Arduino Environment Guide for Andes Corvette-T1

CS340400 Compiler Design

Outline

- Install Arduino
- Install Andes Corvette-T1 Board Package
- Usage

Install Arduino

- System Requirements
  - OS: Windows 7 or above
  - USB: USB 2.0 or above
- Install Arduino 1.8.1 or above
  - only v1.8.13 has been tested (this slides follow v1.8.13)
  - If you find any problem when using other newer version, try switching to v1.8.13
   - https://www.arduino.cc/en/software/OldSoftwareReleases > Arduino 1.8.x

1.8.13	Windows Windows Installer

Install Andes Corvette-T1 Board Package

- Add Board Manifest
- Install Board Package
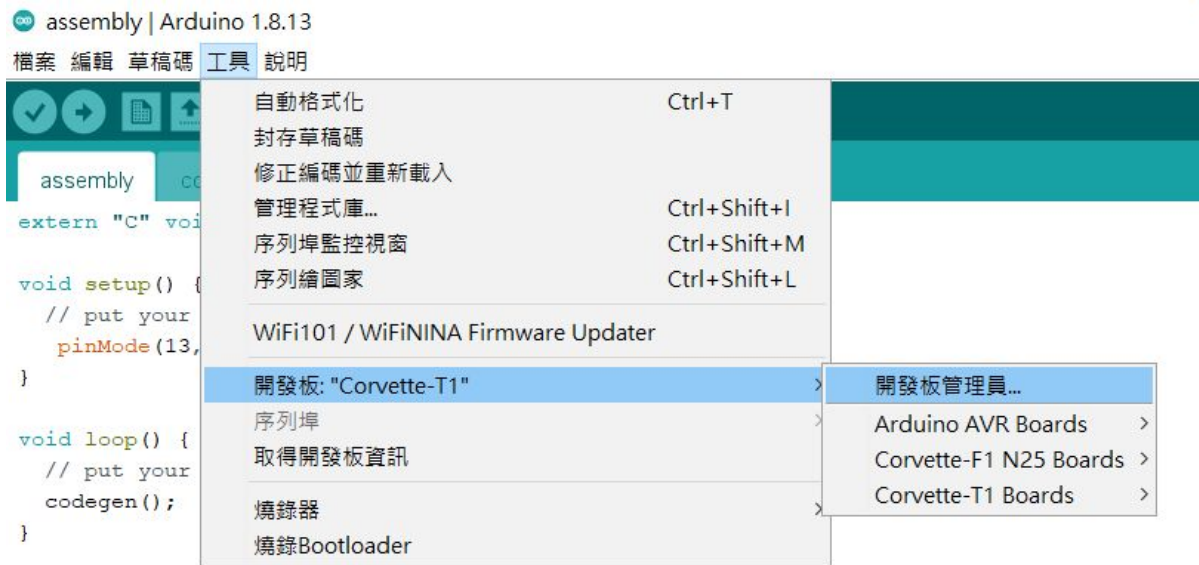- Install Andes Driver

