

IoT + Voice: “Alexa, Turn on my Smart Home”

Home-Smart-Home Tutorial

by Liz Myers

The Internet of Things (IoT for short) refers to any device that is connected to the internet and used to gather data about your environment. All kinds of information can be collected (typically via sensors) so that you can monitor for example: your home temperature/humidity, security cameras, door/window locks— even the contents of your refrigerator.

In this event, “IoT Meets Voice”, you’ll learn how to control your environment with Google Assistant or Amazon Alexa. Speaking of Alexa, there are two strategies to learn:

- 1) Use the Fauxmo libraries to turn devices on/off (or trigger functions!)
- 2) Use AWS IoT and the publish/subscribe or pub/sub technique

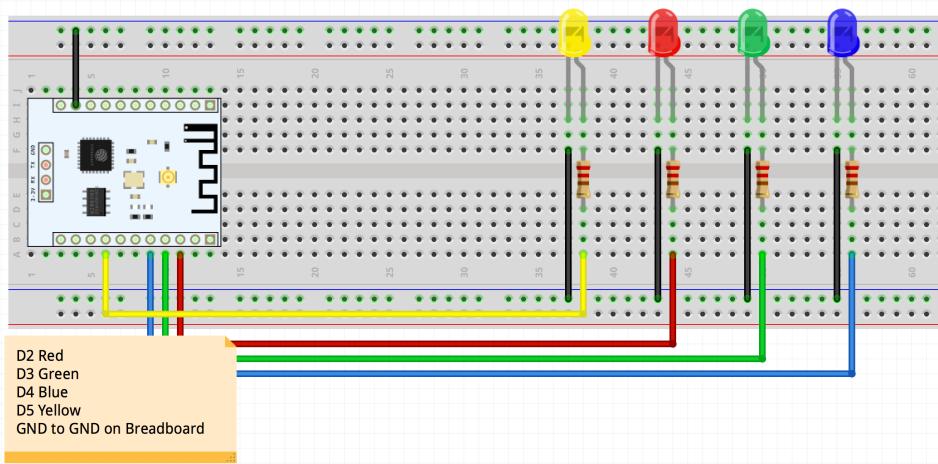
This tutorial focuses on the Fauxmo library, NodeMCU module, and the Elegoo Starter Kit.

Objective: Control 4-6 devices with your voice

Hardware: Node MCU module (ESP8266), 4 x LEDs, 4 x 220 Ohm Resistors, Breadboard, Male to Male Jumper Wires (all found within the Elegoo starter kit)

Software: Arduino Sketch, Arduino IDE, Alexa app

Wiring Your Prototype



Notes About Wiring

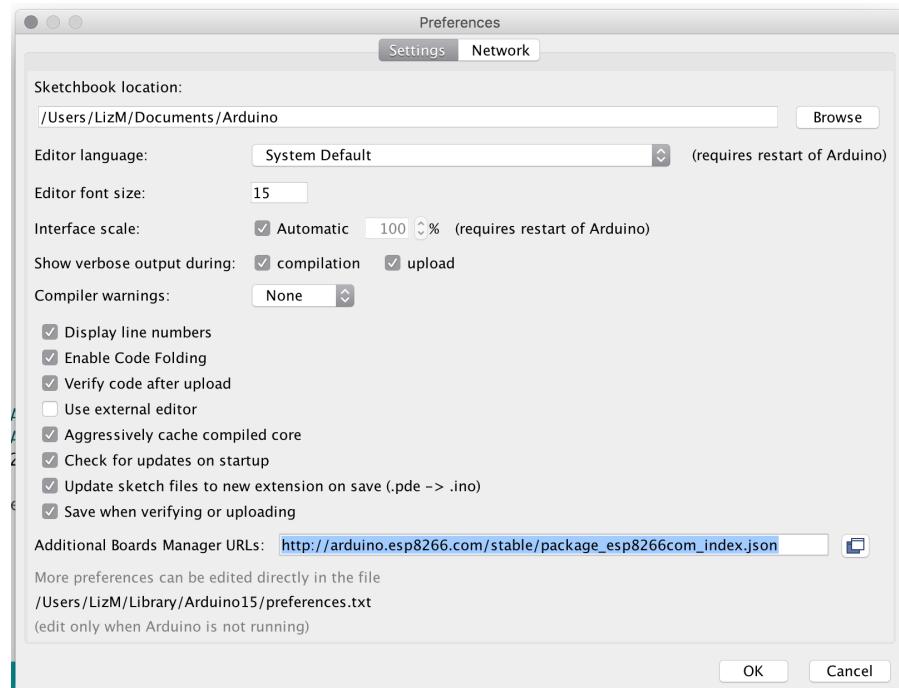
As you can see above, there are LEDs (RGB + White) which represent 4 devices in your home - they could be lamps, a fan, a color LED strip, or a power strip. Each LED is connected to a digital output pin on the NodeMCU as follows: D2 Red, D3 Green, D4 Blue, D5 Fan.

