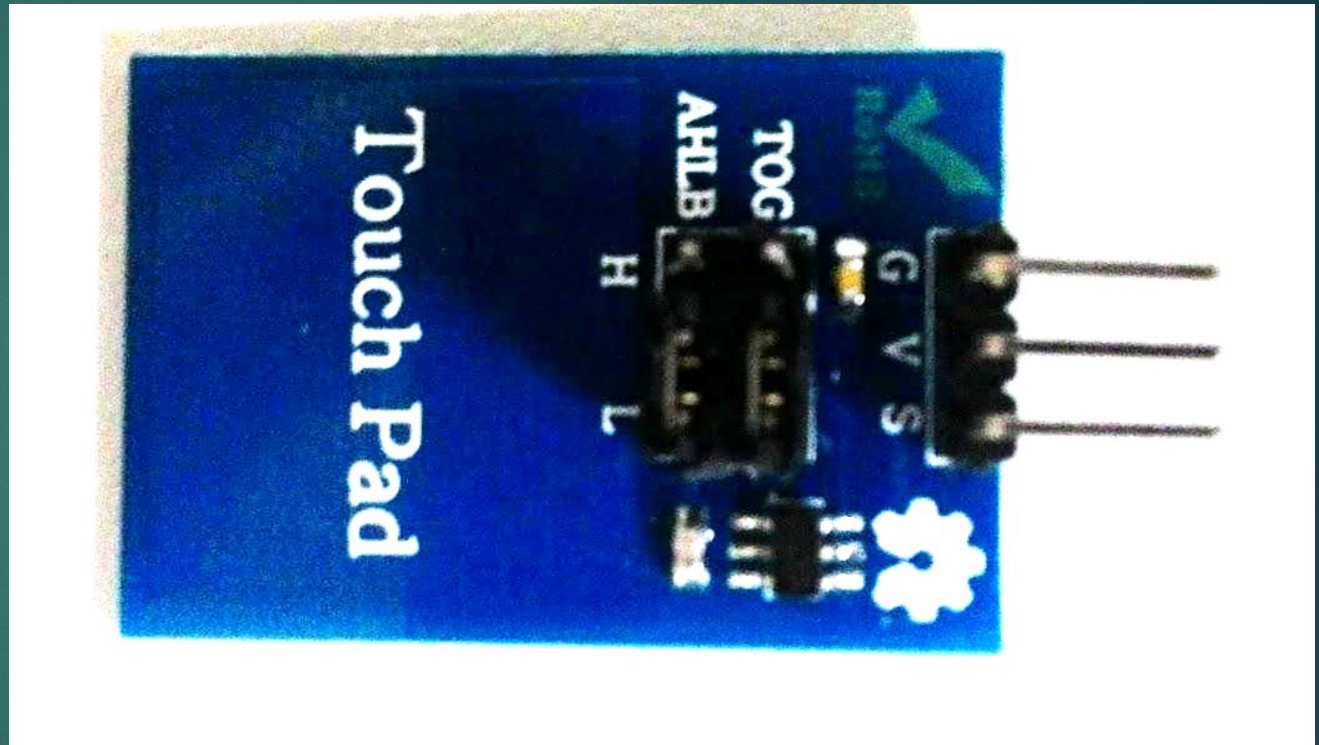


Edison and Arduino Breakout Pins



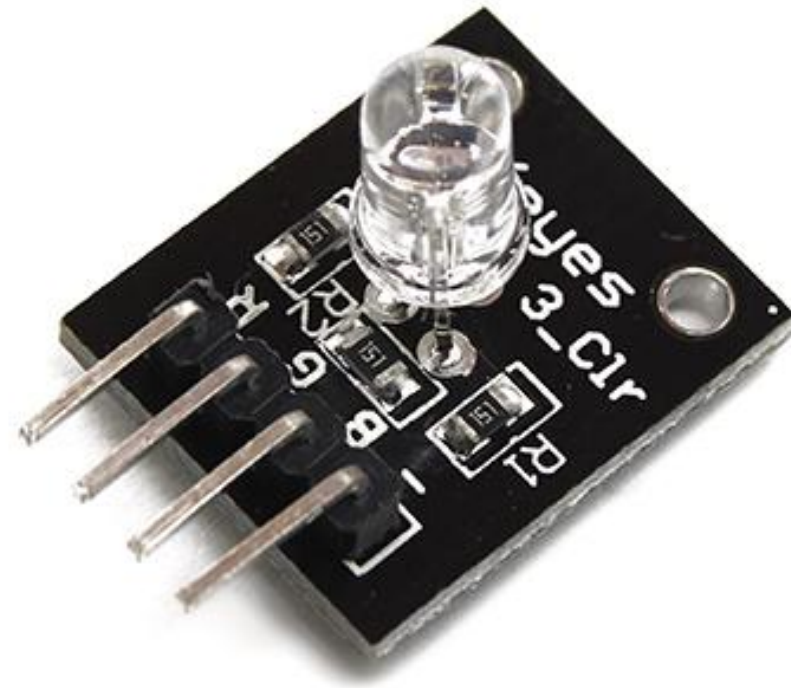
Touch Pad

- ▶ G -> GND
- ▶ V -> 3.3V
- ▶ S -> Digital 2

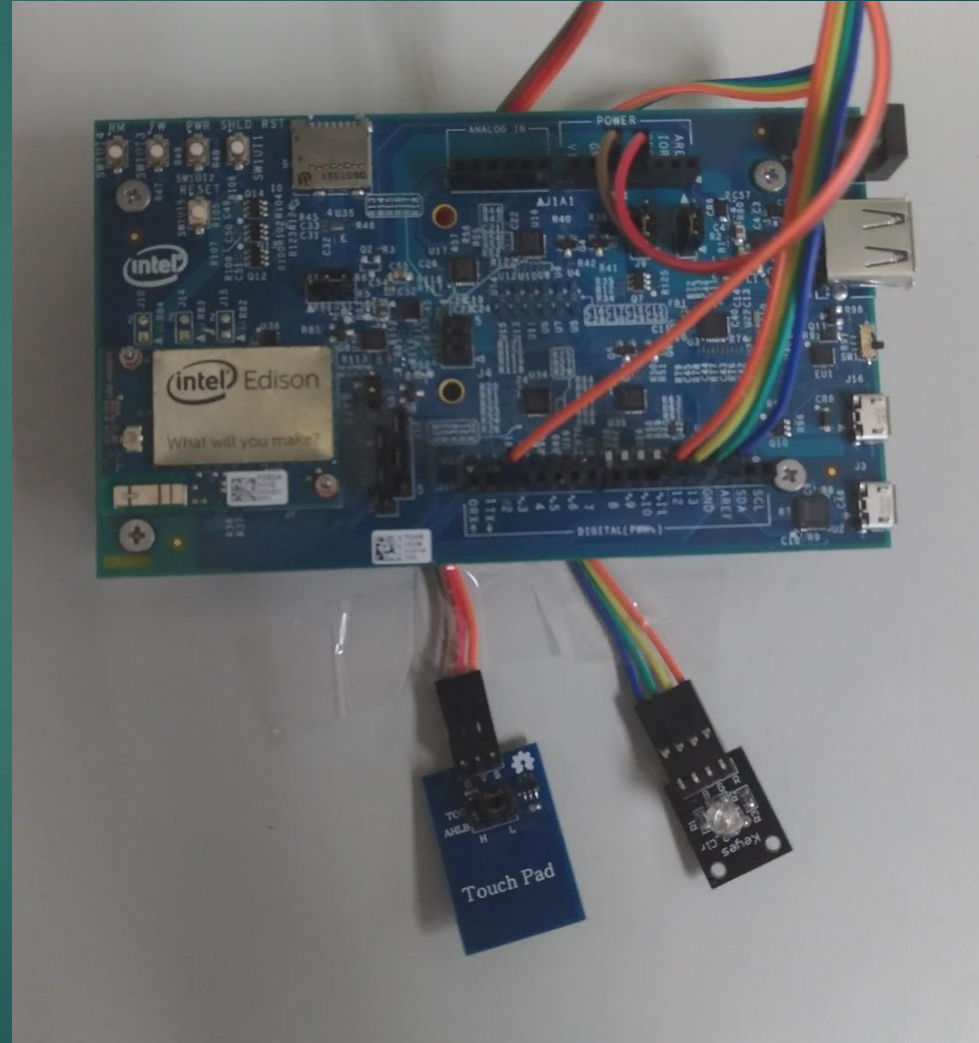


RGB Led