Add Board Manifest

- Navigate to File > Preferences (檔案 > 偏好設定)
- Paste to additional boards manager URLs (額外的開發板管理員網址)
  - https://andestech.github.io/Arduino/package_Corvette_knectme_index.json
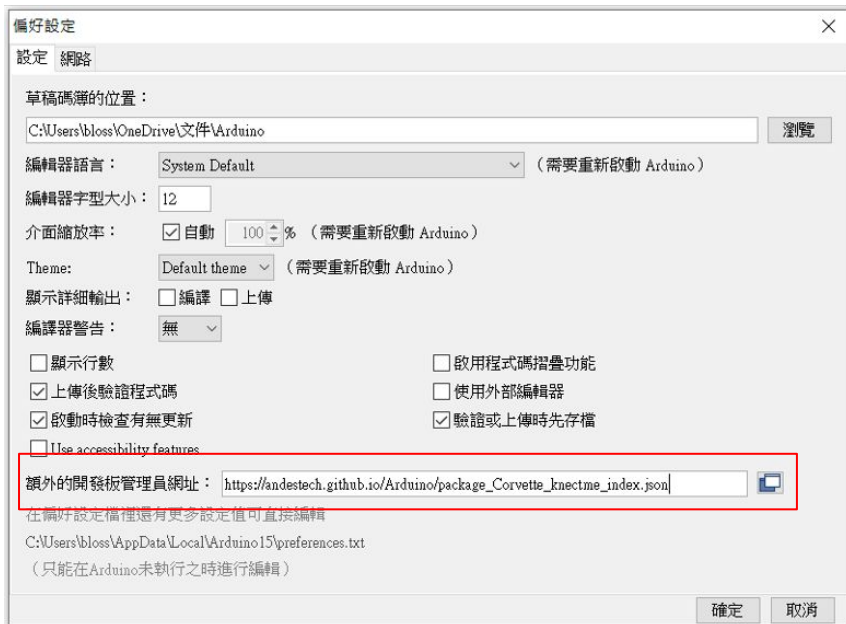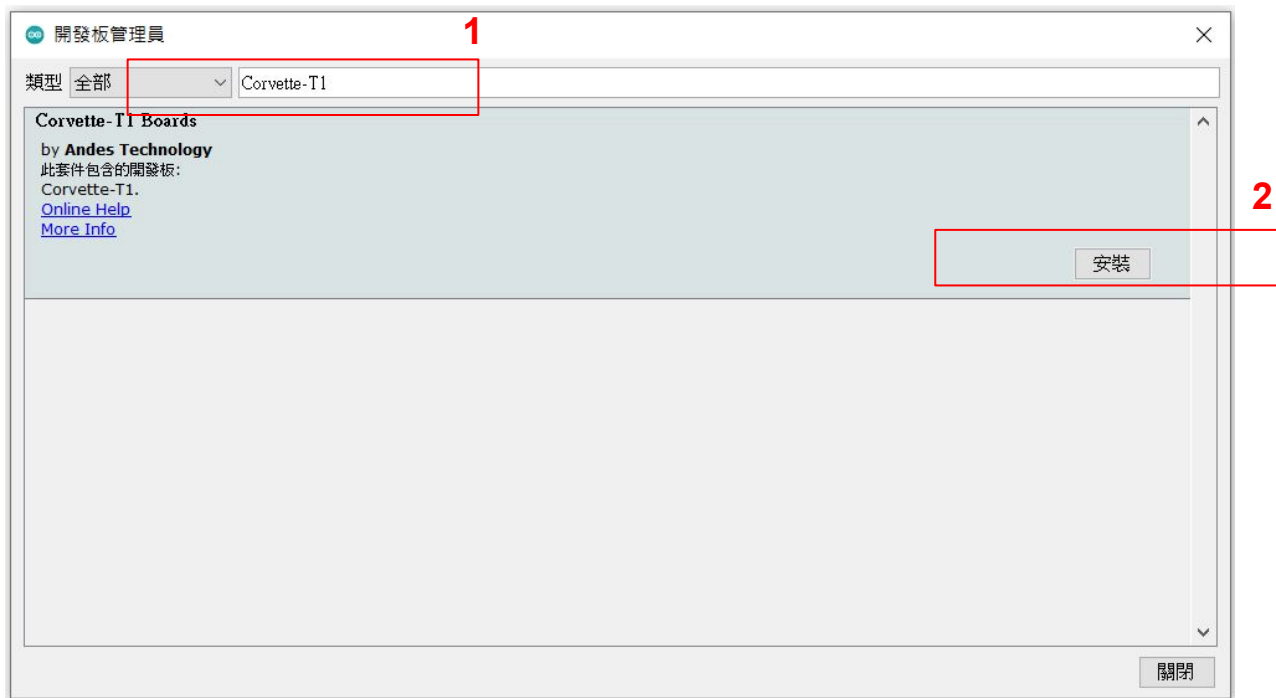
Install Board Package

● Navigate to Tools > Board: > Boards Manager… (工具>開發板>開發板管理員)

Install Board Package (cont.)

