Arduino Lesson ( )

Control an LED using Arduino WeMos D1 ESP8266 with Blynk app

Name: _____ ( ) Class: _____ Date: _____

Objectives: At the end of this lesson, you would be able to

1. Connect a Arduino WeMos D1 Wifi UNO ESP8266 for IoT
2. Write sketches to use ESP8266 with Blynk app on a smartphone to control an LED

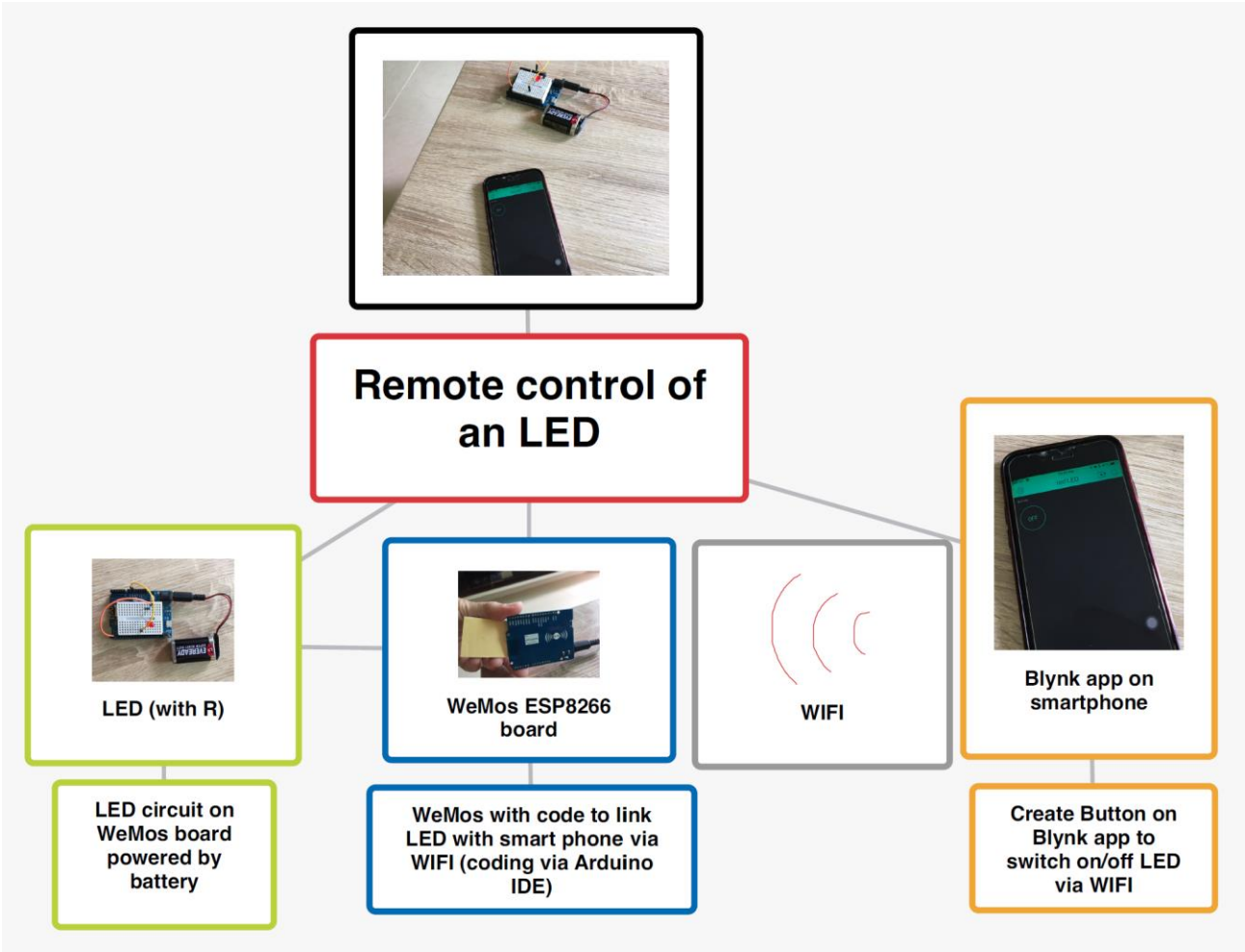
Apparatus:

