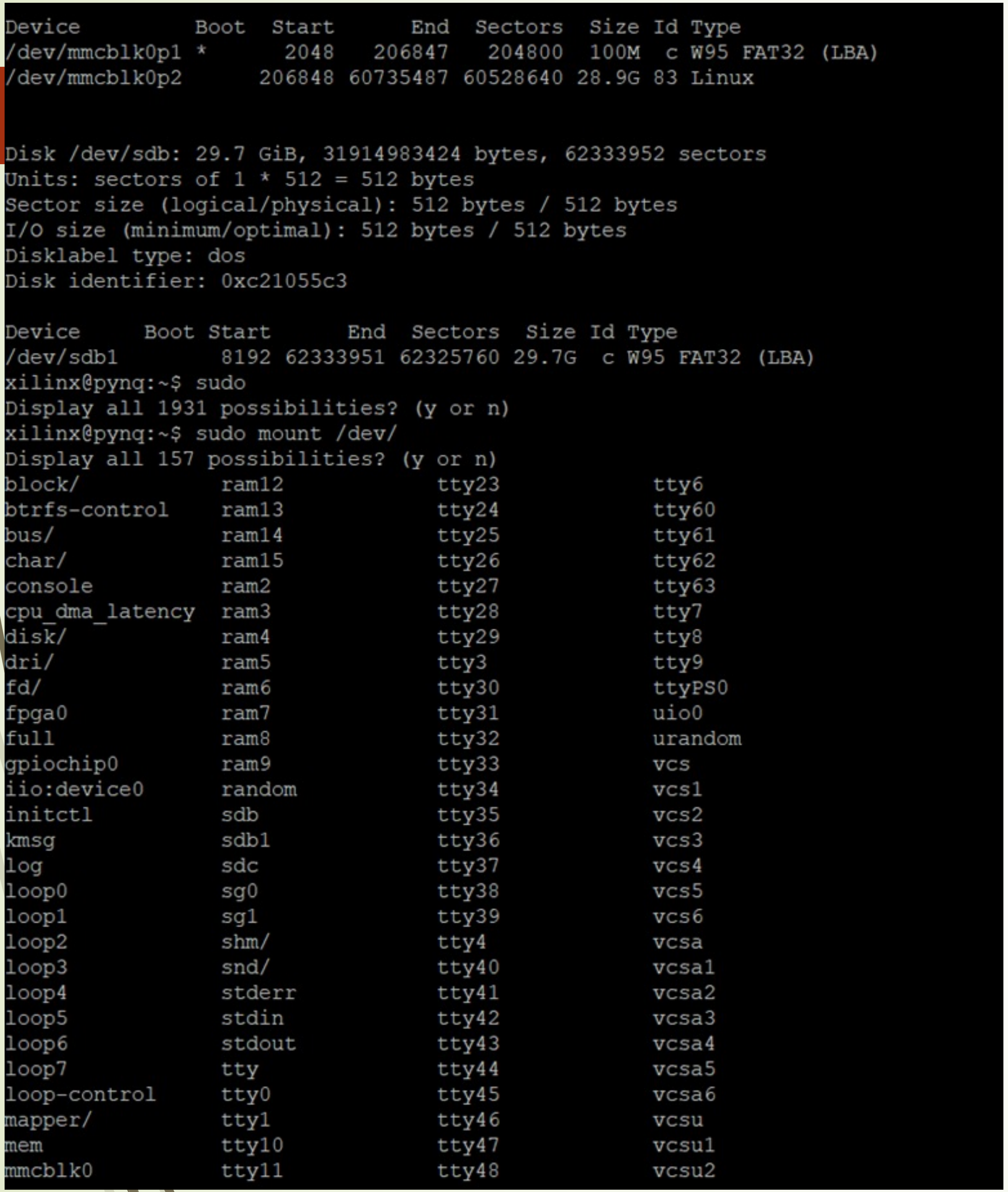
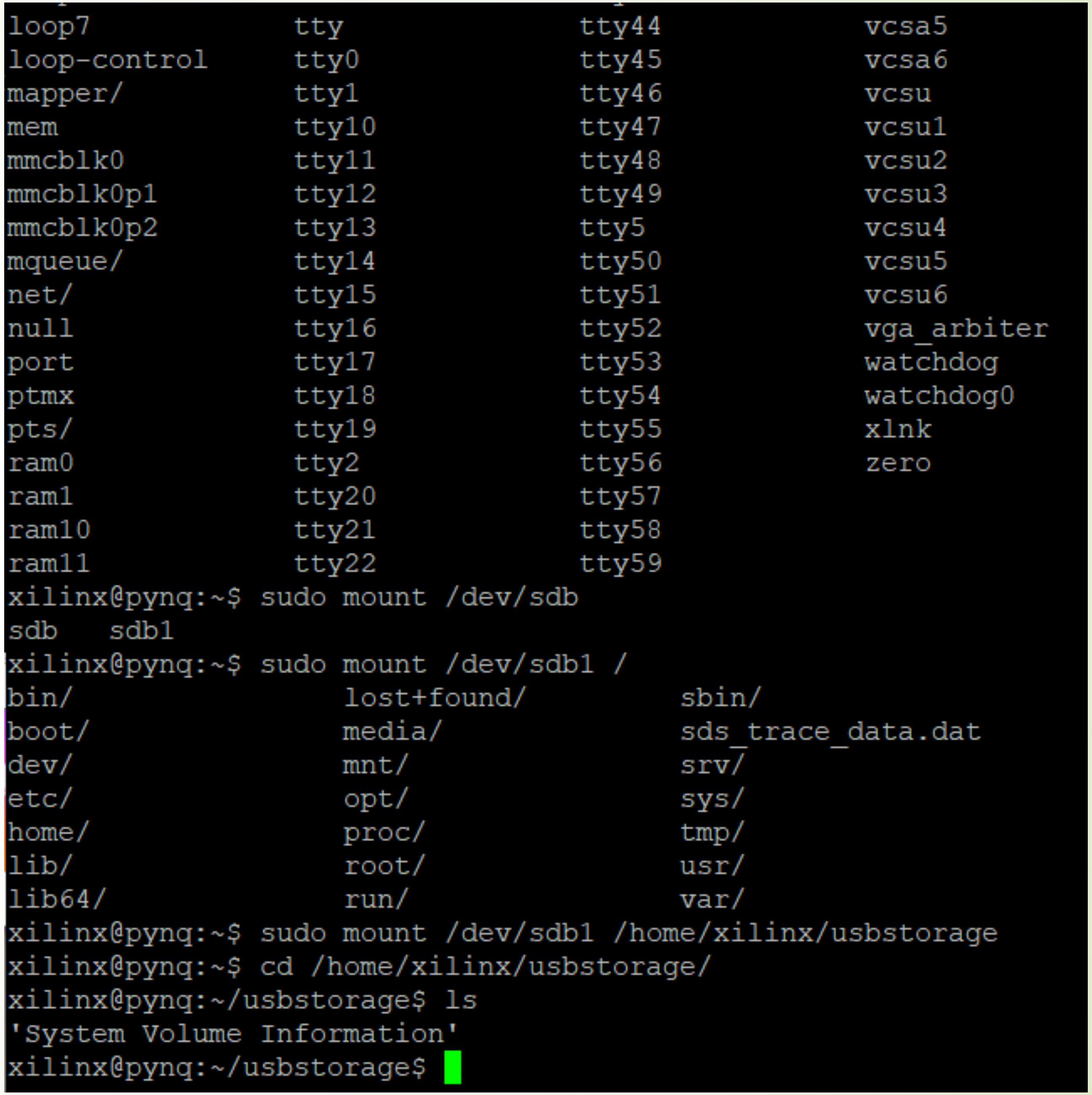
Pynq Electrochemical Sensor