- ▶ — -> GND
- ▶ B -> Digital 13
- ▶ G -> Digital 12
- ▶ R -> Digital 11



After Connection



Digital I/O

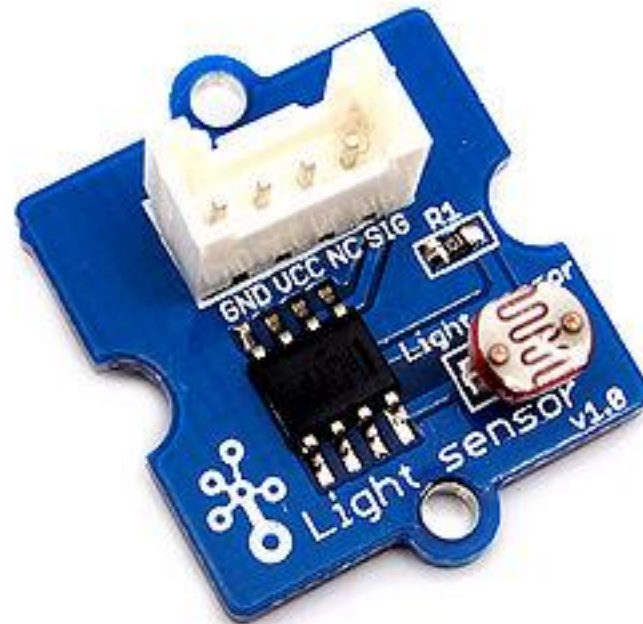
```
void setup() {  
    pinMode(2, INPUT);  
    pinMode(13, OUTPUT); //pin 13 for the Led on board  
}  
  
void loop() {  
    int touchPadState = digitalRead(2);  
    if (touchPadState == HIGH) { //touched  
        digitalWrite(13, HIGH);  
    } else {  
        digitalWrite(13, LOW);  
    }  
}
```

