Example Sketch: AP Web Server

Not only can the ESP8266 connect to a WiFi network and interact with the Internet, but it can also set up a network of its own, allowing other devices to connect directly to it. This example demonstrates how to turn the ESP8266 into an **access point** (AP), and serve up web pages to any connected client.

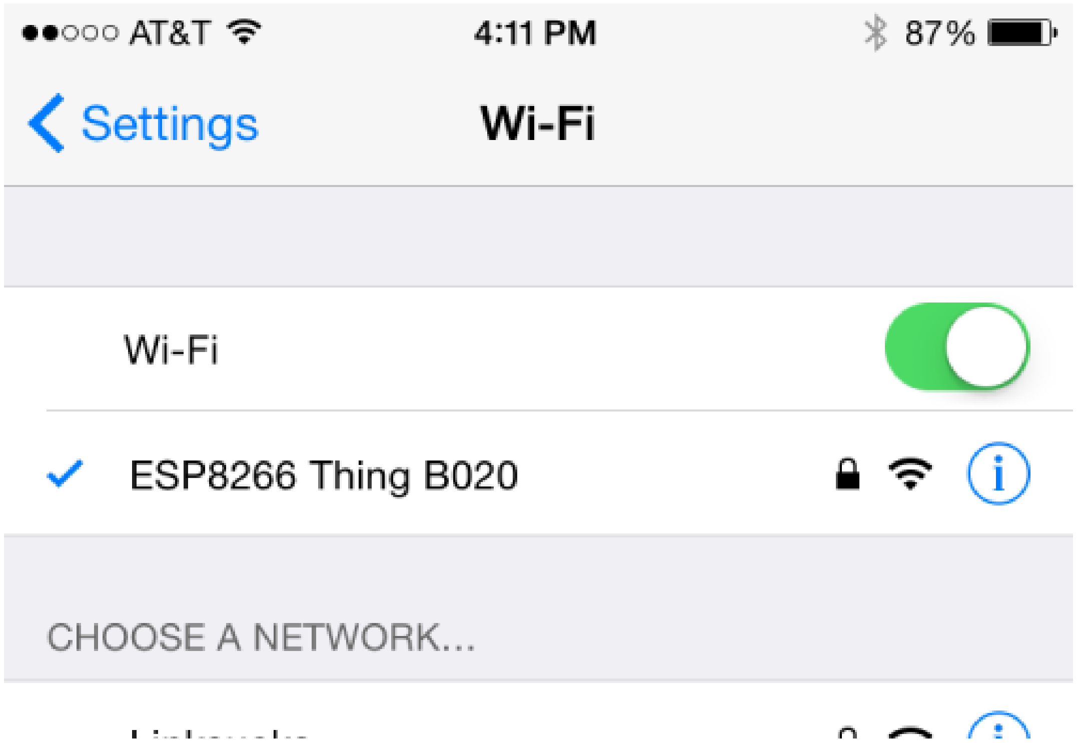
Copy and paste the code from below, or download it here.

COPY CODE

```
#include <ESP8266WiFi.h>

//////////////////////
// WiFi Definitions //
//////////////////////
const char WiFiAPPSK[] = "sparkfun";

/////////////////////
// Pin Definitions //
/////////////////////
const int LED_PIN = 5; // Thing's onboard, green LED
const int ANALOG_PIN = A0; // The only analog pin on the Thing
const int DIGITAL_PIN = 12; // Digital pin to be read

WiFiServer server(80);

void setup()
{
  initHardware();
  setupWiFi();
  server.begin();
}

void loop()
{
  // Check if a client has connected
  WiFiClient client = server.available();
  if (!client) {
    return;
  }

  // Read the first line of the request
  String req = client.readStringUntil('\r');
  Serial.println(req);
  client.flush();

  // Match the request
  int val = -1; // We'll use 'val' to keep track of both the
              // request type (read/set) and value if set.
  if (req.indexOf("/led/0") != -1)
    val = 0; // Will write LED low
  else if (req.indexOf("/led/1") != -1)
    val = 1; // Will write LED high
  else if (req.indexOf("/read") != -1)
    val = -2; // Will print pin reads
  // Otherwise request will be invalid. We'll say as much in HTML

  // Set GPIO5 according to the request
  if (val >= 0)
    digitalWrite(LED_PIN, val);

  client.flush();

  // Prepare the response. Start with the common header:
  String s = "HTTP/1.1 200 OK\r\n";
  s += "Content-Type: text/html\r\n\r\n";
  s += "<!DOCTYPE HTML>\r\n<html>\r\n";
  // If we're setting the LED, print out a message saying we did
  if (val >= 0)
  {
    s += "LED is now ";
    s += (val)?"on":"off";
  }
  else if (val == -2)
  { // If we're reading pins, print out those values:
    s += "Analog Pin = ";
    s += String(analogRead(ANALOG_PIN));
    s += "<br>"; // Go to the next line.
    s += "Digital Pin 12 = ";
    s += String(digitalRead(DIGITAL_PIN));
  }
  else
  {
    s += "Invalid Request.<br> Try /led/1, /led/0, or /read.";
  }
  s += "</html>\n";

  // Send the response to the client
  client.print(s);
  delay(1);
  Serial.println("Client disonnected");

  // The client will actually be disconnected
  // when the function returns and 'client' object is detroyed
}

void setupWiFi()
```