黃郡儀

1. Linux USB 開機自動掛載

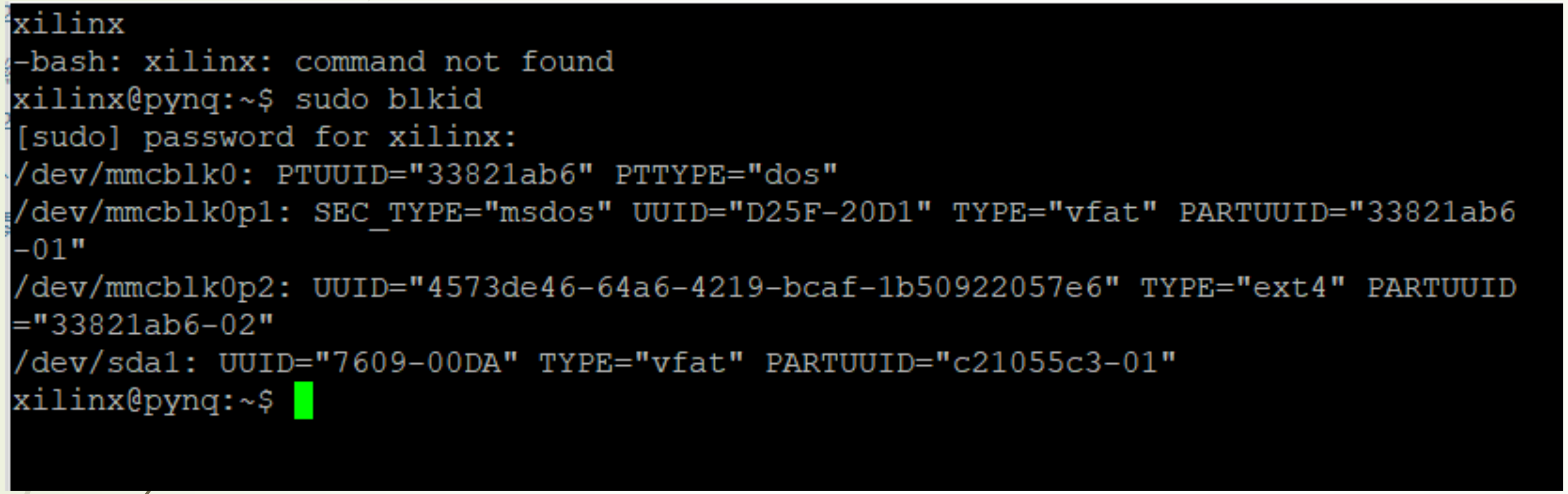


```
Device           Boot  Start       End  Sectors  Size Id Type
/dev/mmcblk0p1 *      2048   206847   204800  100M  c W95 FAT32 (LBA)
/dev/mmcblk0p2      206848 60735487 60528640 28.9G 83 Linux


Disk /dev/sdb: 29.7 GiB, 31914983424 bytes, 62333952 sectors
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disklabel type: dos
Disk identifier: 0xc21055c3

Device     Boot Start      End  Sectors  Size Id Type
/dev/sdb1        8192 62333951 62325760 29.7G  c W95 FAT32 (LBA)
xilinx@pynq:~$ sudo
Display all 1931 possibilities? (y or n)
xilinx@pynq:~$ sudo mount /dev/
Display all 157 possibilities? (y or n)
block/           ram12            tty23            tty6
btrfs-control    ram13            tty24            tty60
bus/             ram14            tty25            tty61
char/            ram15            tty26            tty62
console          ram2             tty27            tty63
cpu_dma_latency  ram3             tty28            tty7
disk/            ram4             tty29            tty8
dri/             ram5             tty3             tty9
fd/              ram6             tty30            ttyPS0
fpga0            ram7             tty31            uio0
full             ram8             tty32            urandom
gpiochip0        ram9             tty33            vcs
iio:device0      random           tty34            vcs1
initctl          sdb              tty35            vcs2
kmsg             sdb1             tty36            vcs3
log              sdc              tty37            vcs4
loop0            sg0              tty38            vcs5
loop1            sg1              tty39            vcs6
loop2            shm/             tty4             vcsa
loop3            snd/             tty40            vcsa1
loop4            stderr           tty41            vcsa2
loop5            stdin            tty42            vcsa3
loop6            stdout           tty43            vcsa4
loop7            tty              tty44            vcsa5
loop-control     tty0             tty45            vcsa6
mapper/          tty1             tty46            vcsu
mem              tty10            tty47            vcsu1
mmcblk0          tty11            tty48            vcsu2
```



```
loop7            tty              tty44            vcsa5
loop-control     tty0             tty45            vcsa6
mapper/          tty1             tty46            vcsu
mem              tty10            tty47            vcsu1
mmcblk0          tty11            tty48            vcsu2
mmcblk0p1        tty12            tty49            vcsu3
mmcblk0p2        tty13            tty5             vcsu4
mqueue/          tty14            tty50            vcsu5
net/             tty15            tty51            vcsu6
null             tty16            tty52            vga_arbiter
port             tty17            tty53            watchdog
ptmx             tty18            tty54            watchdog0
pts/             tty19            tty55            xlnk
ram0             tty2             tty56            zero
ram1             tty20            tty57
ram10            tty21            tty58
ram11            tty22            tty59
xilinx@pynq:~$ sudo mount /dev/sdb
sdb   sdb1
xilinx@pynq:~$ sudo mount /dev/sdb1 /
bin/                lost+found/         sbin/
boot/               media/              sds_trace_data.dat
dev/                mnt/                srv/
etc/                opt/                sys/
home/               proc/               tmp/
lib/                root/               usr/
lib64/              run/                var/
xilinx@pynq:~$ sudo mount /dev/sdb1 /home/xilinx/usbstorage
xilinx@pynq:~$ cd /home/xilinx/usbstorage/
xilinx@pynq:~/usbstorage$ ls
'System Volume Information'
xilinx@pynq:~/usbstorage$
```