Exercise 1 - RGB LED Control

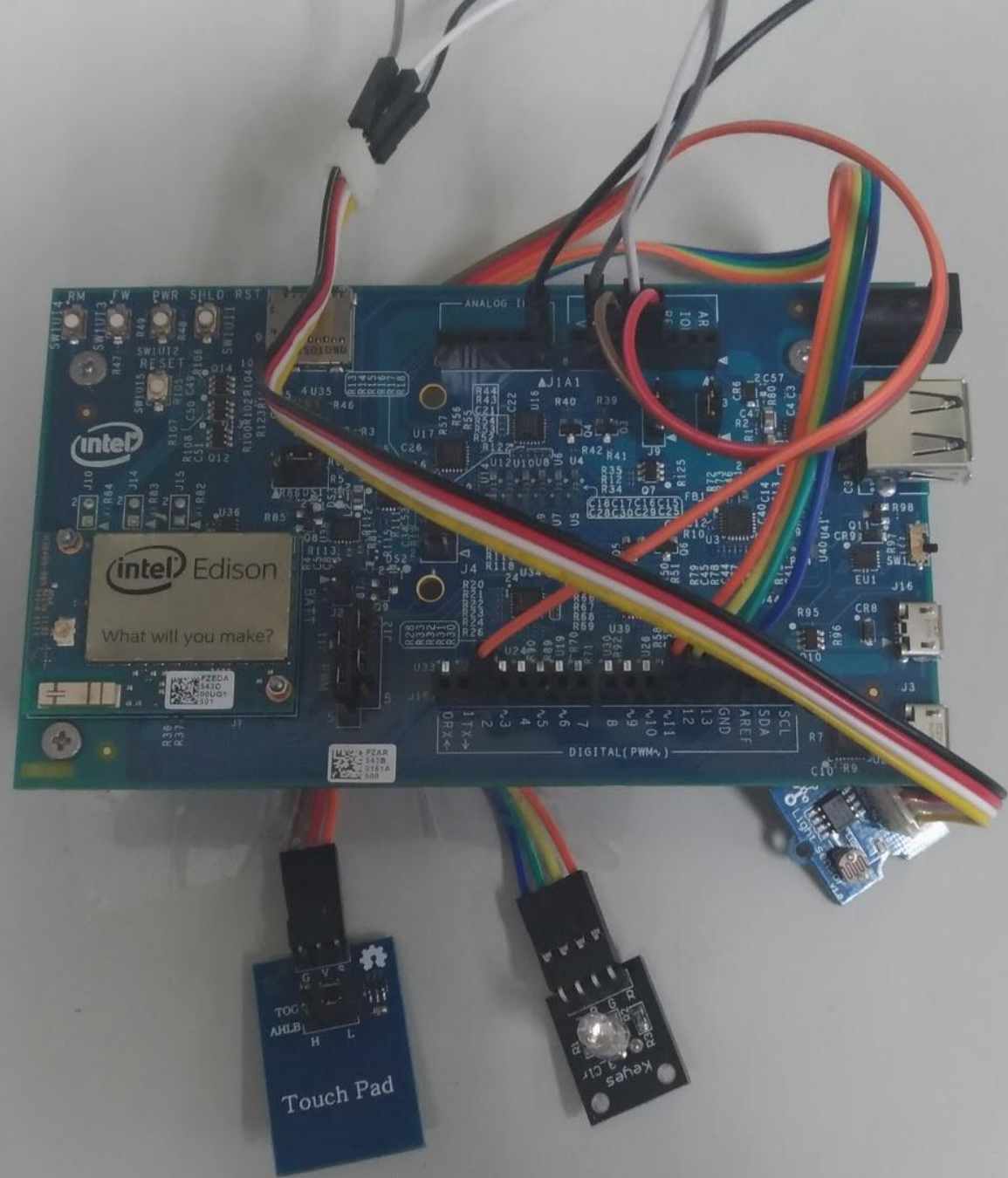
- ▶ Make a program that will show different color when touch and release the touchpad
- ▶ If the user touch the touchpad, show **red light**. Otherwise, show **green light** and **blue light**.