● Search for Corvette-T1 and install Corvette-T1 Boards

Install Andes Driver

- Find Arduino's AppData directory, it may be different from the following paths, depending on your system.
  - C:\Users\${USERNAME}\AppData\Roaming\Arduino15\
  - C:\Users\${USERNAME}\AppData\Local\Arduino15\
- Execute install_driver.exe & reboot your computer
  - Arduino15\packages\Corvette\tools\burner\5.1.0- ast\libusb-AICE-driver\Install_driver.exe

|			
Local > Arduino15 > packages > Corvette > tools > burner > 5.1.0-ast > libusb-AICE-driver			
名稱 ^	修改日期	類型	大小
📁 amd64	2022/1/25 上午 09:27	檔案資料夾	
📁 license	2022/1/25 上午 09:27	檔案資料夾	
📁 x86	2022/1/25 上午 09:27	檔案資料夾	
Andes_FTDI_USB_device	2022/1/20 上午 09:53	安全性目錄	8 KB
Andes_FTDI_USB_device	2022/1/20 上午 09:53	安全性憑證	2 KB
Andes_FTDI_USB_device	2022/1/20 上午 09:53	安裝資訊	8 KB
dpinst_amd64	2022/1/20 上午 09:53	應用程式	1,026 KB
dpinst_x86	2022/1/20 上午 09:53	應用程式	901 KB
FTDI_USB_device	2022/1/20 上午 09:53	安全性目錄	8 KB
FTDI_USB_device	2022/1/20 上午 09:53	安全性憑證	2 KB
FTDI_USB_device	2022/1/20 上午 09:53	安裝資訊	8 KB
Install_driver	2022/1/20 上午 09:53	應用程式	45 KB
installer_x64	2022/1/20 上午 09:53	應用程式	141 KB
installer_x86	2022/1/20 上午 09:53	應用程式	117 KB

Usage

- Connect Corvette-T1 to USB
- Set Board-to-Use in Arduino
- Upload/Test Sample Assembly Project

