ECEN 361
Real-Time and Embedded Systems

Lab-10 Setup Description

ESP8266 Board and Cloud IOT

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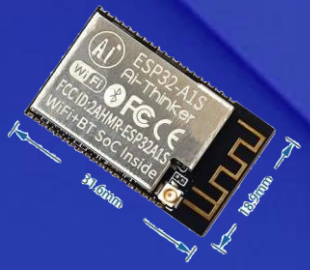
Lab-10 ESP8266

ESP8266 (Made by ExpressIF and …)

- Cheap, reliable
- Wireless :WiFi, B/T
- 160Mhz Processor
- GPIOs, serial port USB
- Very popular
- Used by hundreds of mfg's (mostly Chinese)



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Lab Description

Two Parts to the lab:

1. No Wifi – Just get a "BLINK" example running
2. Wifi. – connected IOT Device to Cloud Service (using Blynk.cloud)

Needed:

- ESP8266 board (NodeMCU or equiv)
- Cell phone
- WiFi network for which you have password and can join
  Note: `BYUI` and `BYUI_Visitor` on campus are blocked

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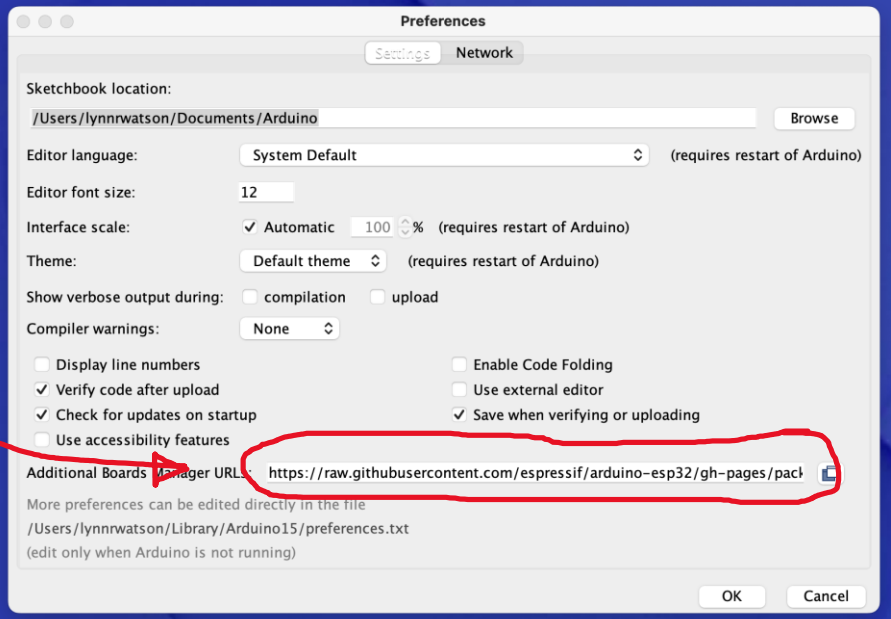
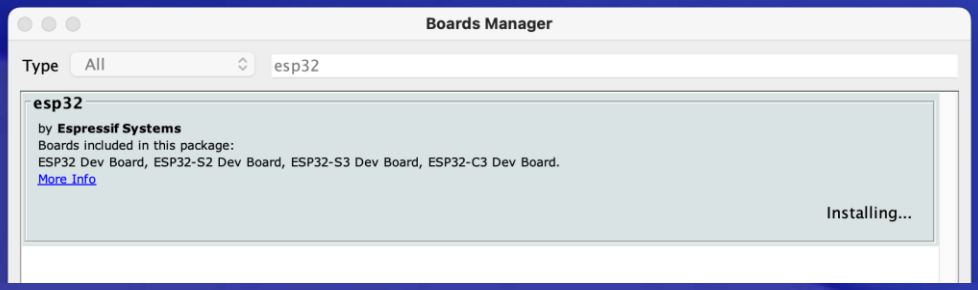
Lab-10 Part 1 -- Just running 1/3

Steps: (Tutorial Online HERE)

