Introduction to MicroPython

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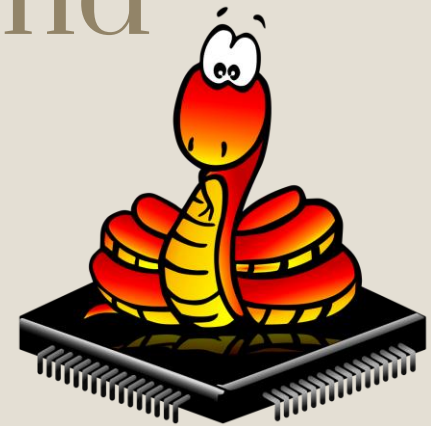
01

MicroPython Intro

Background

ARDUINO



C++

Python

What is MicroPython?

- 由來自澳洲的計算機工程師**Dr. Damien George**帶領其團隊在2013年開始開發的;
- 是Python3的精簡高效實現，語法和Python3保持一致，但只實現了標準庫的一部分;
- 經過優化可以在MCU等受限環境中使用;
- 使用MIT license的開源項目;

Why MicroPython?

- 對比別的編程語言（C++），Python是一種易於學習，使用廣汎的編程語言；
- 通過REPL (*Read, Eval, Print, Loop*) – 一種Python命令提示符，能實現及時的反饋；
- 可以實現realtime debugging;
- “Install **once** with access to the file system for adding and changing code.”
- 比較多可以使用的library。

Environment Setup

Software required:

- Cygwin
- Python 3
- Teraterm (REPL promt)
- Text Editor (eg: Notepad++)

02
Learning Experience Sharing

My learning difficulties as a MP newbie

- Getting used to develop with Python.
- Being familiar with the folder structure of MP, especially some important folders (eg: py/, ports/)
- Learning the build system in details (compiling, linking, and locating).
- Learning about Makefile to deal with a large number of source code.
- Learning how to achieve OOP with C language.

Some useful links for MP learners:

- **MicroPython project on Github:** https://github.com/micropython/micropython
- **Official documentation:** https://docs.micropython.org/
- **MicroPython RTL8722 Port:** https://github.com/ambiot/ambd_micropython
- **Guides on AMEBA forum (“*Introduction to developing MicroPython*”):** https://forum.amebaiot.com/t/introduction-to-developing-micropython-1-background-and-structure/93

03

Demo on RTL8722DM_MINI

l) Build firmware

- download SDK to local
- make sure you have installed **GNU** make and **Python3**
-

```
$ make
```

- **Common error solution:**

  1) Python error:

     Python3 not added to system environment varialble;

  2) MPY-CROSS error:

     - navigate to “MicroPython_RTL8722/mpy-cross”
     - “make” in Cygwin

2) Upload (2 methods)

- **Use “Double-Click-Me-to-Upload.cmd” file in *release folder***

  - Edit COM port number

  - Double click the file

- **Use “make upload” command in *port/rtl8722 folder***

  - Edit UPLOAD_PATH in “Makefile”

  -

```
$ make upload
```

GPIO - Toggle LED

- LED used: build-in BLUE LED, “PA_9”
- Import Pin module;
- Create a Pin object;

```
Pin("pin_name"[required], direction[required], pull_mode[optional], initial_value[optional] )
```

```
from machine import Pin
a = Pin("PA_9", Pin.OUT)
a.value(1)
time.sleep_ms(500)
a.value(0)
time.sleep_ms(500)
a.on()
time.sleep_ms(500)
a.off()
time.sleep_ms(500)
a.toggle()
time.sleep_ms(500)
a.toggle()
```

WiFi module

- ✓ Import WiFi module;
- ✓ Create an object;

Scan network

```
from wireless import WLAN
wifi = WLAN(mode = WLAN.STA)
wifi.scan()
```

Connect to WiFi

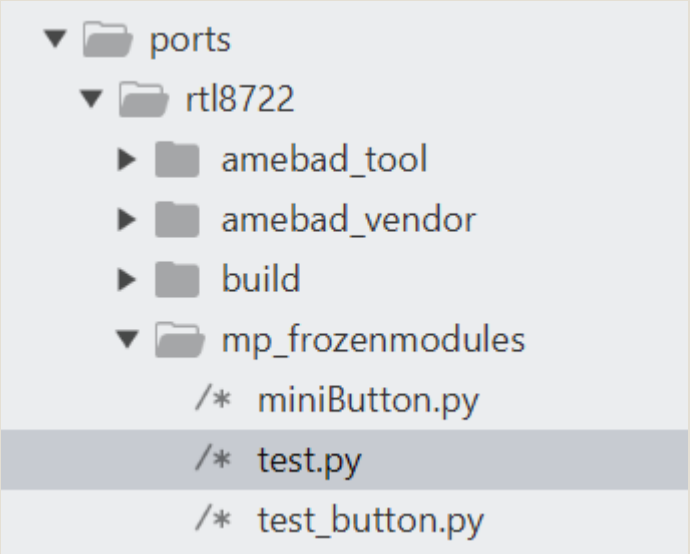
```
from wireless import WLAN
wifi = WLAN(mode = WLAN.STA) # STA means Station Mode
wifi.connect(ssid = "MPSSID", pswd = "upyameba")
```

FLASH module

- read：讀取
- write: 寫入
- update: 更新
- erase: 刪除

```
from machine import FLASH
f = FLASH()
text = "Hello"
f.read(5, 1048576)
f.write(text, 1048576)
f.read(5, 1048576)
new = "Hey"
f.update(new, 1048576)
f.read(3, 1048576)
```

Frozen Module




```
MicroPython RTL8722 V1.0.1 by Realtek Ameba; Commit: v1.11 on 2021-10-21
Type "help()" for more information.
>>> import test
Testing Import from File
>>>
```

04

Q&A

Thank you!