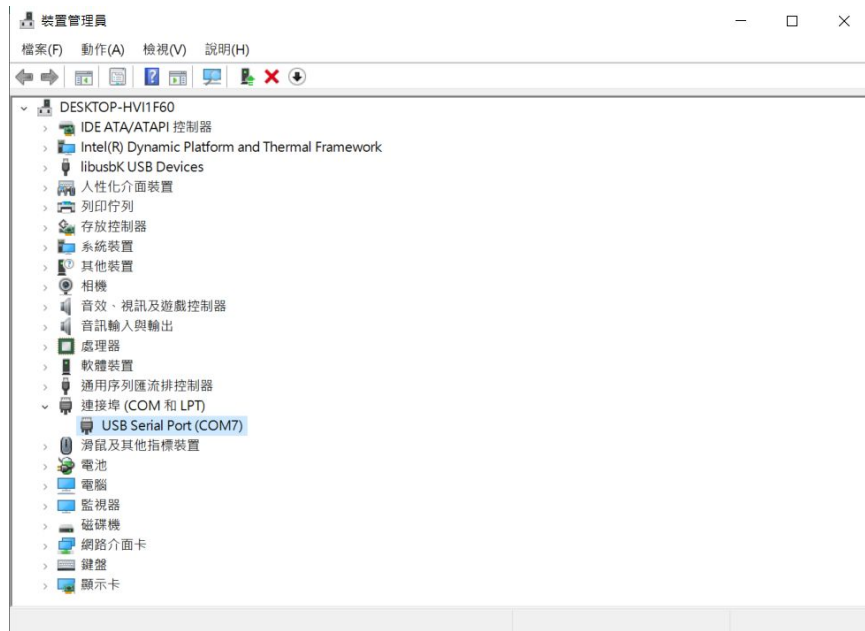# Connect Corvette-T1 to USB

1. Connect USB to your computer

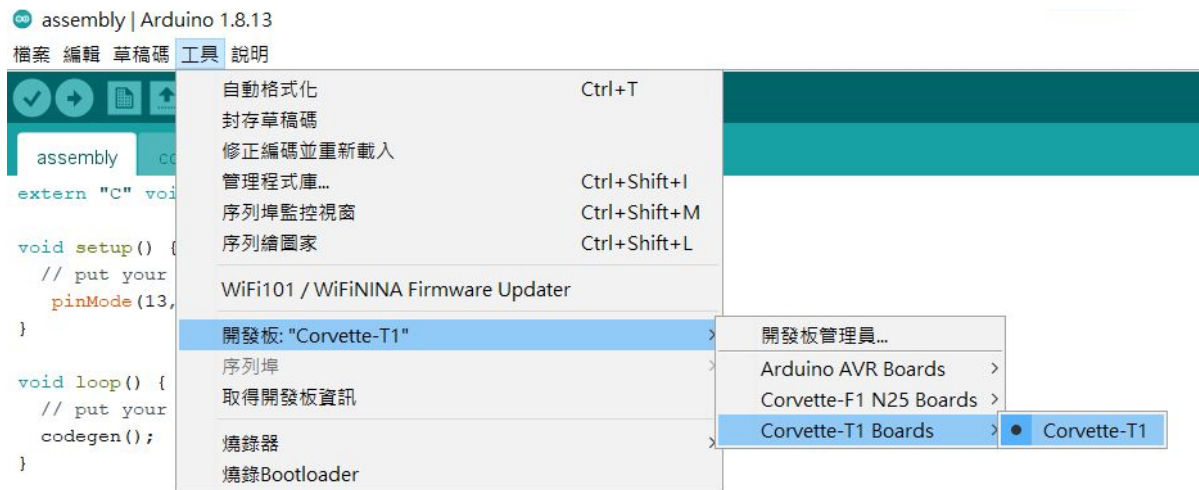LED1 should lights up

2. Connect Micro USB port "COM2"
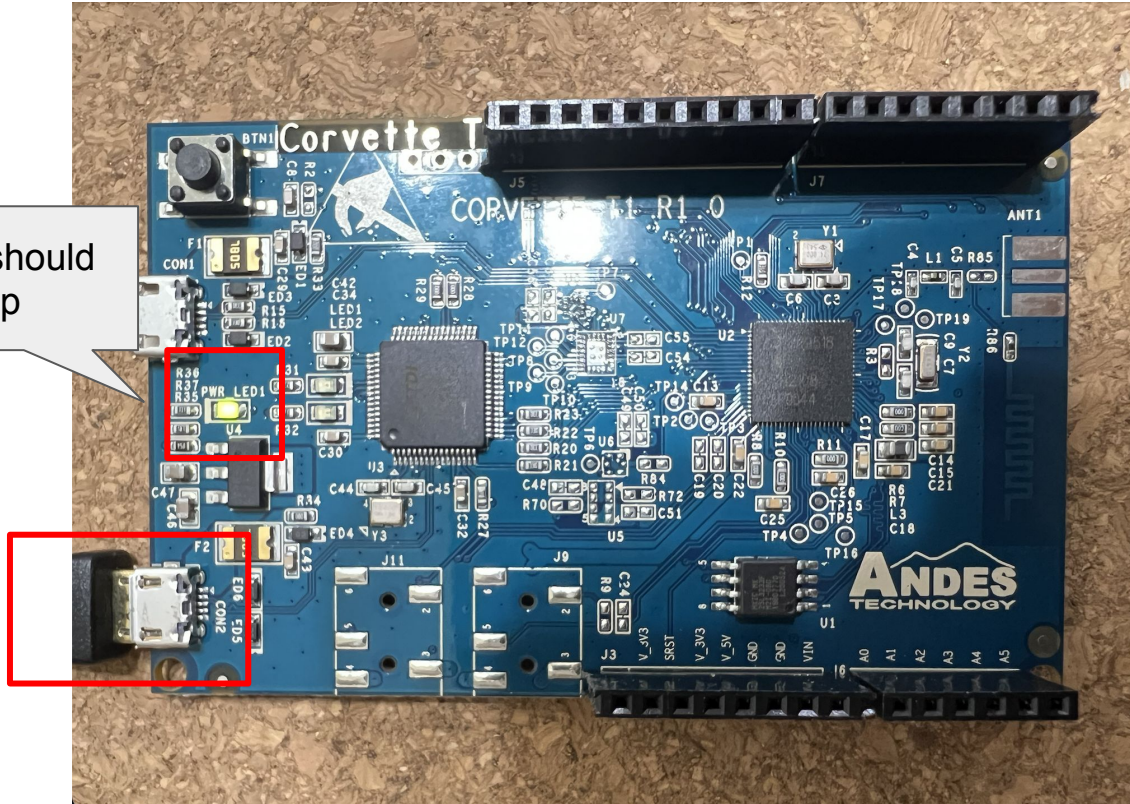
Connect Corvette-T1 to USB (cont.)

● In your device manager (裝置管理員), "USB Serial Port (COMX)" should appear. (e.g. COM7, COM6, …)