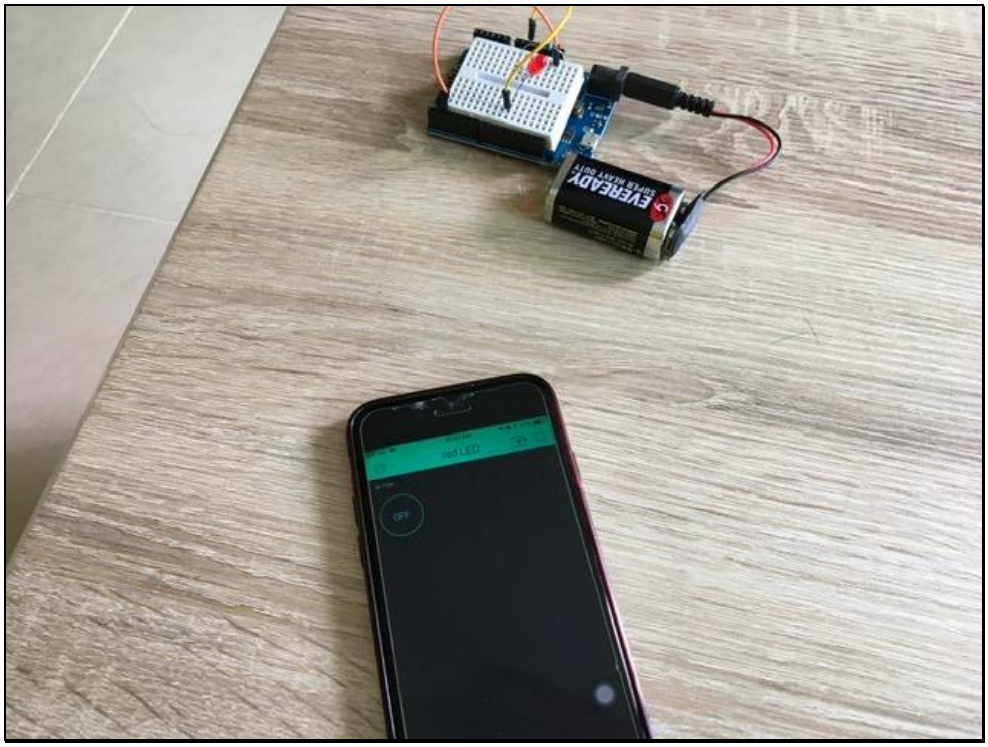
- 01 Arduino **WeMos D1 Wifi UNO ESP8266**
- 01 *USB micro B cable
- 01 10 kΩ resistor
- 01 red LED
- 01 mini-breadboard
- 02 male-male jumper wires
- smartphone (with **Blynk** app downloaded)

USB micro B cable

Note:

- *WEMOS D1 is a WIFI development board based on ESP8266 12E, and is built resembling Arduino UNO.*
- *It turns the very popular ESP8266 wireless (WiFi) module into a fully fledged development board.*
- **Must use proper **USB micro B cable**. Those typically used for powerbank **often don't have data wires** (data line) **(they are charge only)** such that the **Port** may not be detected.*
  See https://superuser.com/questions/1260407/are-all-usb-3-micro-b-cables-functionally-the-same





Using a smartphone to switch on/off an LED via WIFI

Assignment 1: Install the Arduino WeMos on Arduino IDE

1. Go to **File** → **Preferences**

→ go to bottom of dialog box: **Additional Boards Manager URLs** text box

→ copy & paste http://arduino.esp8266.com/stable/package_esp8266com_index.json

→ click OK to download the package

2. Go to **Tools** → **Board** & **Boards Manager**: search and install **esp8266** by ESP8266 Community *(e.g. ESP8266 version 2.6.3)*

[See Appendix A if you cannot install esp8266]

3. Connect the Arduino WeMos board to the laptop with USB micro B cable and check for connectivity:

Select **Tools** → **Board**: scroll down to select "**WeMos D1 R1**"

and select ***Port**: "COM#"

***Note:**

Reference:

- https://www.instructables.com/id/Arduino-WeMos-D1-WiFi-UNO-ESP-8266-IoT-IDE-Compati/
- https://www.arduino.cc/en/Tutorial/ConnectWithWPA
- http://help.blynk.cc/en/articles/512105-how-to-install-blynk-library-for-arduino-ide

Assignment 2: Set up LED circuit with Arduino WeMos

4. Insert the LED onto the mini-breadboard. Set up the LED in series with a 10 kΩ resistor using the diagram shown.
   - GND → cathode (shorter leg) of LED
   - resistor → anode (longer leg) of LED
   - resistor → digital pin D2

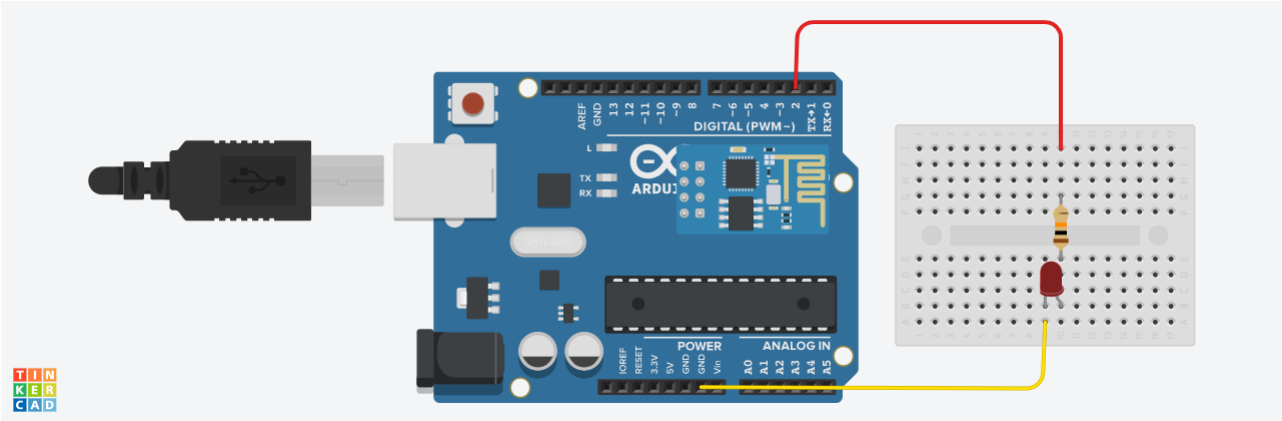
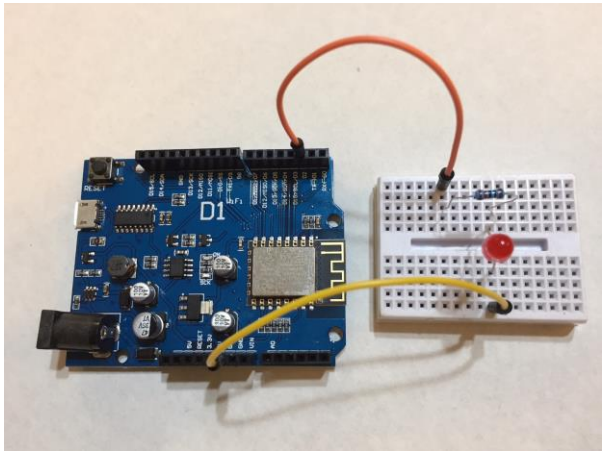


Diagram drawn in tinkercad.com (circuits)