Light Sensor

- ▶ GND -> GND
- ▶ VCC -> 5V
- ▶ NC: no connection
- ▶ SIG -> A0



After Connection



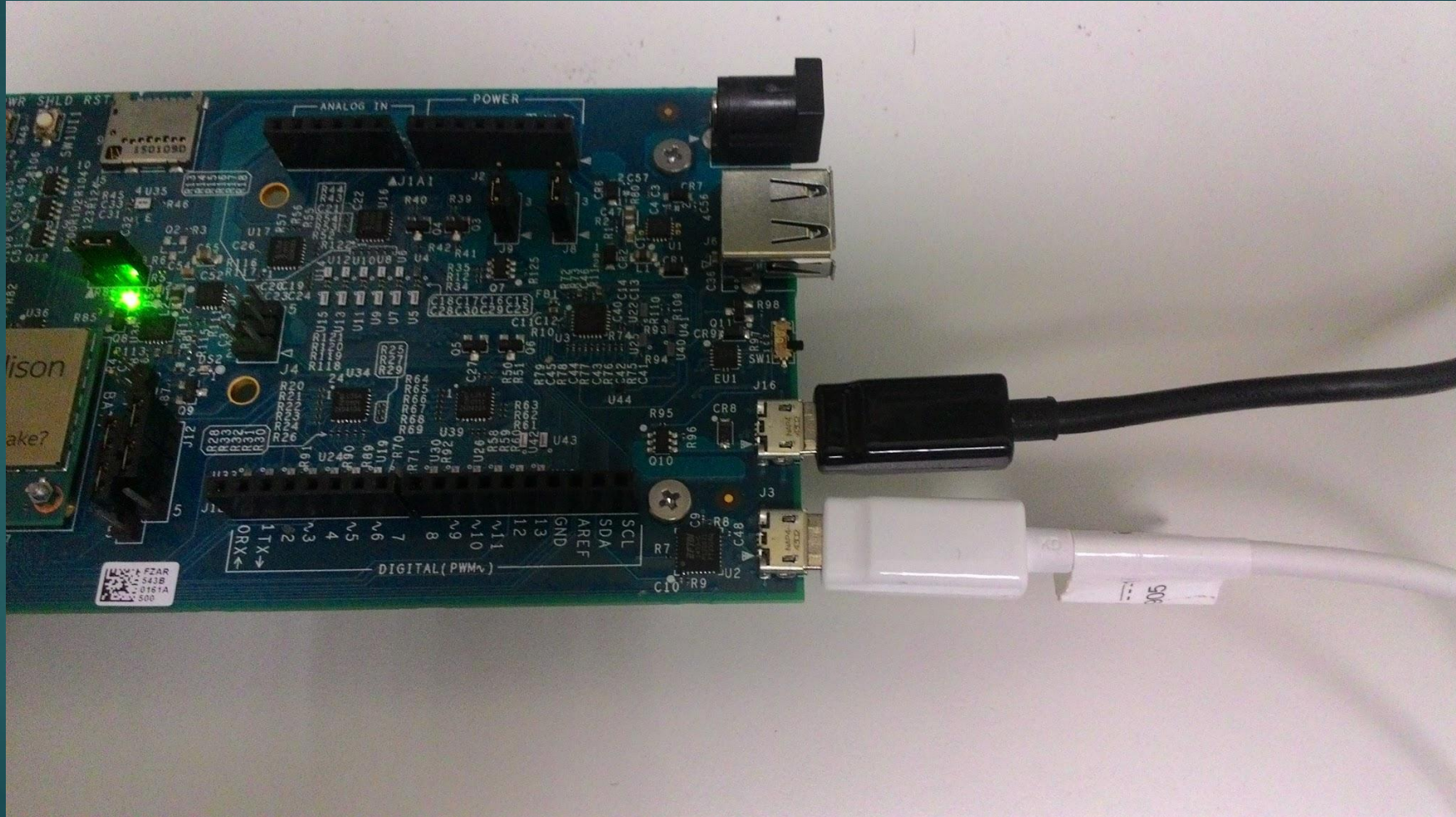
Analog Input

```
void setup() {  
}  
void loop() {  
  // read the input on analog pin 0:  
  int sensorValue = analogRead(A0);  
  delay(1);      // delay in between reads for stability  
}
```

