

Software

Overview

Welcome to the Software Onboarding for the 2025-2026 school year!

Goals

- Learning
 - How do we write software in SCR?
 - How does a microcontroller control hardware?
- practical
 - Writing Arduino/ C++ code
 - Managing software dependencies
 - Reading software documentation

Downloads

Arduino:

Go [here](#) and download the version of the arduino IDE for your operating system (Windows, OSX, linux).



Pico board support:

We'll be using the Raspberry Pi Pico 2 for onboarding. To develop on the pico, you need to add an additional board manager URL to the Arduino IDE.

Go [here](#) and scroll to the **installation** section. Follow the short directions there.



In the boards manager tab, search for these two libraries and **install** them



Compilation

Select the Pico 2:

Use the Arduino IDE to select the Pico 2 as the compilation target.



Connect the Pico 2 to your computer using a micro-usb cable. You should see this drop down turn **bold**.



Verifying Source Code:

Copy this skeleton code into an arduino sketch file.

```
#define LED1_PIN 13
#define LED2_PIN 14
#define LED3_PIN 15

#define IR1_PIN 0
#define IR2_PIN 1
#define IR3_PIN 2
#define IR4_PIN 3
```

```
#define IR5_PIN 4

#define MOTOR2_IN3 18
#define MOTOR2_IN4 19

#define MOTOR1_IN1 20
#define MOTOR1_IN2 21

#define SERVO_PIN 22

Servo payloadServo;

void driveForward() {
    // right motor
    digitalWrite(MOTOR1_IN1, HIGH);
    digitalWrite(MOTOR1_IN2, LOW);

    // left motor
    digitalWrite(MOTOR2_IN3, HIGH);
    digitalWrite(MOTOR2_IN4, LOW);
}

void dumpPayload(Servo servo) {
    servo.write(180);
}

void setup() {
    // IR Pin Setup
    pinMode(IR1_PIN, INPUT);
    pinMode(IR2_PIN, INPUT);
    pinMode(IR3_PIN, INPUT);
    pinMode(IR4_PIN, INPUT);
    pinMode(IR5_PIN, INPUT);

    // LED Setup
    pinMode(LED1_PIN, OUTPUT);
    pinMode(LED2_PIN, OUTPUT);
    pinMode(LED3_PIN, OUTPUT);
    pinMode(LED_BUILTIN, OUTPUT);
}
```

```

// Motor setup
pinMode(MOTOR1_IN1, OUTPUT);
pinMode(MOTOR1_IN2, OUTPUT);

pinMode(MOTOR2_IN3, OUTPUT);
pinMode(MOTOR2_IN4, OUTPUT);

// Servo setup
pinMode(SERV0_PIN, 22);
payloadServo.attach(SERV0_PIN);
}

void loop() {
  // put your main code here, to run repeatedly:
  driveForward();
  delay(500);
  dumpPayload();
  delay(500);
}

```

This file contains `#define`s for the Pico 2's inputs and outputs as well as a function to drive both motors forward.

Edit the `setup()` function and add the line

```
digitalWrite(LED1_PIN, HIGH);
```

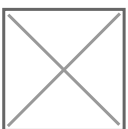
Click the check mark at the top left of the IDE to check for compilation errors. If your program compiles correctly you should see this output.



Flashing Pico 2:

Click the arrow at the top left of the IDE to flash the Pico 2. If flashing doesn't work, you may need to unplug the Pico 2 and hold the BOOTSEL button while reconnecting the micro-usb cable.

If your flash is successful, you should see this output, and LED1 should be turned on.





Useful Documentation

Motor Driver:

You shouldn't need more than this truth table, but if you'd like to read the full documentation you can do that [here](#).



Arduino:

[Arduino API](#), [Servos](#), [Search](#)

Revision #1

Created 2026-07-12 15:01:10 UTC by Daniel Brown

Updated 2026-07-12 15:01:34 UTC by Daniel Brown