1. Arduino on your PC/Mac
2. Add the Board Support Package:
    1. Add Library Path
    2. Add Board





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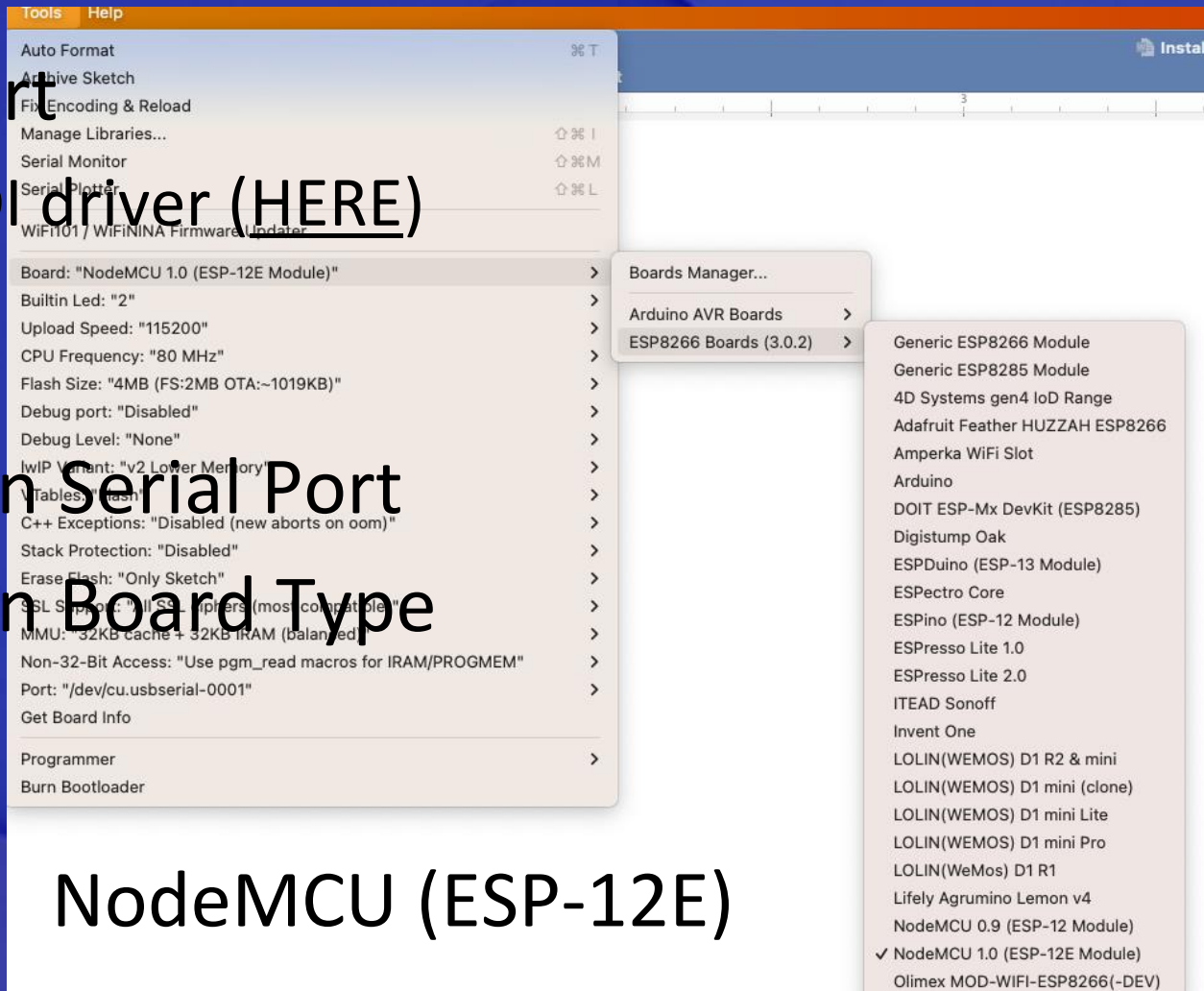
3. Check serial port

   If not – Install FTDI driver (HERE)

4. Arduino: Assign Serial Port
5. Arduino: Assign Board Type



Board is: NodeMCU (ESP-12E)