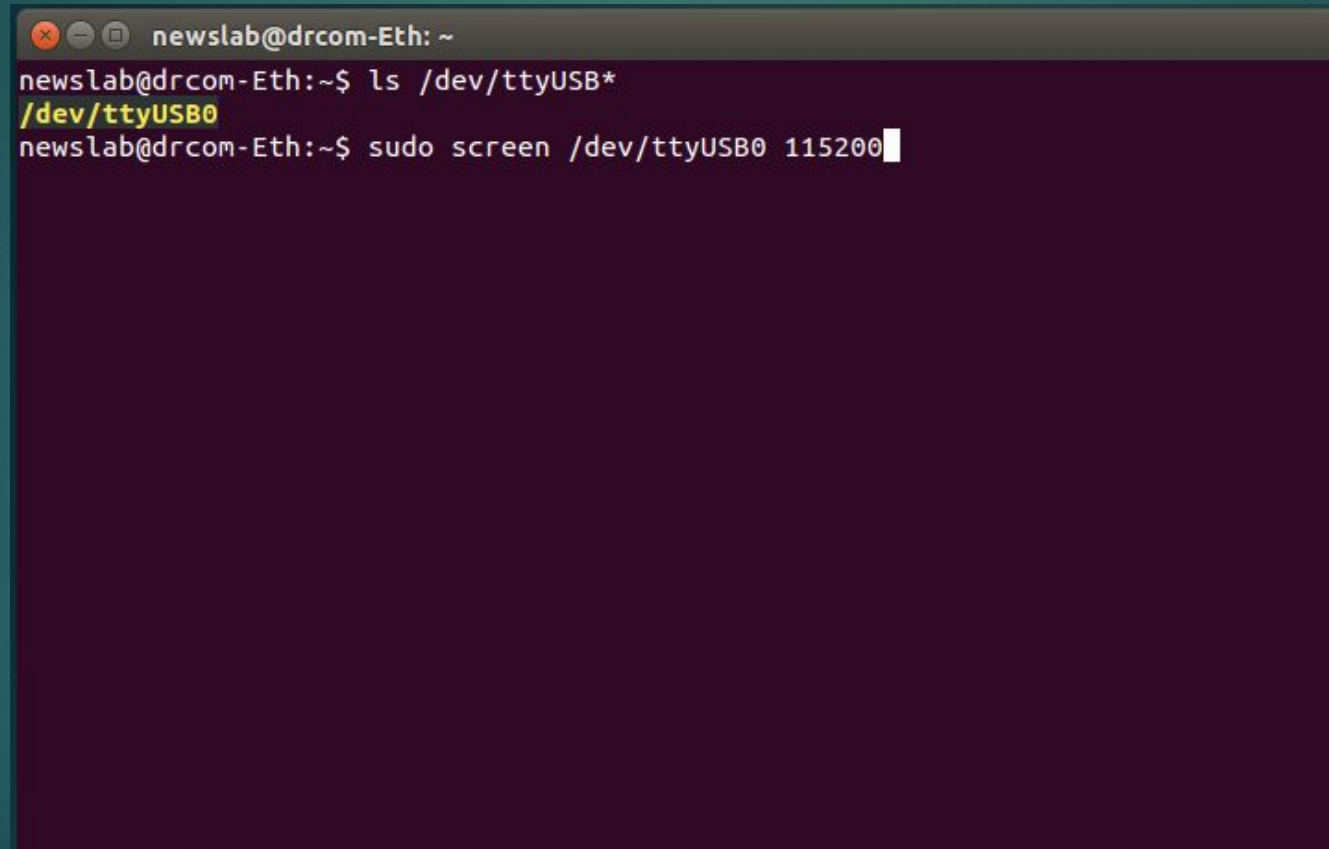

Exercise 2 - Light Sensor Reader

- ▶ Make a program that read the light sensor value. Print the value to serial port and use it to control the RGB LED with 3 to 4 different pattern.