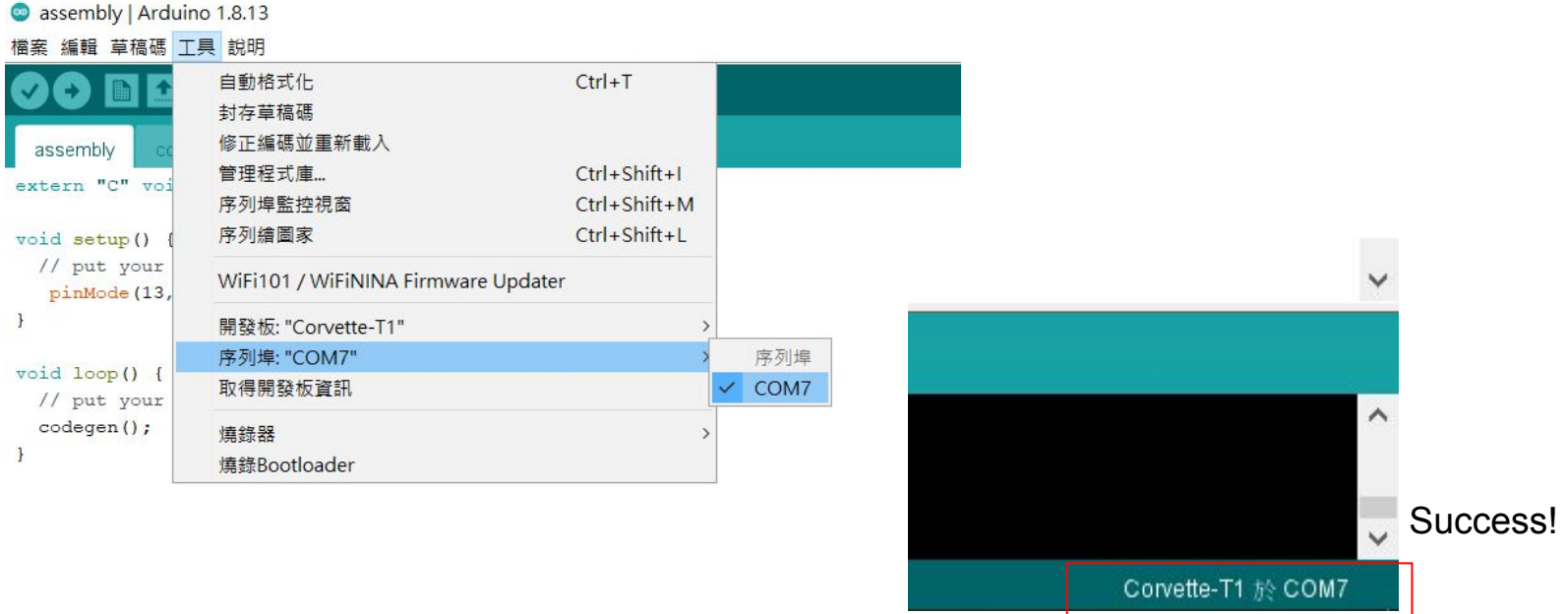# Set Board-to-Use in Arduino
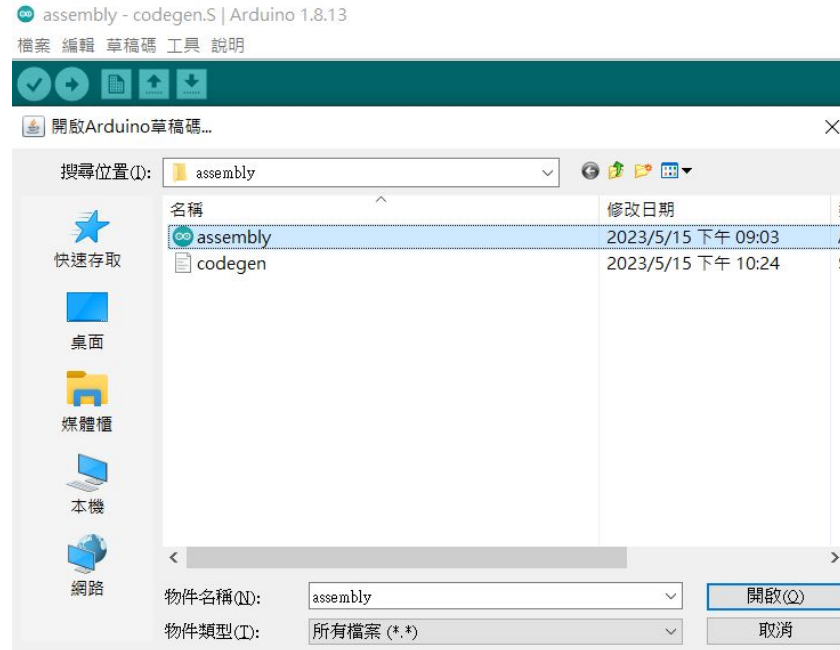
- Navigate to Tools > Board: and select Corvette-T1.