開機自動mount



```
xilinx
-bash: xilinx: command not found
xilinx@pynq:~$ sudo blkid
[sudo] password for xilinx:
/dev/mmcblk0: PTUUID="33821ab6" PTTYPE="dos"
/dev/mmcblk0p1: SEC_TYPE="msdos" UUID="D25F-20D1" TYPE="vfat" PARTUUID="33821ab6
-01"
/dev/mmcblk0p2: UUID="4573de46-64a6-4219-bcaf-1b50922057e6" TYPE="ext4" PARTUUID
="33821ab6-02"
/dev/sda1: UUID="7609-00DA" TYPE="vfat" PARTUUID="c21055c3-01"
xilinx@pynq:~$ 
```

```
$sudo nano /etc/fstab    #進入nano編輯器
```

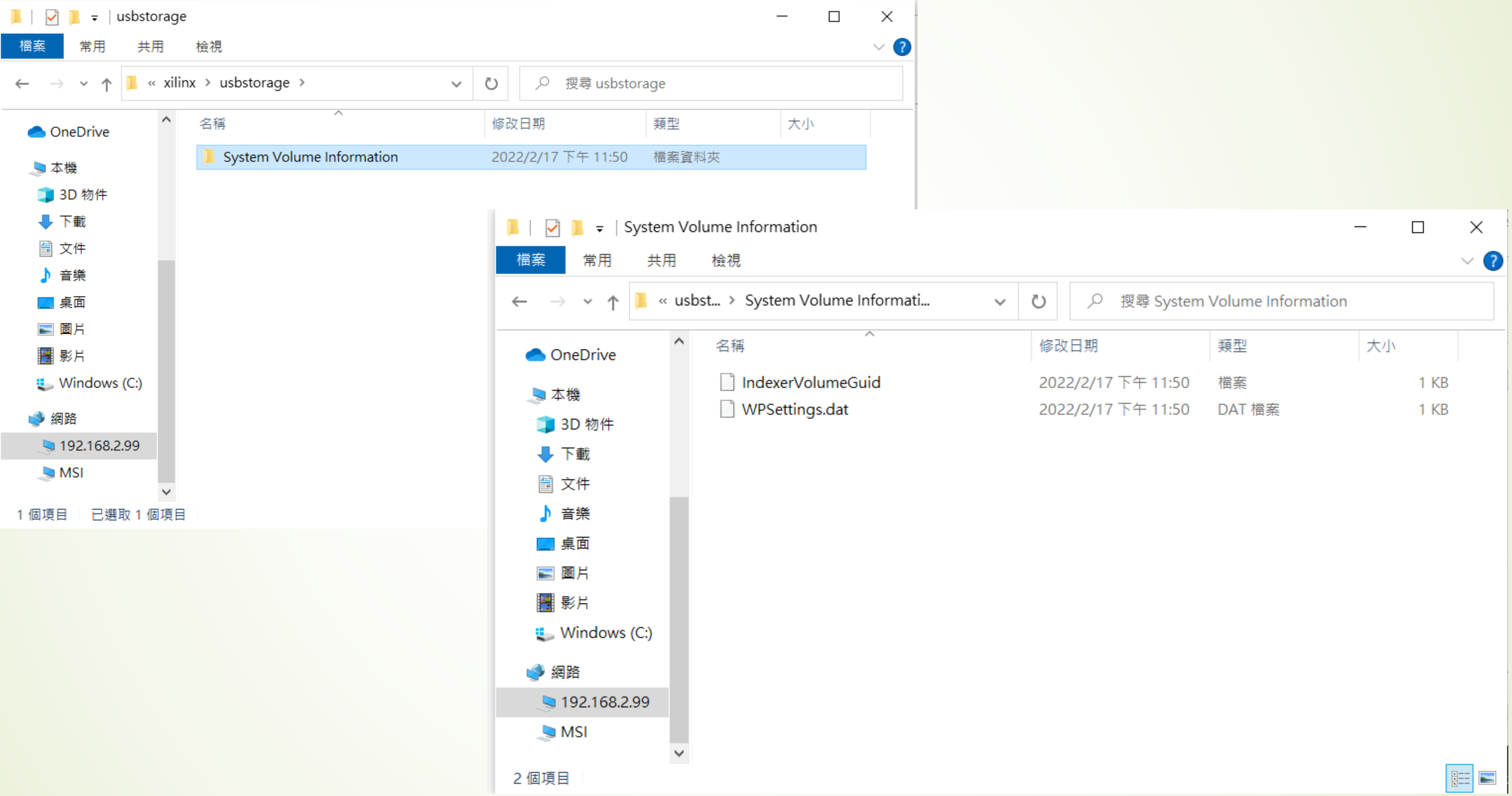
在最後加入這一行：

```
UUID=“7609-00DA” /home/Xilinx/usbstorage vfat rw,defaults 0 0
```

然後下指令測試：

```
$ sudo mount –a   #列出mount裝置
```

Samba dir.



名稱	修改日期	類型	大小
System Volume Information	2022/2/17 下午 11:50	檔案資料夾	

1 個項目 已選取 1 個項目

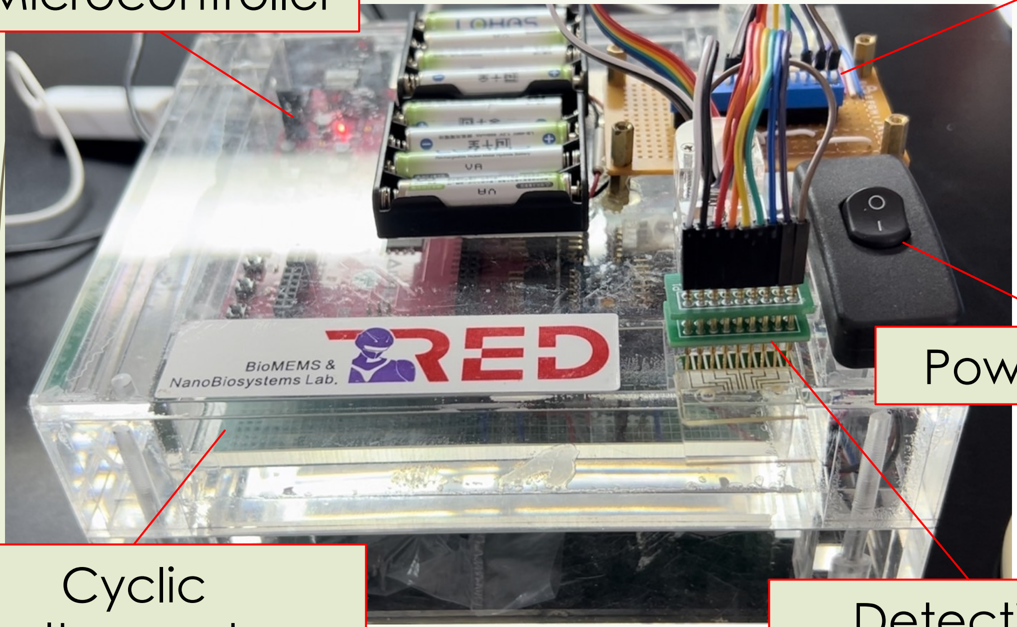
System Volume Information
檔案
常用
共用
檢視
« usbst... › System Volume Informati...
搜尋 System Volume Information
OneDrive
本機
3D 物件
下載
文件
音樂
桌面
圖片
影片
Windows (C:)
網路
192.168.2.99
MSI

