

MicroPython and Microcontrollers

NetApp YWIT

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Chapter 1

Introduction

This workshop will introduce the student to Python coding, electronics, and project design. We will building several projects ranging from simple to complicated. These projects are based on the ESP8266 microcontroller which is running MicroPython and they depend on some other electronics components such as LEDs, buttons, and more.

Chapter 2

Project 1: Blink

2.1 Overview

This project is designed to provide a foundation for subsequent projects in this book (**and beyond**). Over the course of this project, you will:

- Create a simple circuit using your breadboard
- Write a program that runs in a loop
- Use MicroPython in your program to interact with your microcontroller's GPIO pins.

At the end of this project, your microcontroller should run a MicroPython program which alternates a light between its ON and OFF states. Let's get started!

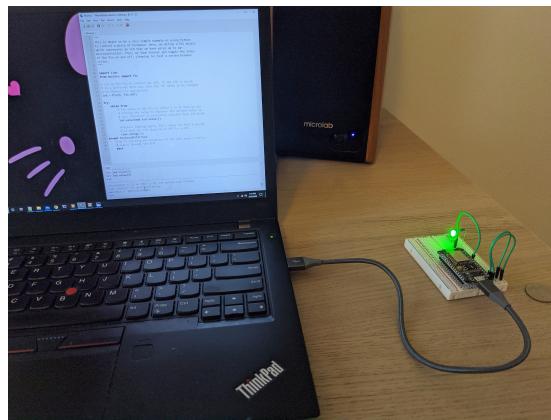


Figure 2.1: The end result should look something like this

2.2 Directions

2.2.1 Creating the circuit

Using jumper cables, you will be assembling a circuit between your microcontroller, your breadboard, an LED, and a 220Ω resistor.

Attach the microcontroller to the breadboard

Carefully insert the pins at the bottom of your microcontroller into the breadboard, making sure that the microcontroller is oriented such that:

- The pin labeled **3V3** is inserted in hole at **Column C, Row 1** of the breadboard (or **C1**, for short)
- The pin labeled **Vin** is inserted in hole **J1** of the breadboard
- The pin labeled **D0** is inserted in hole **C15** of the breadboard
- the pin labeled **A0** is inserted in hole **J15** of the breadboard

You may need to apply more pressure than expected to seat the microcontroller properly in the breadboard. When its over, it should look like this:

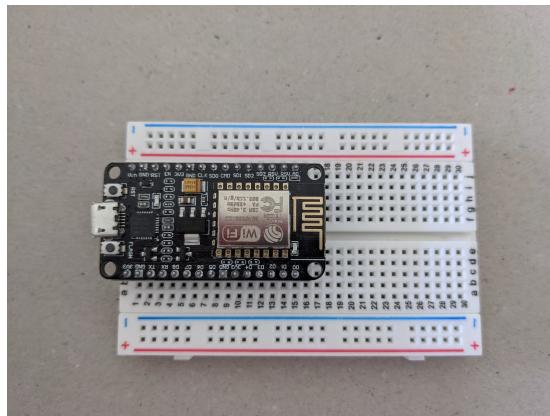


Figure 2.2: So far, so good!

Connect your microcontroller to the positive and negative rails of your breadboard

Using a jumper wire, pin one end of the wire into hole **A1** of the breadboard and the other end on *any* hole in the column labelled with a + on the side of the breadboard. This column is called the **positive rail**, and will eventually move power from your microcontroller around the circuit we are building.

Using another jumper wire, pin one end of the wire into hole **A2** and the other into *any* hole in the column labelled with a - on the side of the breadboard. This column is called the **negative rail** and, like the positive rail, helps to move power around the circuit we are building.

You should be left with something that looks like this:

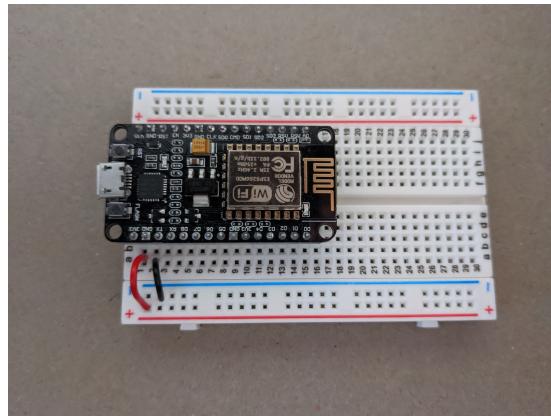


Figure 2.3: I'm absolutely POSITIVE I connected everything correctly!

Connect microcontroller to LED

Connect resistor between LED and negative power rail

2.2.2 Programming the microcontroller

2.3 Review

2.4 Possible Extensions