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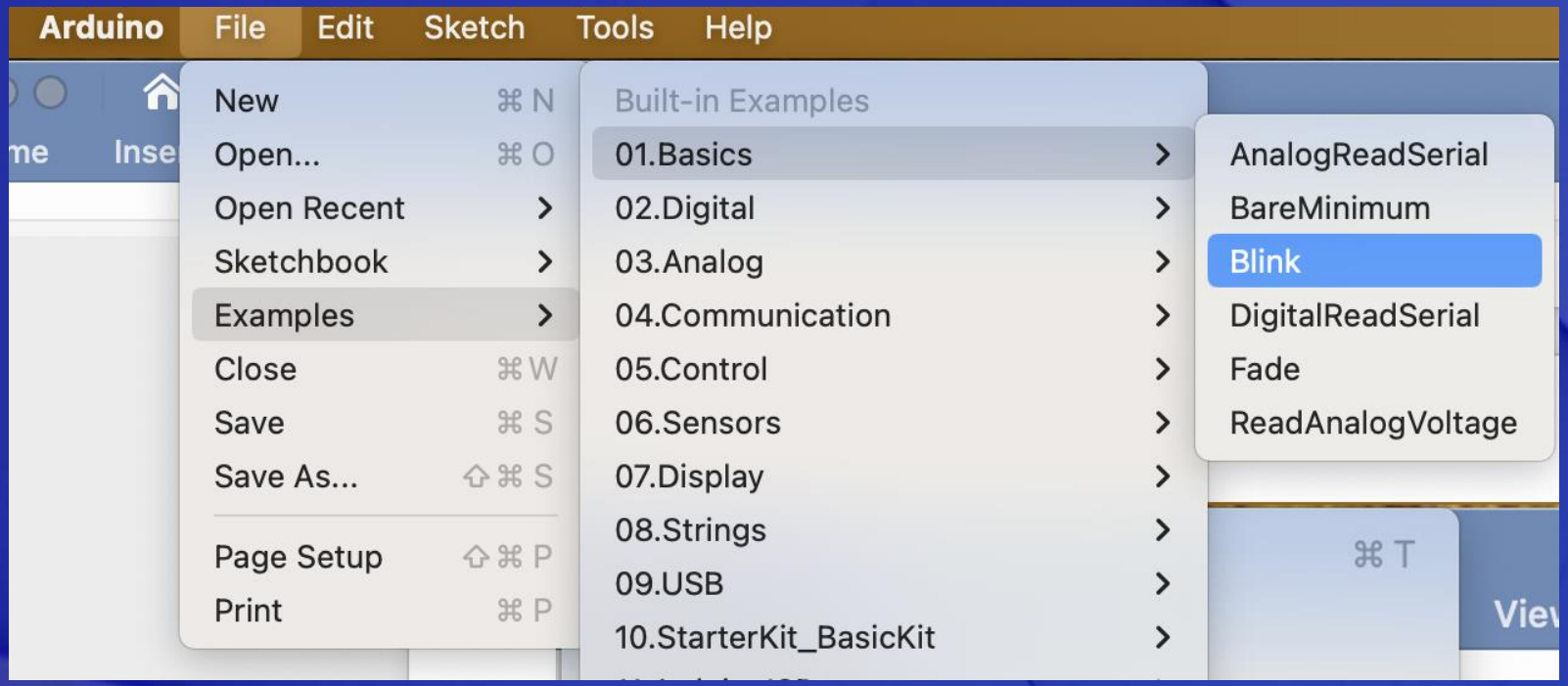
6. Install/Run Blink Demo



Compile/Upload/Run Blue built-in light blinks

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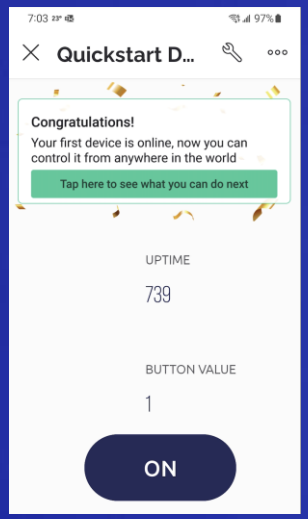
This part connects ESP8266 to Cloud Service