Set Board-to-Use in Arduino (cont.)

- Navigate to Tools > Port, choose the serial port appears in your device manager "USB Serial Port (COMX)".
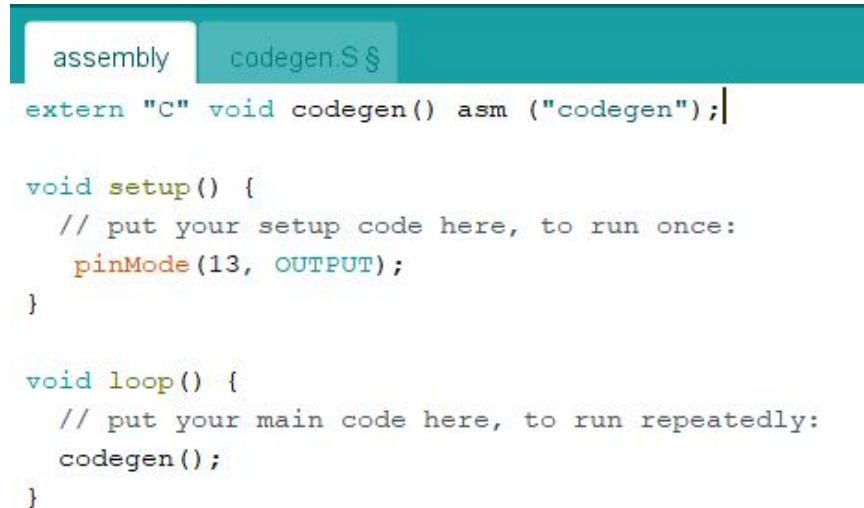

Success!

Upload/Test Sample Assembly Project

- Download sample - Corvette-T1.zip from eeclass
- Navigate to File > Open, and open Corvette-T1/assembly/assembly.ino

Upload/Test Sample Assembly Project (cont.)