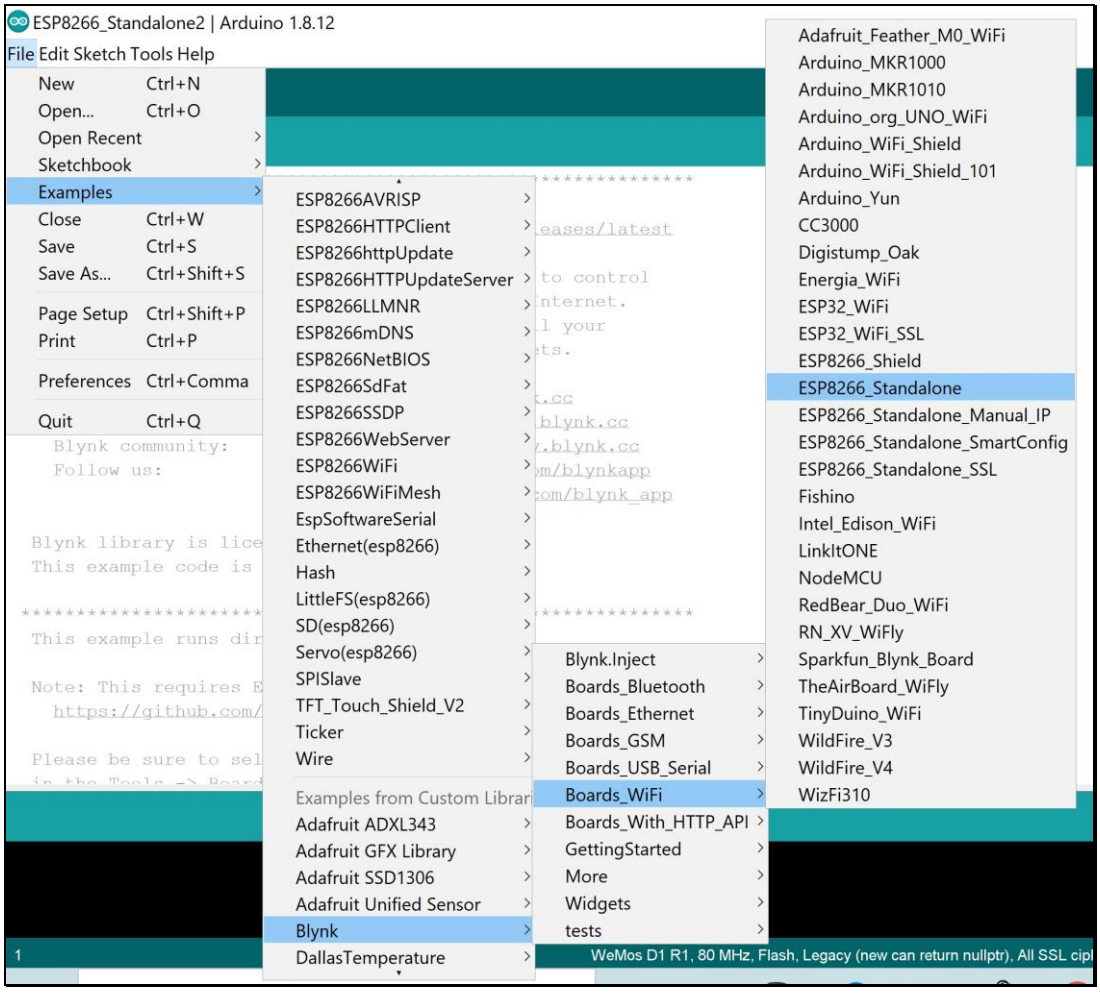
Arduino WeMos D1 board with LED circuit

Assignment 3: Install Blynk library on Arduino IDE

5. Go to **Sketch → Include Library →** scroll to the top **Manage Libraries …**
6. In **Library manager**, search and install latest version of **Blynk**

- **Blynk** *by Volodymyr Shymanskyy version 0.6.1 installed (1 Jan 2020)*

7. Go to **Sketch → Include Library** menu → scroll down to check **Blynk** is present.
8. Go to **Files → Examples → Blynk → Boards_WiFi → ESP8266 Standalone** to open the sketch. [See below.]
9. Once **Auth Token** from Blynk app (**Assignment 4**) is available, update the sketch and upload into Arduino WeMos microcontroller.