名稱	修改日期	類型	大小
IndexerVolumeGuid	2022/2/17 下午 11:50	檔案	1 KB
WPSettings.dat	2022/2/17 下午 11:50	DAT 檔案	1 KB

2 個項目

2. Hardware design with pynq(zynq) & python API

In-House FPGA-Based POCT System



FPGA Microcontroller

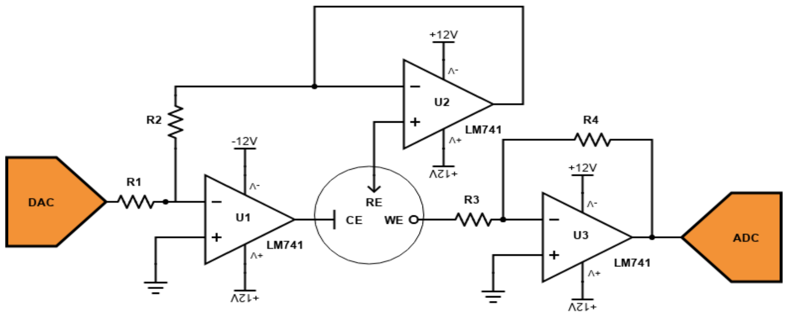
Sensor switch

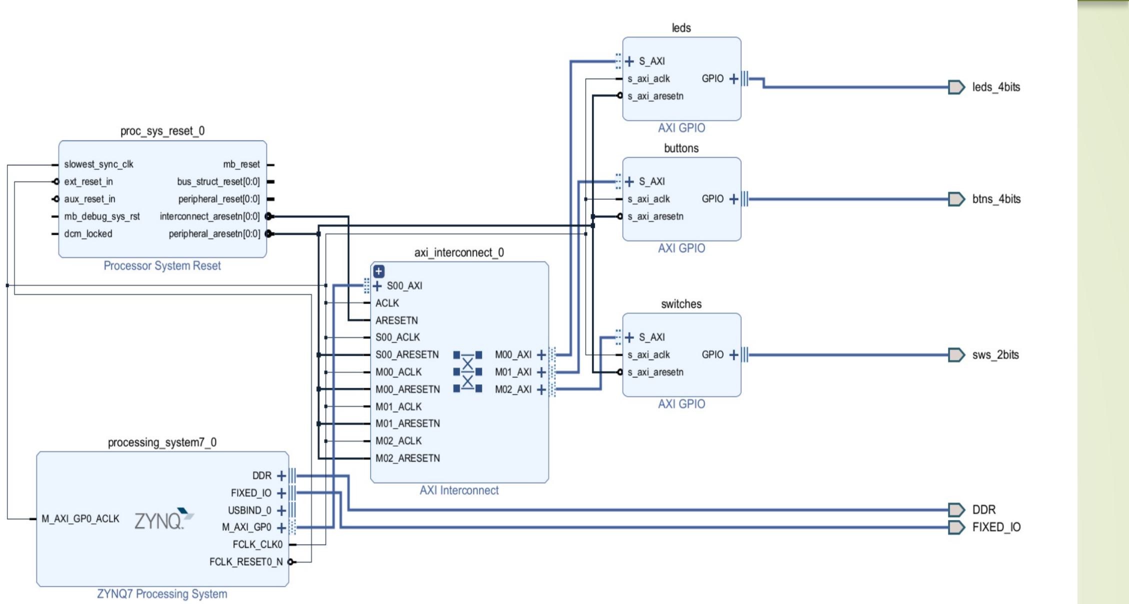
Power switch

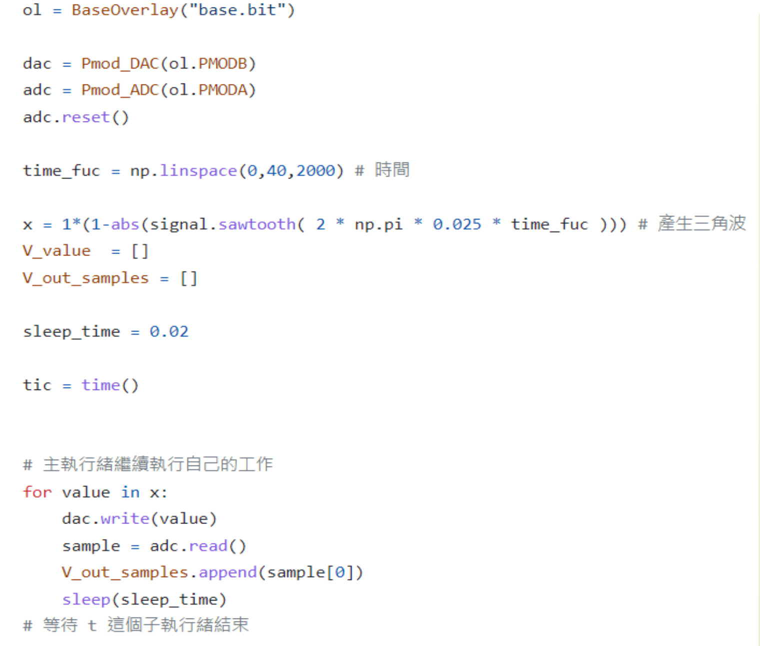
Cyclic voltammetry circuit

Detection module

PYNQ-Z1

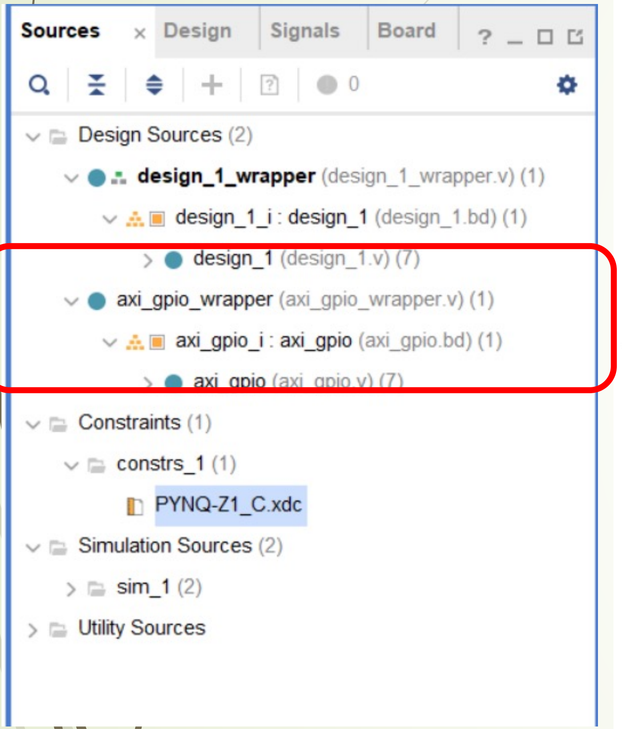