A: Phone App

C: ESP Code Running

Internet

Blynk's Cloud Services

B: Setup Service

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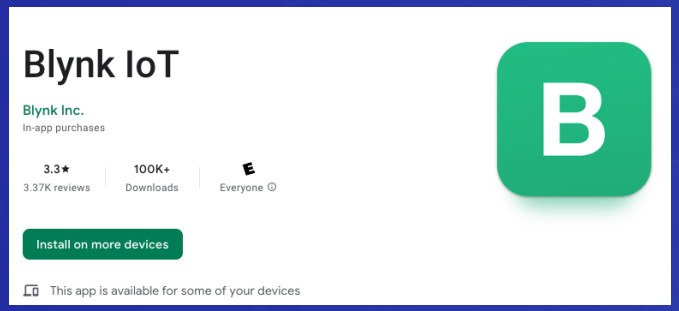
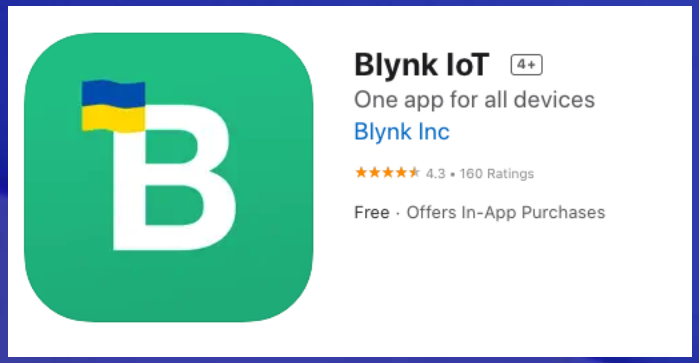
Lab-10 Part 2 2/8

To get connection pieces

1. Install Phone App:

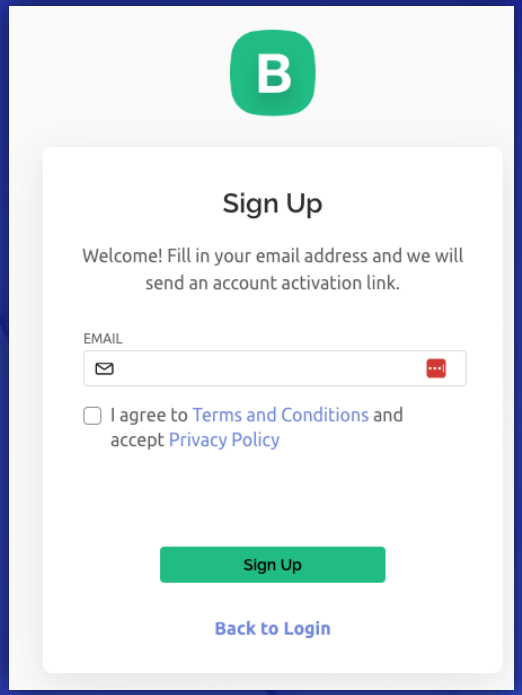




A: Phone App

B: Setup Services

2. Create Blynk Account (blynk.cloud) It's free verify your email, etc.



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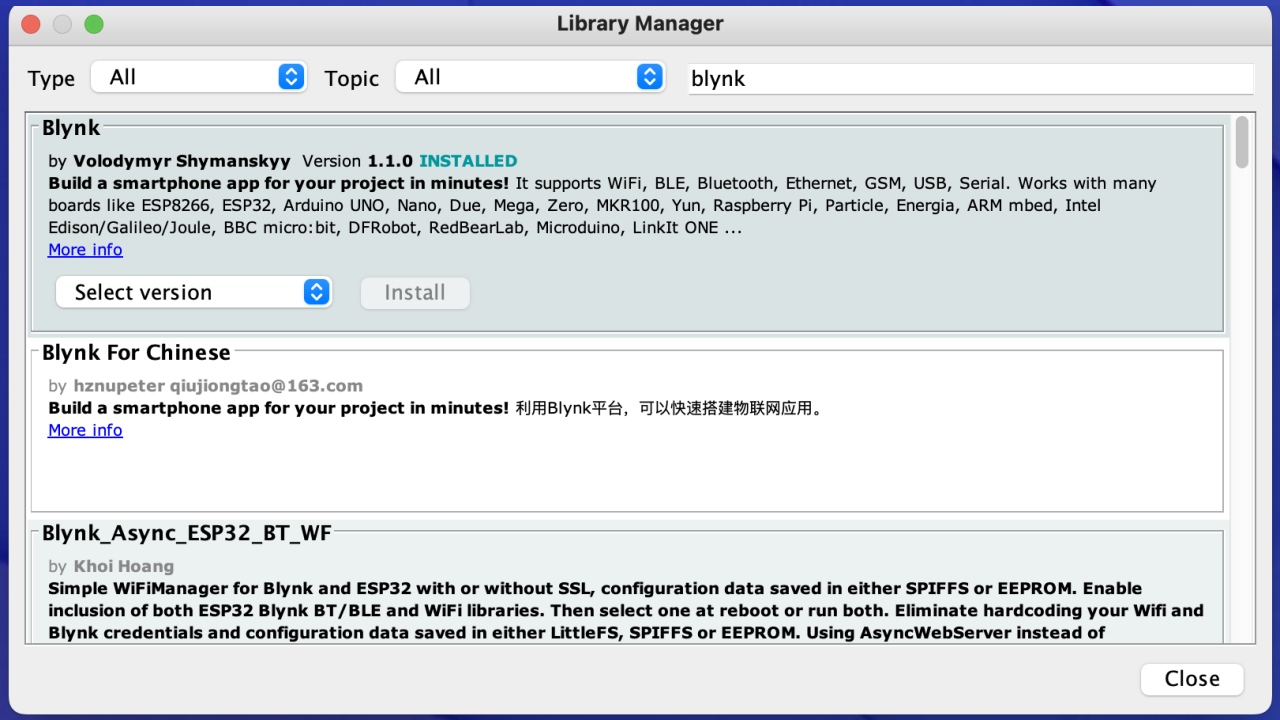
C: ESP Code Running (LINK HERE)