Assignment 3: Sample sketch

```
/*************************************************************
  Download latest Blynk library here: ……...
    Downloads, docs, tutorials: http://www.blynk.cc
    Sketch generator:           http://examples.blynk.cc
    Blynk community:            http://community.blynk.cc
 *************************************************************
  This example runs directly on ESP8266 chip.
  Please be sure to select the right ESP8266 module
  in the Tools -> Board menu!
  Change WiFi ssid, pass, and Blynk auth token to run :)
*************************************************************/
#define BLYNK_PRINT Serial
#include <ESP8266WiFi.h>
#include <BlynkSimpleEsp8266.h>

// You should get Auth Token in the Blynk App.
// Go to the Project Settings (nut icon).
char auth[] = "YourAuthToken";                  // replace YourAuthToken with Auth Token

// Your WiFi credentials.
// Set password to "" for open networks.
char ssid[] = "YourNetworkName";                // replace YourNetworkName with Network SSID
char pass[] = "YourPassword";                   // replace YourPassword with Network key

void setup()
{
  // Debug console
  Serial.begin(9600);
  Blynk.begin(auth, ssid, pass);
}

void loop()
{
  Blynk.run();
}
```

Example:

- If **Auth Token:** 275UBpwLoy3I5U1FdhvH0ZR6bsG4aVRx
  Network SSID: SINGTEL-1234
  Network Key: abcdefghij

Note:

- ***Auth Token****: is obtained from* ***Blynk*** *email or Project Settings in* ***Blynk*** *app on smartphone*
- ***Network SSID*** *(Service Set ID) is the* ***network name*** *that displays when you refresh your wireless network list.*

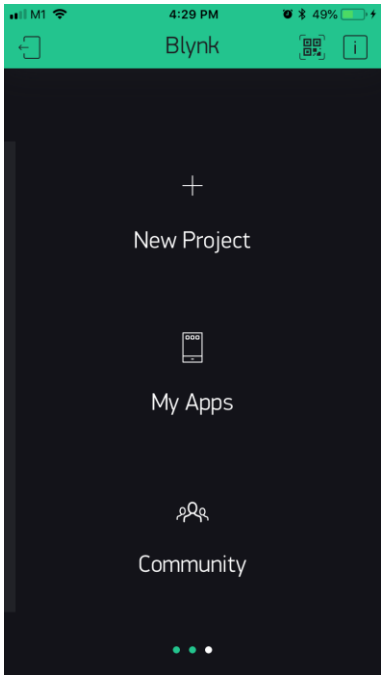
Assignment 4: Set up Blynk app on smartphone & set up button switch

10. Download "**Blynk**" app at IOS Appstore.
11. Sign up using your email (e.g. gmail – can reset password).
12. Swipe sideways to "**New Project**". Enter your project name (if needed).

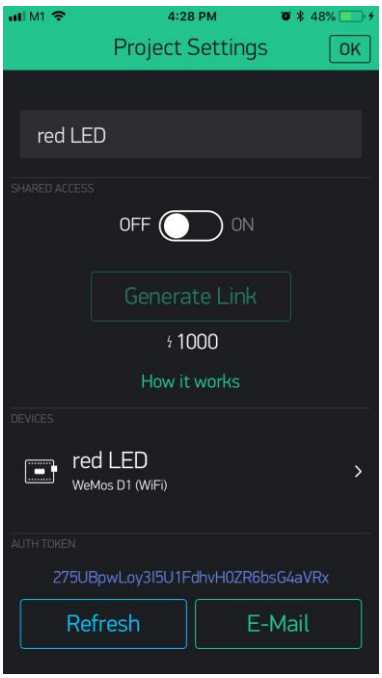
- **Choose device** "WeMos D1". Click OK.
- **Connection type** "Wifi".
- Click **Create Project**. (After this, you will receive **Auth Token** in your email).
- Check email for **Auth Token**. (Also found in top right "nut icon" ⎔ **Project Settings).**
- *Insert **Auth Token** into the Blynk sketch in Assignment 3.*

13. Slide to the left to open "Widget Box".
14. Touch and hold "Button" to add button.
15. Touch the button (in OFF state) for "Button Settings".
16. Under OUTPUT, tap on **PIN** → select **Digital** → select **D2** to choose pin connection. Click OK.
17. Under MODE, select **SWITCH**.
18. Click OK (top right corner).
19. Under the correct project where you can see the "button" switch **D2**, click the "start" triangle to activate button. Tap it to switch the LED on the WeMos microcontroller on and off remotely.