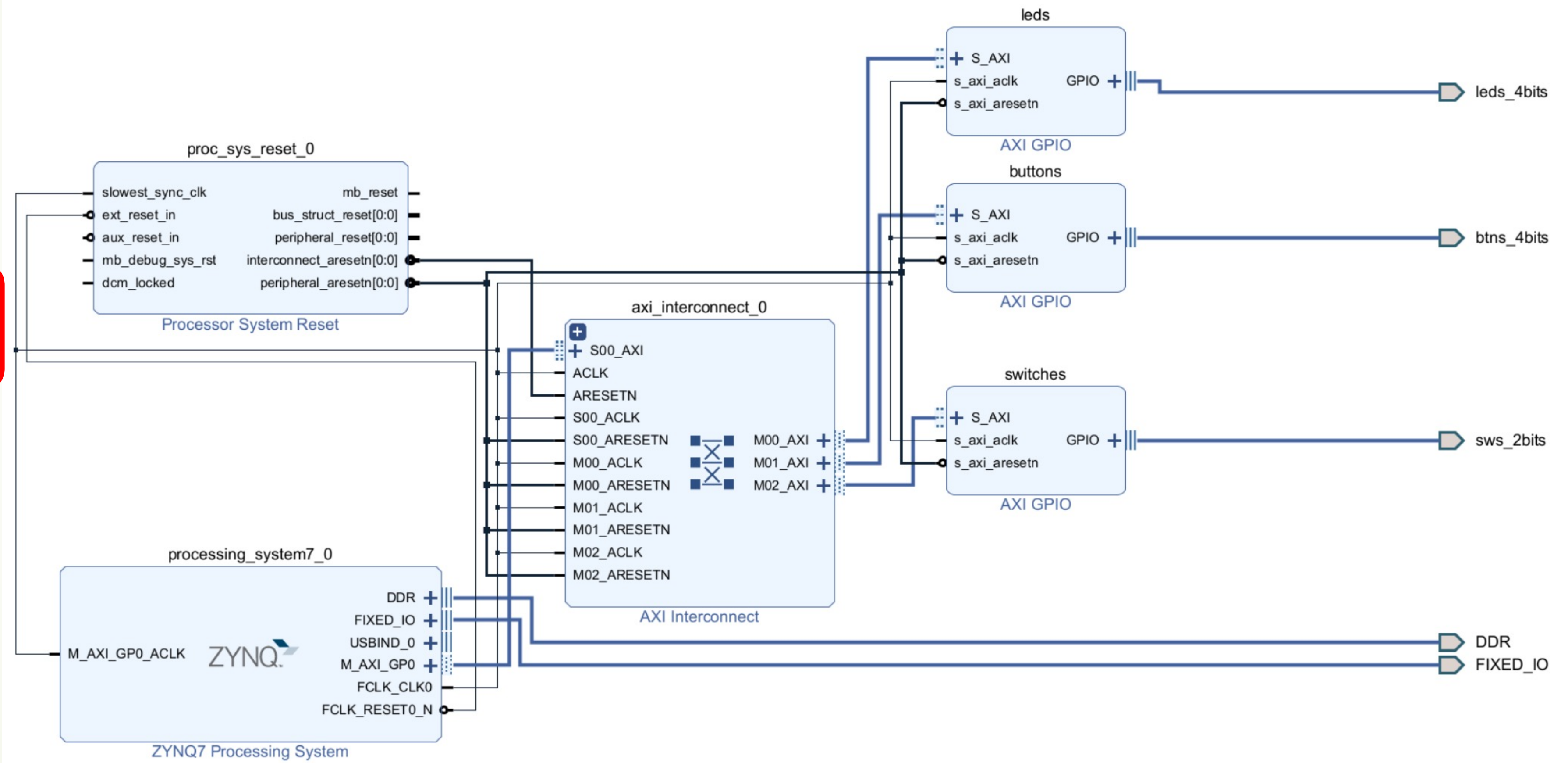


```
ol = BaseOverlay("base.bit")

dac = Pmod_DAC(ol.PMODB)
adc = Pmod_ADC(ol.PMODA)
adc.reset()

time_fuc = np.linspace(0,40,2000) # 時間

x = 1*(1-abs(signal.sawtooth( 2 * np.pi * 0.025 * time_fuc ))) # 產生三角波
V_value  = []
V_out_samples = []

sleep_time = 0.02

tic = time()


# 主執行緒繼續執行自己的工作
for value in x:
    dac.write(value)
    sample = adc.read()
    V_out_samples.append(sample[0])
    sleep(sleep_time)
# 等待 t 這個子執行緒結束
```