- In Arduino IDE, there will appear two files, *assembly* and *codegen.S*.
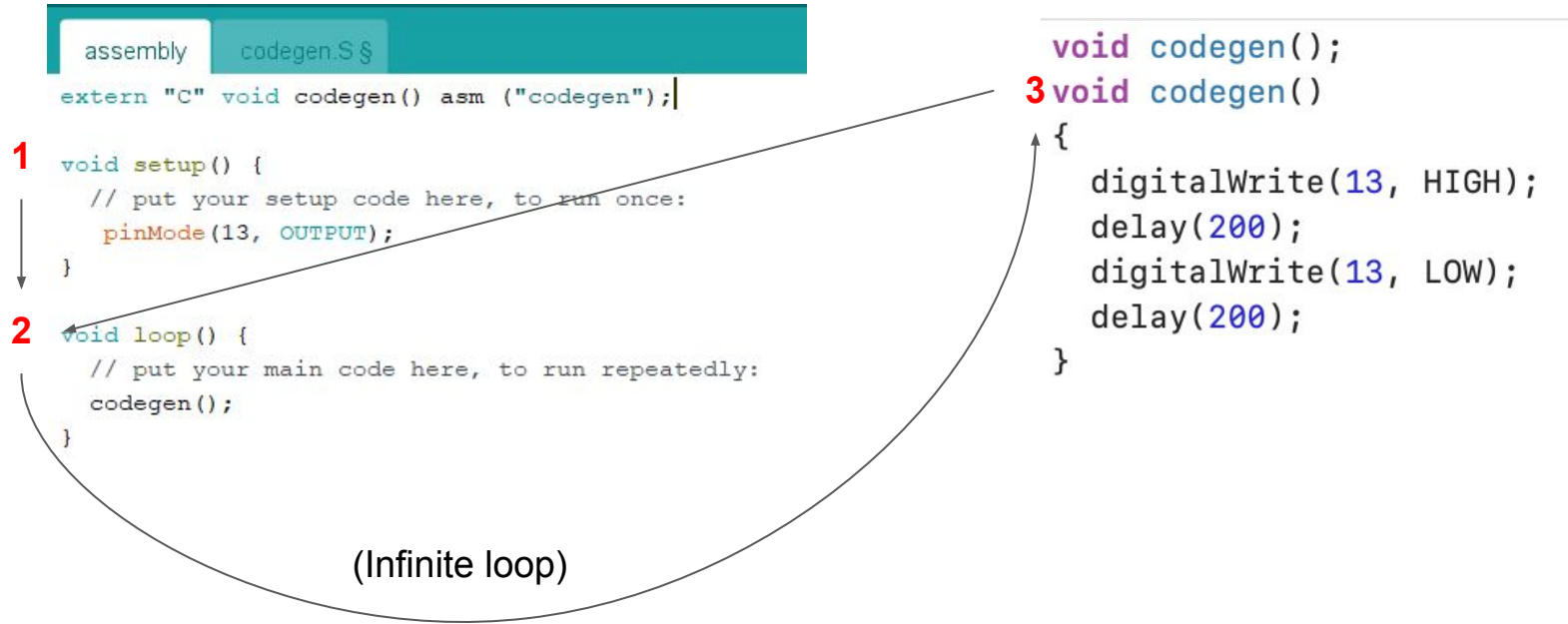


```
assembly      codegen.S §

extern "C" void codegen() asm ("codegen");

void setup() {
  // put your setup code here, to run once:
    pinMode(13, OUTPUT);
}

void loop() {
  // put your main code here, to run repeatedly:
  codegen();
}
```

Sample Assembly Project Explained

(Infinite loop)

Sample Assembly Project Explained (cont.)

- In HW3, you need to compile similar C programs to codegen.S

```
void codegen();
void codegen()
{
    digitalWrite(13, HIGH);
    delay(200);
    digitalWrite(13, LOW);
    delay(200);
}
```

```
assembly    codegen.S
// END PROLOGUE
```

```
addi sp, sp, -4
sw ra, 0(sp)
li a0, 13
li a1, 1
jal ra, digitalWrite
lw ra, 0(sp)
addi sp, sp, 4
```

```
addi sp, sp, -4
sw ra, 0(sp)
li a0, 200
jal ra, delay
lw ra, 0(sp)
addi sp, sp, 4
```

delay 200ms

```
addi sp, sp, -4
sw ra, 0(sp)
li a0, 13
li a1, 0
jal ra, digitalWrite
lw ra, 0(sp)
addi sp, sp, 4
```

```
addi sp, sp, -4
sw ra, 0(sp)
li a0, 200
jal ra, delay
lw ra, 0(sp)
addi sp, sp, 4
```

delay 200ms

Compile&Upload Program to Corvette-T1

- Click upload icon   to upload program to Corvette-T1.

- Wait for compiling assembly&codegen.S to the final executable.

- Upload success!

Compile&Upload Program to Corvette-T1 (cont.)

- LED3 should blink (on for 0.2 sec, off for 0.2 sec, on for 0.2 sec, …)
- **[Important!]** Try to modify delay's parameter to larger number (e.g. from 200 to 2000), save codegen.S, and upload again. See if the LED blinks slower.

LED3 is at the back of the board.


```
// END PROLOGUE

addi sp, sp, -4
sw ra, 0(sp)
li a0, 13
li a1, 1
jal ra, digitalWrite
lw ra, 0(sp)
addi sp, sp, 4

addi sp, sp, -4
sw ra, 0(sp)
li a0, 2000
jal ra, delay
lw ra, 0(sp)
addi sp, sp, 4

addi sp, sp, -4
sw ra, 0(sp)
li a0, 13
li a1, 0
jal ra, digitalWrite
lw ra, 0(sp)
addi sp, sp, 4

addi sp, sp, -4
sw ra, 0(sp)
li a0, 2000
jal ra, delay
lw ra, 0(sp)
addi sp, sp, 4
```

Thanks