1. Install Blynk SDK into Arduino System

Arduino: Tools/Library Manager Search Blynk

Install latest version



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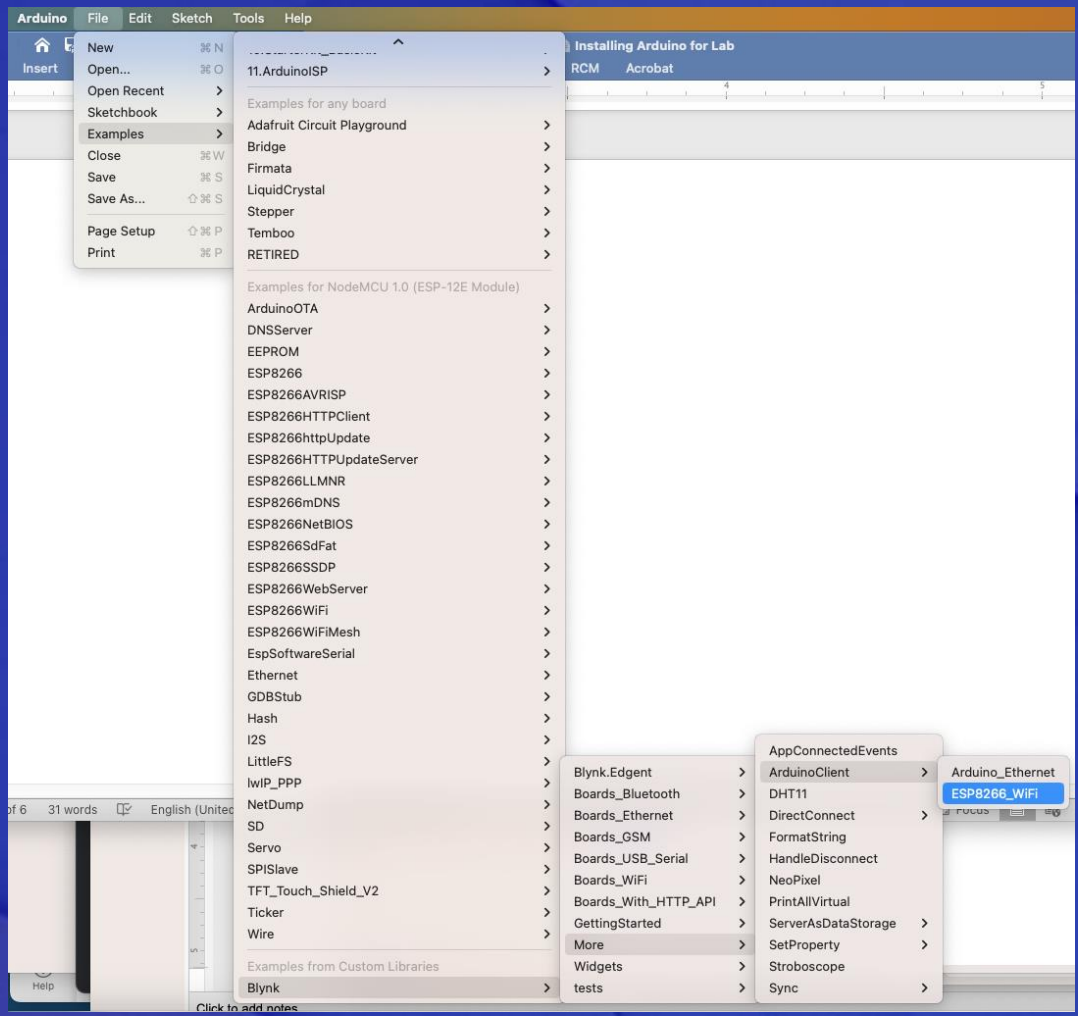
C: ESP Code Running