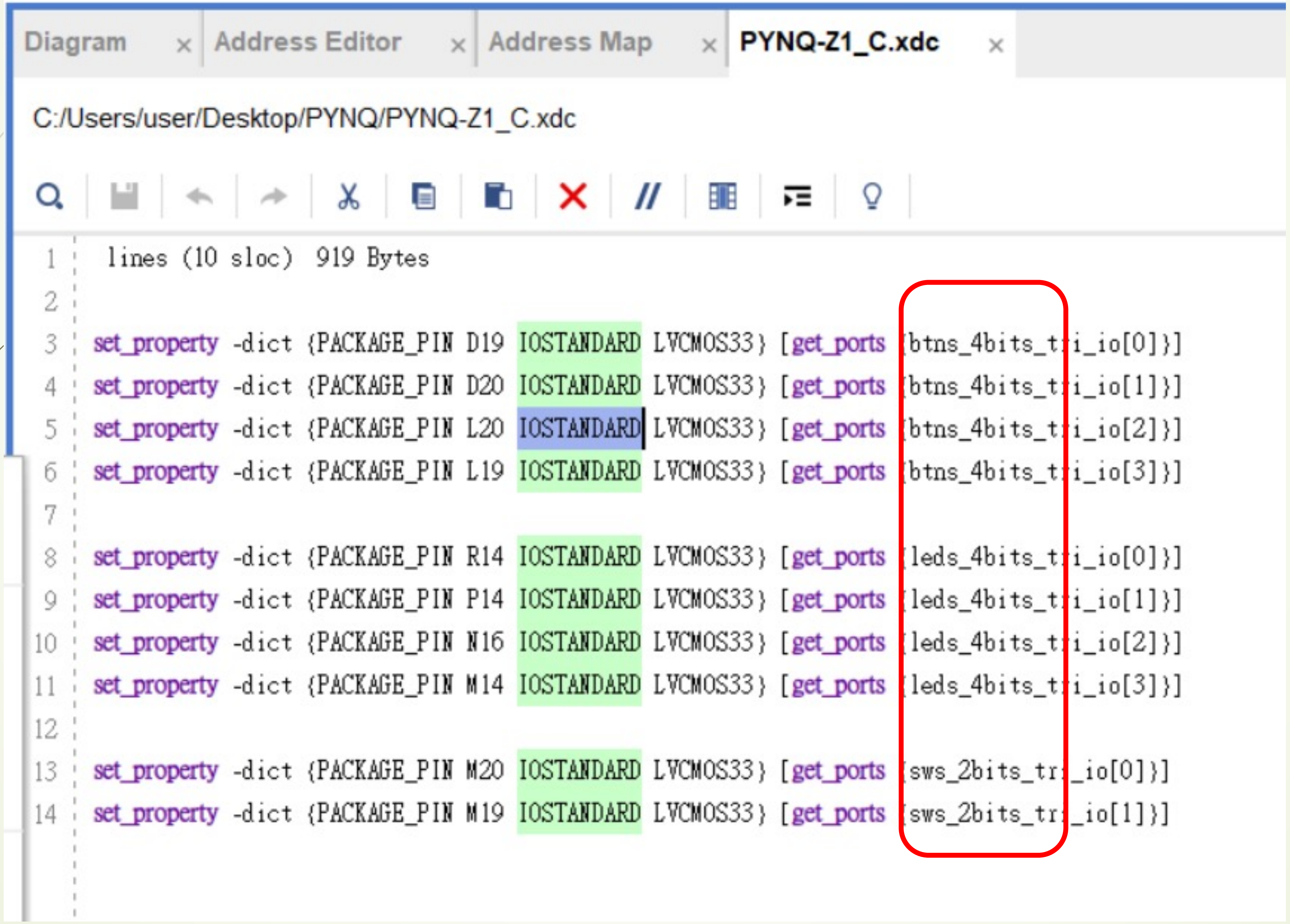
Hardware in vivado



- Design Sources (2)
  - design_1_wrapper (design_1_wrapper.v) (1)
    - design_1_i : design_1 (design_1.bd) (1)
      - design_1 (design_1.v) (7)
  - axi_gpio_wrapper (axi_gpio_wrapper.v) (1)
    - axi_gpio_i : axi_gpio (axi_gpio.bd) (1)
      - axi_gpio (axi_gpio.v) (7)
- Constraints (1)
  - constrs_1 (1)
    - PYNQ-Z1_C.xdc
- Simulation Sources (2)
  - sim_1 (2)
- Utility Sources



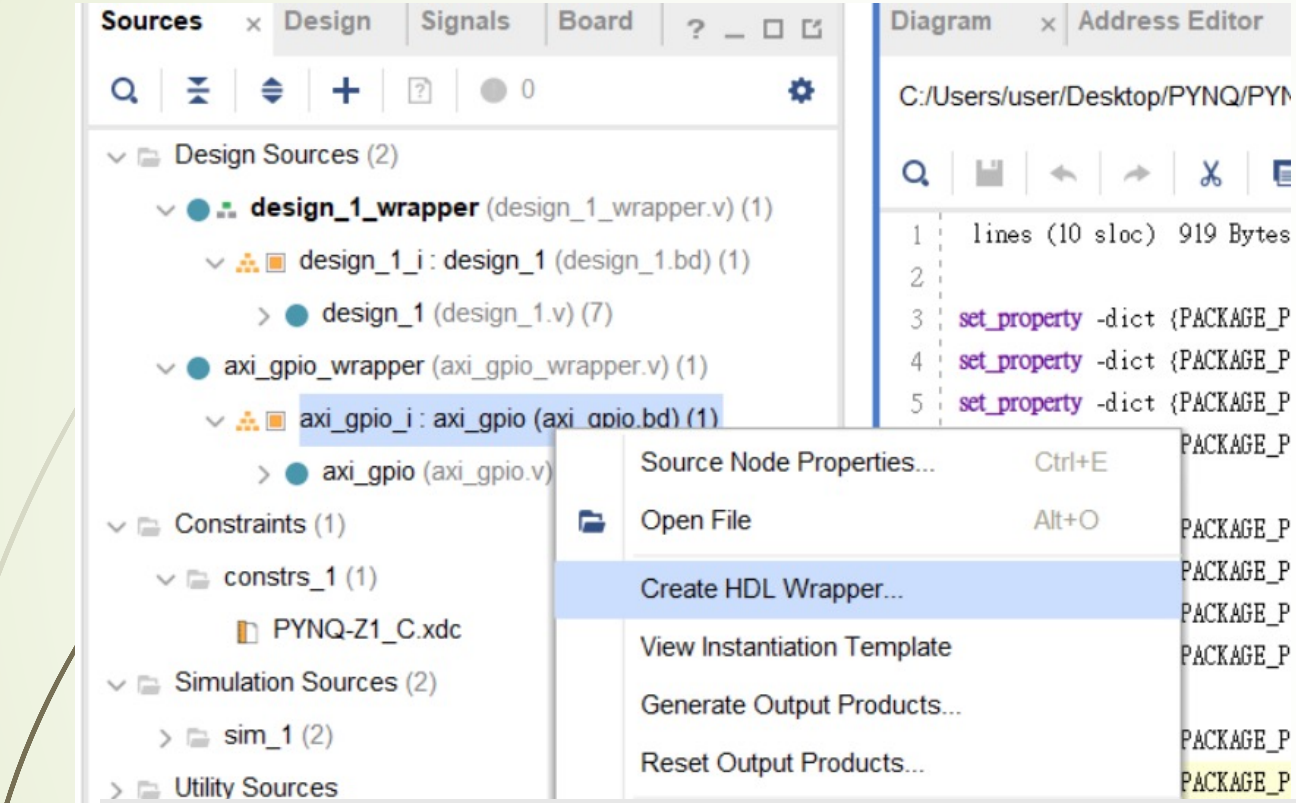
Constraint



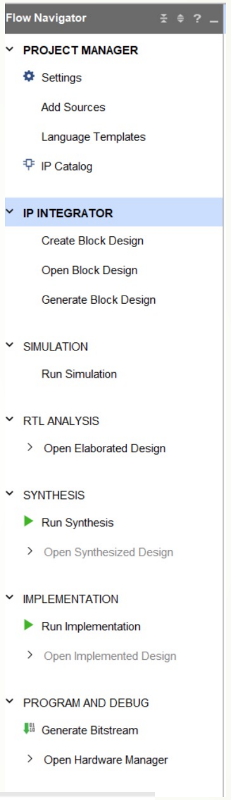
C:/Users/user/Desktop/PYNQ/PYNQ-Z1_C.xdc