Login to Edison's linux OS



Connect to Edison

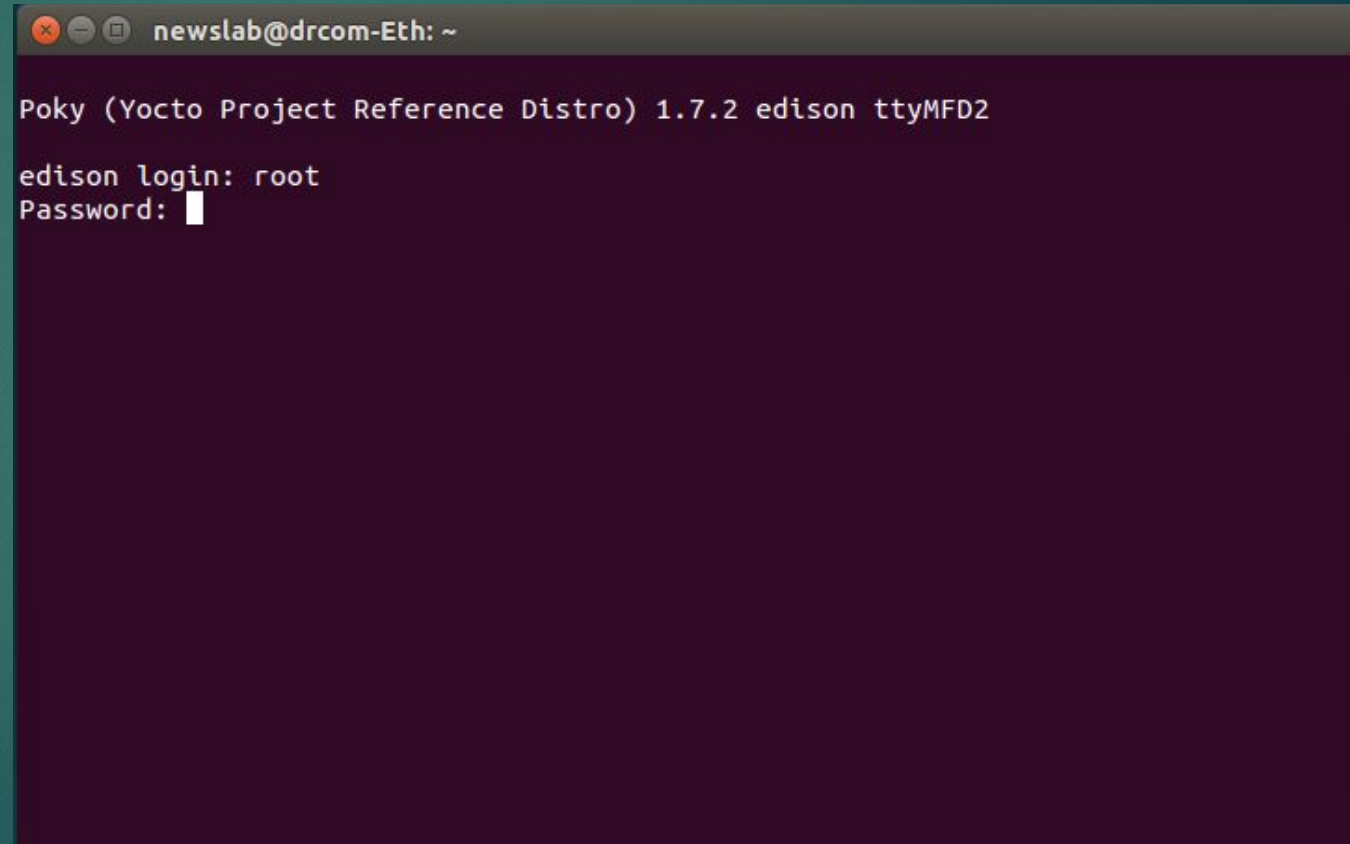
A terminal window with a dark purple background and a light gray title bar. The title bar contains three window control icons (close, minimize, maximize) and the text 'newslab@drcom-Eth: ~'. The terminal shows three lines of text: the first line is the prompt 'newslab@drcom-Eth:~\$' followed by the command 'ls /dev/ttyUSB*'; the second line is the output '/dev/ttyUSB0' in yellow text; the third line is the prompt 'newslab@drcom-Eth:~\$' followed by the command 'sudo screen /dev/ttyUSB0 115200' and a white cursor at the end.

```
newslab@drcom-Eth: ~  
newslab@drcom-Eth:~$ ls /dev/ttyUSB*  
/dev/ttyUSB0  
newslab@drcom-Eth:~$ sudo screen /dev/ttyUSB0 115200
```

Login

Username: root

Password: ntuiof2016

A terminal window with a dark purple background and a title bar that reads 'newslab@drcom-Eth: ~'. The terminal output shows the system booting into Poky (Yocto Project Reference Distro) 1.7.2 on the edison ttyMFD2. It then prompts for a login, where 'root' is entered, followed by a password prompt where 'ntuiof2016' is entered.

```
newslab@drcom-Eth: ~  
Poky (Yocto Project Reference Distro) 1.7.2 edison ttyMFD2  
edison login: root  
Password: 
```


Python Example

<https://github.com/intel-iot-devkit/mraa/tree/master/examples/python>

<https://github.com/intel-iot-devkit/mraa/blob/master/examples/python/blink-io8.py>

<https://github.com/intel-iot-devkit/mraa/blob/master/examples/python/aio.py>

Python mraa library

- ▶ `x = mraa.Gpio(2)`
- ▶ `x.dir(mraa.DIR_IN)`
- ▶ `value = x.read()`

- ▶ `y = mraa.Gpio(13)`
- ▶ `y.dir(mraa.DIR_OUT)`
- ▶ `y.write(1)`

- ▶ `z = mraa.Aio(0)`
- ▶ `print(x.read())`

Exercise 3

- ▶ Do the same functions as exercise 1 & 2