Create a new Example Arduino Sketch (not too important, we'll replace code)



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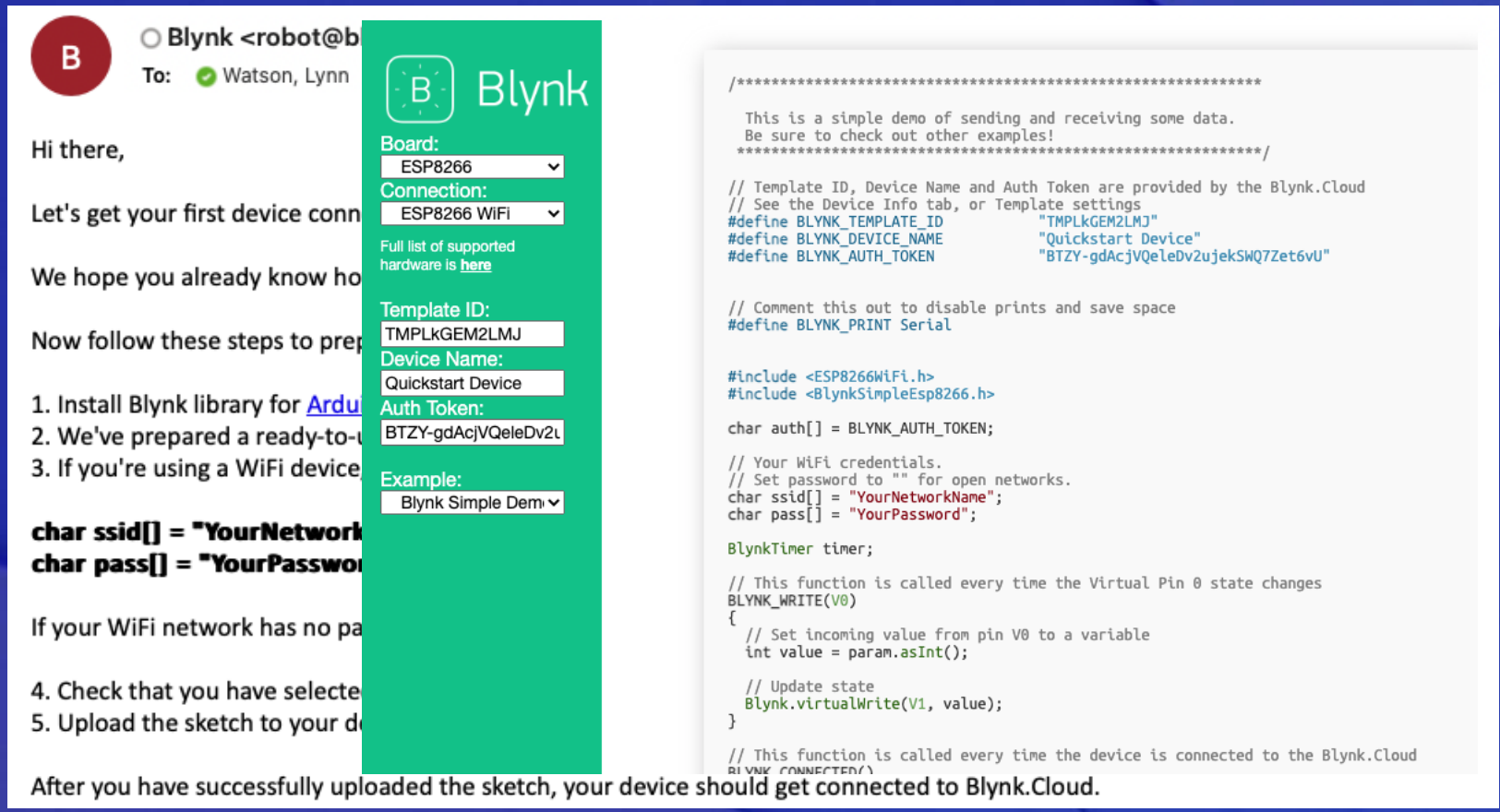
C: ESP Code Running