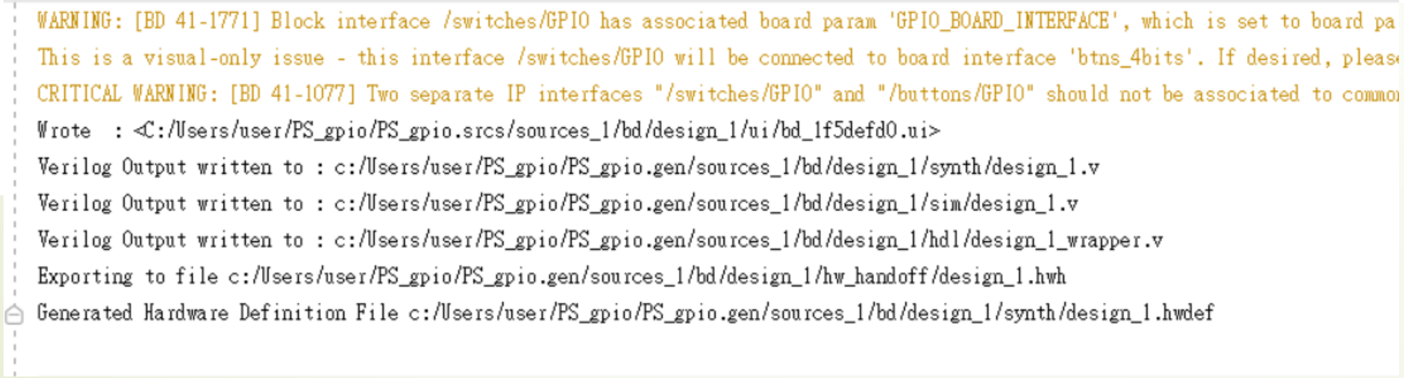
```
 lines (10 sloc)  919 Bytes

set_property -dict {PACKAGE_PIN D19 IOSTANDARD LVCMOS33} [get_ports {btns_4bits_tri_io[0]}]
set_property -dict {PACKAGE_PIN D20 IOSTANDARD LVCMOS33} [get_ports {btns_4bits_tri_io[1]}]
set_property -dict {PACKAGE_PIN L20 IOSTANDARD LVCMOS33} [get_ports {btns_4bits_tri_io[2]}]
set_property -dict {PACKAGE_PIN L19 IOSTANDARD LVCMOS33} [get_ports {btns_4bits_tri_io[3]}]

set_property -dict {PACKAGE_PIN R14 IOSTANDARD LVCMOS33} [get_ports {leds_4bits_tri_io[0]}]
set_property -dict {PACKAGE_PIN P14 IOSTANDARD LVCMOS33} [get_ports {leds_4bits_tri_io[1]}]
set_property -dict {PACKAGE_PIN N16 IOSTANDARD LVCMOS33} [get_ports {leds_4bits_tri_io[2]}]
set_property -dict {PACKAGE_PIN M14 IOSTANDARD LVCMOS33} [get_ports {leds_4bits_tri_io[3]}]

set_property -dict {PACKAGE_PIN M20 IOSTANDARD LVCMOS33} [get_ports {sws_2bits_tri_io[0]}]
set_property -dict {PACKAGE_PIN M19 IOSTANDARD LVCMOS33} [get_ports {sws_2bits_tri_io[1]}]
```

HWH & Tcl export


Sources
Design
Signals
Board
Design Sources (2)
design_1_wrapper (design_1_wrapper.v) (1)
design_1_i : design_1 (design_1.bd) (1)
design_1 (design_1.v) (7)
axi_gpio_wrapper (axi_gpio_wrapper.v) (1)
axi_gpio_i : axi_gpio (axi_gpio.bd) (1)
axi_gpio (axi_gpio.v)
Constraints (1)
constrs_1 (1)
PYNQ-Z1_C.xdc
Simulation Sources (2)
sim_1 (2)
Utility Sources
Source Node Properties... Ctrl+E
Open File Alt+O
Create HDL Wrapper...
View Instantiation Template
Generate Output Products...
Reset Output Products...
Diagram
Address Editor
C:/Users/user/Desktop/PYNQ/PYN

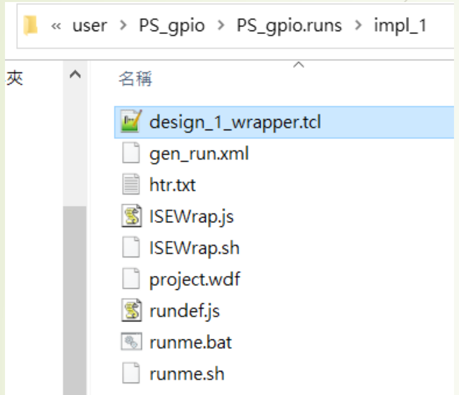
```
 lines (10 sloc)  919 Bytes

set_property -dict {PACKAGE_P
set_property -dict {PACKAGE_P
set_property -dict {PACKAGE_P
                    PACKAGE_P

                    PACKAGE_P
                    PACKAGE_P
                    PACKAGE_P
                    PACKAGE_P

                    PACKAGE_P
                    PACKAGE_P
```





```
WARNING: [BD 41-1771] Block interface /switches/GPIO has associated board param 'GPIO_BOARD_INTERFACE', which is set to board pa
This is a visual-only issue - this interface /switches/GPIO will be connected to board interface 'btns_4bits'. If desired, please
CRITICAL WARNING: [BD 41-1077] Two separate IP interfaces "/switches/GPIO" and "/buttons/GPIO" should not be associated to commo
Wrote  : <C:/Users/user/PS_gpio/PS_gpio.srcs/sources_1/bd/design_1/ui/bd_1f5defd0.ui>
Verilog Output written to : c:/Users/user/PS_gpio/PS_gpio.gen/sources_1/bd/design_1/synth/design_1.v
Verilog Output written to : c:/Users/user/PS_gpio/PS_gpio.gen/sources_1/bd/design_1/sim/design_1.v
Verilog Output written to : c:/Users/user/PS_gpio/PS_gpio.gen/sources_1/bd/design_1/hdl/design_1_wrapper.v
Exporting to file c:/Users/user/PS_gpio/PS_gpio.gen/sources_1/bd/design_1/hw_handoff/design_1.hwh
Generated Hardware Definition File c:/Users/user/PS_gpio/PS_gpio.gen/sources_1/bd/design_1/synth/design_1.hwdef
```

HWH & Tcl to local

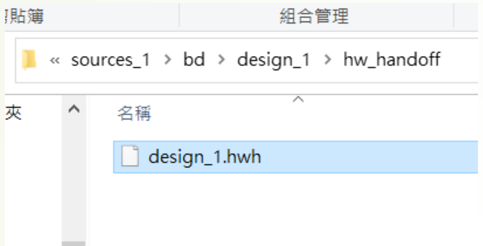


« user › PS_gpio › PS_gpio.runs › impl_1

夾

名稱

- design_1_wrapper.tcl
- gen_run.xml
- htr.txt
- ISEWrap.js
- ISEWrap.sh
- project.wdf
- rundef.js
- runme.bat
- runme.sh