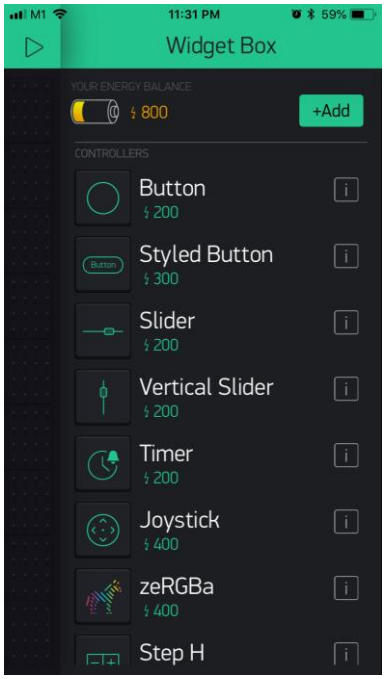
Screen shots of Blynk on smartphone



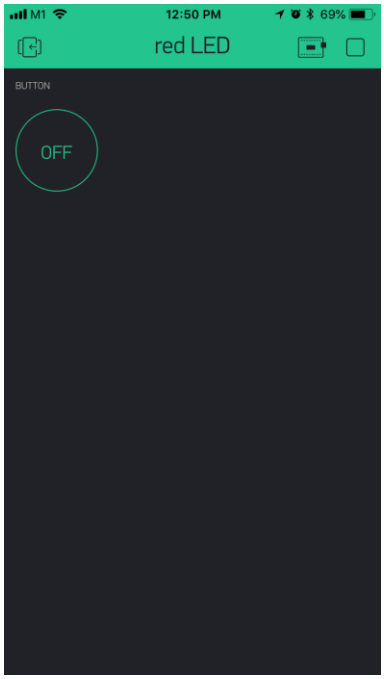
Step 12



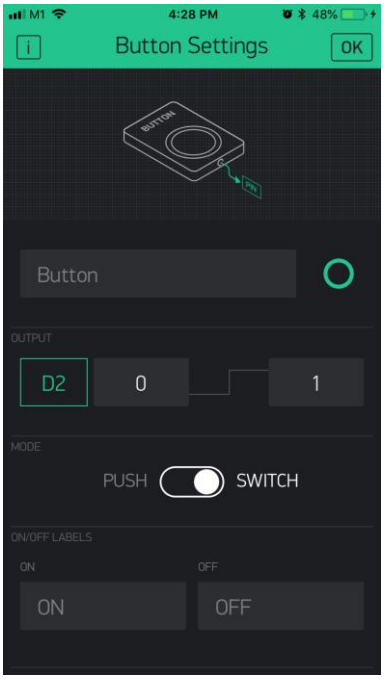
Step 12



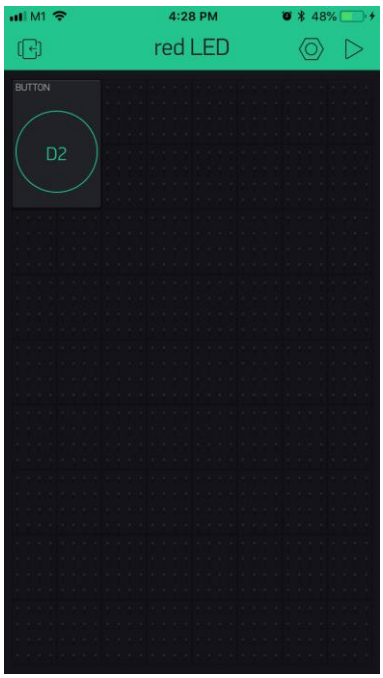
Step 13



Step 14



Steps 15 to 17



Step 19

Annex A

Trouble-shooting:

1	Problem	Solution
	Tools → Boards Manager: Cannot find esp8266 to install	**Reference**: https://forum.arduino.cc/index.php?topic=461880.0 1. C:/ drive, View → tick "hidden items" to see *AppData* (if nec.) *C:\Users\AppData\Local\Arduino15* → Open *preferences.txt* → remove value for boardsmanager.additional.urls file 2. Delete all ".tmp" files in this folder (if you see such files) 3. File → Preferences → Additional Boards Manager URLs: paste http://arduino.esp8266.com/stable/package_esp8266com_index.json **Outcome**: To install **esp8266** by ESP8266 Community (v. 2.6.3) [1 Jan 2020]