Warning: if you want to substitute the white LED for the Fan/motor in the Elegoo kit - READ the PDF FIRST! The motor may damage the MCU module if not powered separately as described on pages 138-147).

Arduino Setup

Get the [latest build \(1.8.5\)](#) and install it to your laptop. If you're new to Arduino, consult the [detailed PDF guide](#) to learn about adding/managing libraries, uploading sketches, and testing via the Serial monitor - all important tools to master.

NodeMCU Setup

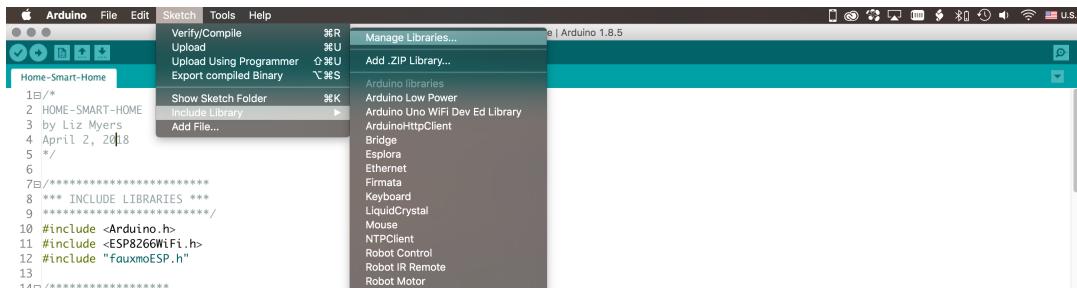


To install the NodeMCU module, go to **Preferences** and copy this url:

http://arduino.esp8266.com/stable/package_esp8266com_index.json

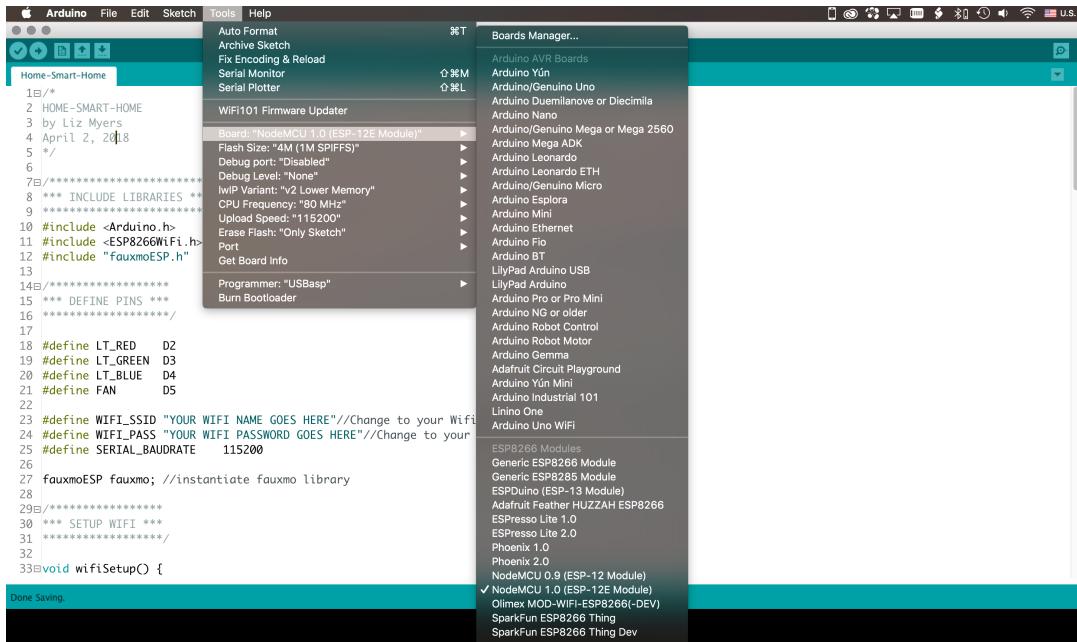
into the boards manager field as shown above. Then go to the **libraries menu > Add Library > Manage Libraries and search for NodeMCU**. Now check the Tools > Boards menu again - NodeMCU 1.0 should appear in the list.