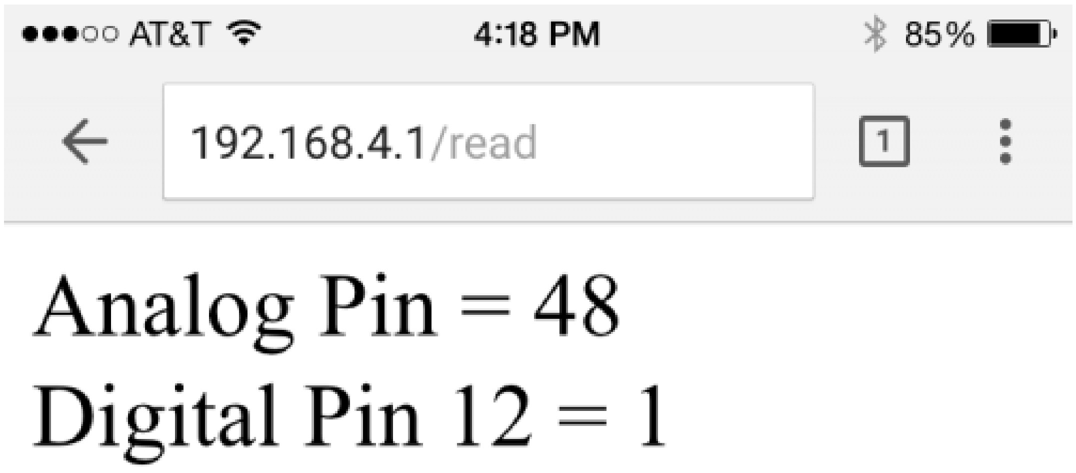
```
{
  WiFi.mode(WIFI_AP);

  // Do a little work to get a unique-ish name. Append the
  // last two bytes of the MAC (HEX'd) to "Thing-":
  uint8_t mac[WL_MAC_ADDR_LENGTH];
  WiFi.softAPmacAddress(mac);
  String macID = String(mac[WL_MAC_ADDR_LENGTH - 2], HEX) +
                 String(mac[WL_MAC_ADDR_LENGTH - 1], HEX);
  macID.toUpperCase();
  String AP_NameString = "ESP8266 Thing " + macID;

  char AP_NameChar[AP_NameString.length() + 1];
  memset(AP_NameChar, AP_NameString.length() + 1, 0);

  for (int i=0; i<AP_NameString.length(); i++)
    AP_NameChar[i] = AP_NameString.charAt(i);

  WiFi.softAP(AP_NameChar, WiFiAPPSK);
}

void initHardware()
{
  Serial.begin(115200);
  pinMode(DIGITAL_PIN, INPUT_PULLUP);
  pinMode(LED_PIN, OUTPUT);
  digitalWrite(LED_PIN, LOW);
  // Don't need to set ANALOG_PIN as input,
  // that's all it can be.
}
```

After uploading this sketch, find another device that you can connect to a WiFi network – phone, laptop, etc. Look for a network called “Thing-XXXX”, where XXXX is the last 2 bytes of the Thing’s MAC address.



The sketch sets the network's password to "sparkfun".

After connecting to your Thing's AP network, load up a browser and point it to `192.168.4.1/read`. The Thing should serve up a web page showing you its ADC and digital pin 12 readings:



```
Analog Pin = 48
Digital Pin 12 = 1
```

After that, give `192.168.4.1/led/0` and `192.168.4.1/led/1` a try, and keep an eye on the Thing's green LED while you do.

As always, check through the code comments to get a line-by-line breakdown of what's going on.