Go to the email from blynk.cloud quickstart

Copy Code from Link



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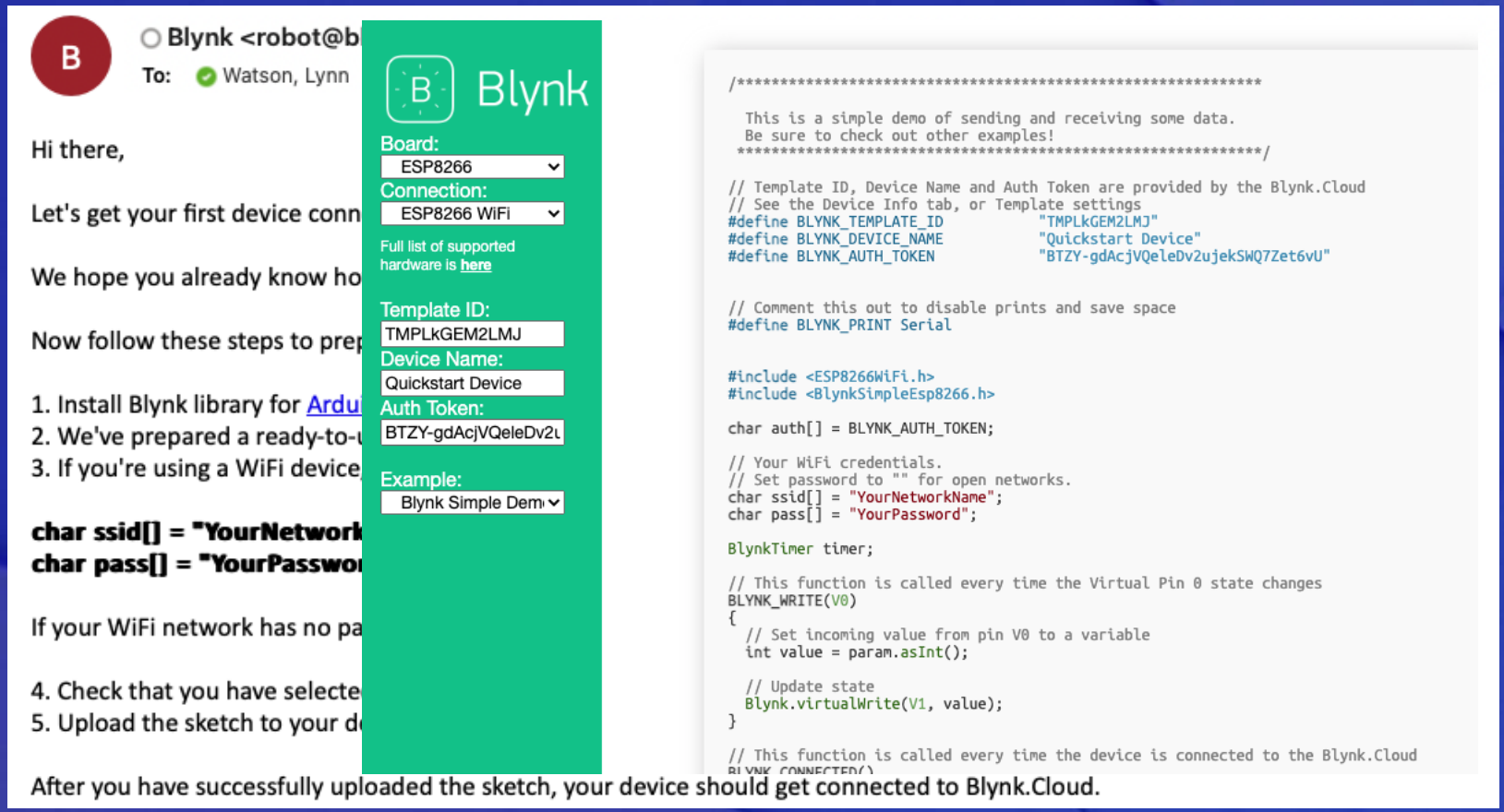
C: ESP Code Running

Go to the email from blynk.cloud quickstart

Copy Code from Link

Paste Into SRC .c



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C: ESP Code Running

Modify Arduino Source to include your codes:

ECEN_361-Lab10-Blynk-Works-ESP8266_Standalone

```
/*************************************************************

  This is a simple demo of sending and receiving some data.
  Be sure to check out other examples!
 *************************************************************/

// Template ID, Device Name and Auth Token are provided by the Blynk.Cloud
// See the Device Info tab, or Template settings
#define BLYNK_TEMPLATE_ID           "TMPLkGEM[redacted]"
#define BLYNK_DEVICE_NAME           "Quickstart Device"
#define BLYNK_AUTH_TOKEN            "BTZY-gdAcjVQeleDv2ujekSWQ[redacted]6vU"
```

And WiFi:

```
// Your WiFi credentials.
// Set password to "" for open networks.
char ssid[] = "BYU_Visitor";
char pass[] = "";
```

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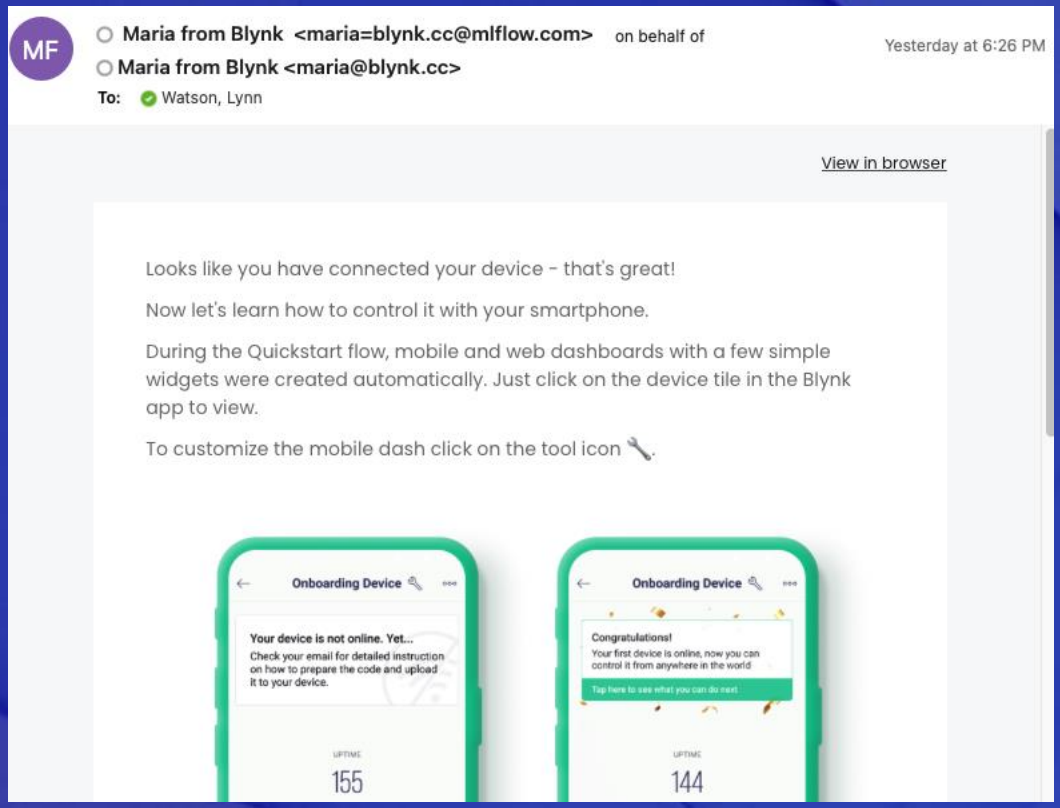
C: ESP Code Running

- Run the code. If connected, you'll get an email!
- Doesn't do the LED yet! Just shows that you pressed the App button



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C: ESP Code Running

Connect the on-board LED to do something when the switch is pressed

- Set the onboard LED port direction

```
void setup()
{
  // Debug console
  Serial.begin(115200);
  pinMode(LED_BUILTIN, OUTPUT);  // ECEN-361 ADDED
```

- Turn the light on/off based on the value from the cloud

```
// This function is called every time the Virtual Pin 0 state changes
BLYNK_WRITE(V0)
{
  // Set incoming value from pin V0 to a variable
  int value = param.asInt();

  digitalWrite(LED_BUILTIN, !value); // ECEN-361 ADDED  -- LED tied high, so negative-true logic.
```