Home-Smart-Home Sketch



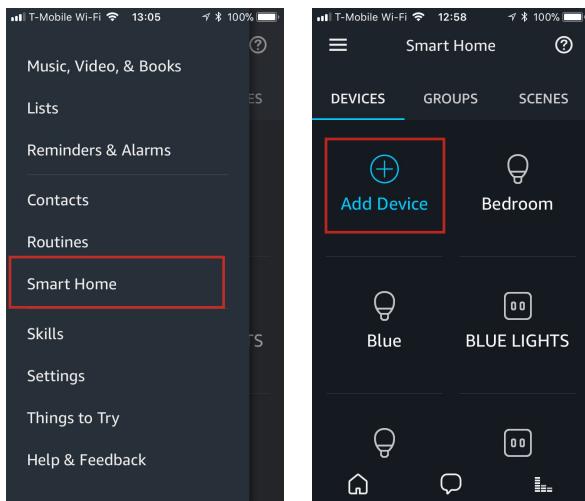
Open the [Home-Smart-Home sketch](#). At the top of the code there are several libraries or dependencies that must be installed before uploading to your NodeMCU module. In the Arduino IDE > go to the Sketch menu > Add Library > Manage Libraries. Then type “**ESP8266WiFi**” for example. Highlight the library, and click the install button. Do the same for the **Arduino.h** library.

Note: sometimes libraries are not available within the Arduino IDE. In this case, you need to install the library manually. First you need to download the library .zip file to your hard drive, so you can install it via the Sketch menu > Add Library > add .ZIP Library... (then target the file on your hard drive). Use this method for these required libraries: [ESPAsyncUDP-Master.zip](#), [ESPAsyncWebServer-master.zip](#), [ESPAsyncTCP-master.zip](#), and the [fauxmoESP.h](#) library. (Note: also available from the “libraries” folder in this GitHub repository).



Once you have the libraries installed, you can try uploading your sketch. From the Arduino IDE, go to **Tools > Board > select NodeMCU 1.0**. Be sure and check **Tools > Port > USBtoUART** as well. HINT: If you don't see the port - be sure and connect your micro-USB cable to your laptop - then check the port list again. If you still don't see, you can download the driver from [SiliconLabs.com](#).

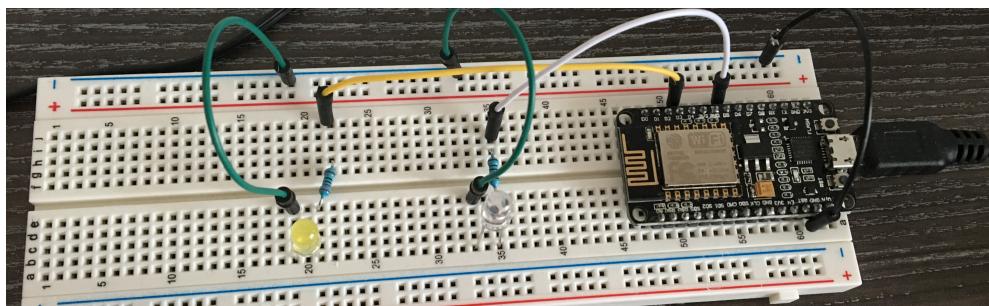
Show Alexa the New Devices



From the **hamburger menu** > select **Smart Home** > **Add Device** to initiate device discovery.
Note: if the Alexa app fails to discover devices, make sure the ESP8266 module is connected to the internet and running your code (check the Serial Monitor) before pressing the **+Add Device** button again.

Further Ideas

What else could you control with your voice? Take a look inside the Elegoo Starter Kit and see if you can find a temperature/humidity sensor or a fan. (Warning: be sure and read the PDF instructions before connecting new items - there are special power considerations associated with driving motors from an Arduino or NodeMCU module). In order to monitor device status, try connecting the LCD screen as well!



Did you know?

Infrared devices (like your TV remote) use a kind of LED to transmit signals too. You can use the Arduino board and IR Receiver that came with your kit to capture IR codes sent by your remote control. Check out Keenan Van Deusens super tutorial to learn how to capture the codes. Then rewire your breadboard for transmission, modify this sketch (by adding your codes), and upload it to the NodeMCU module. Add the device to your smart home collection in the Alexa app and Voila! You should be able to control your device with your voice.