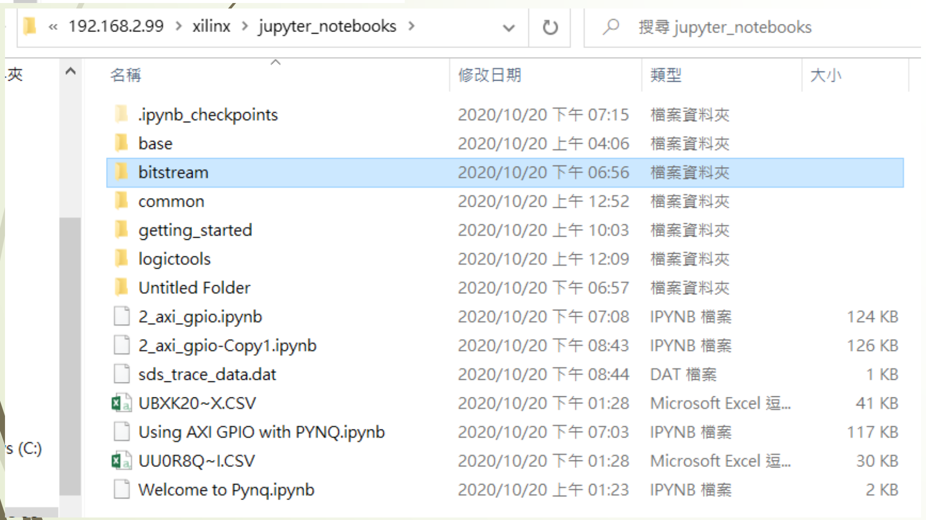
貼簿 組合管理

« sources_1 › bd › design_1 › hw_handoff

夾

名稱

- design_1.hwh



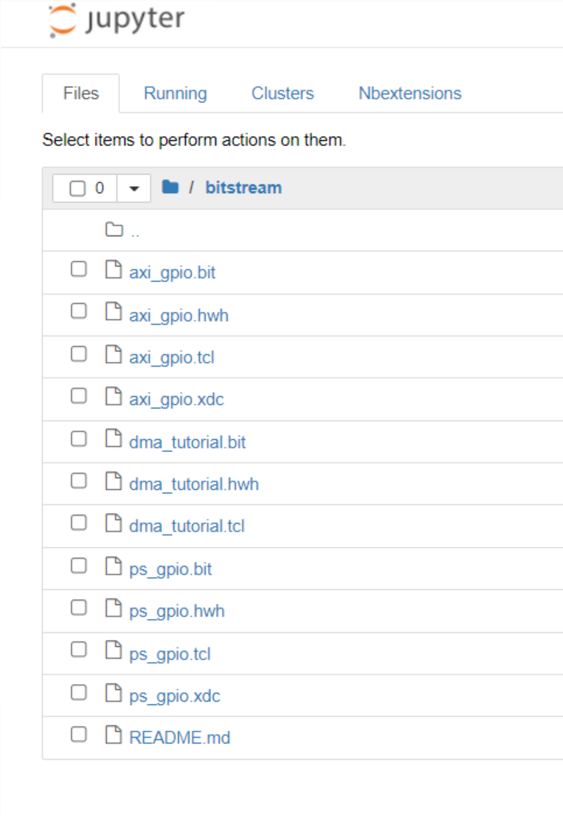
« 192.168.2.99 › xilinx › jupyter_notebooks ›

搜尋 jupyter_notebooks

夾

s (C:)

名稱	修改日期	類型	大小
.ipynb_checkpoints	2020/10/20 下午 07:15	檔案資料夾	
base	2020/10/20 上午 04:06	檔案資料夾	
bitstream	2020/10/20 下午 06:56	檔案資料夾	
common	2020/10/20 上午 12:52	檔案資料夾	
getting_started	2020/10/20 上午 10:03	檔案資料夾	
logictools	2020/10/20 上午 12:09	檔案資料夾	
Untitled Folder	2020/10/20 下午 06:57	檔案資料夾	
2_axi_gpio.ipynb	2020/10/20 下午 07:08	IPYNB 檔案	124 KB
2_axi_gpio-Copy1.ipynb	2020/10/20 下午 08:43	IPYNB 檔案	126 KB
sds_trace_data.dat	2020/10/20 下午 08:44	DAT 檔案	1 KB
UBXK20~X.CSV	2020/10/20 下午 01:28	Microsoft Excel 逗...	41 KB
Using AXI GPIO with PYNQ.ipynb	2020/10/20 下午 07:03	IPYNB 檔案	117 KB
UU0R8Q~I.CSV	2020/10/20 下午 01:28	Microsoft Excel 逗...	30 KB
Welcome to Pynq.ipynb	2020/10/20 上午 01:23	IPYNB 檔案	2 KB



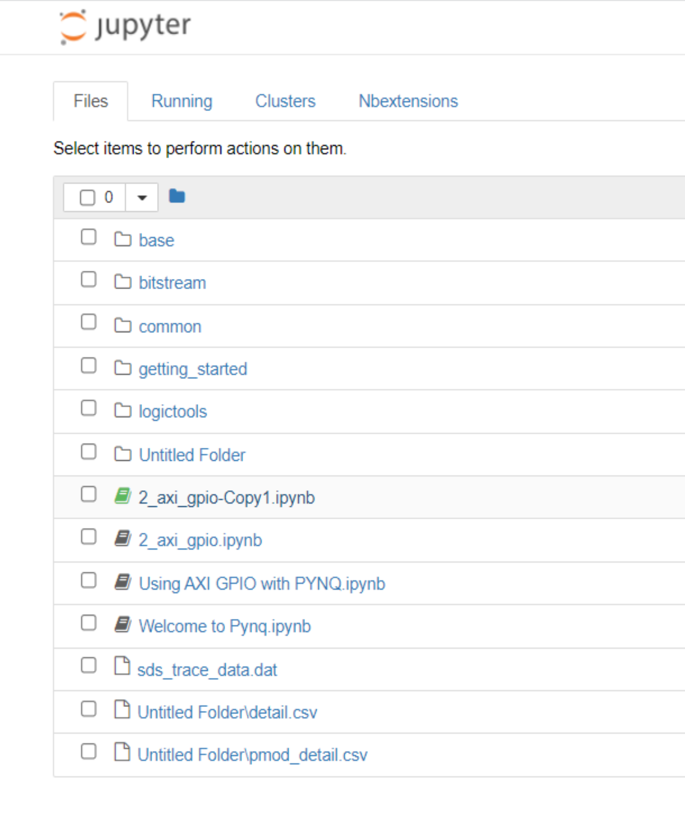
jupyter

Files Running Clusters Nbextensions

Select items to perform actions on them.

□ 0 ▾ / bitstream

- ..
- □ axi_gpio.bit
- □ axi_gpio.hwh
- □ axi_gpio.tcl
- □ axi_gpio.xdc
- □ dma_tutorial.bit
- □ dma_tutorial.hwh
- □ dma_tutorial.tcl
- □ ps_gpio.bit
- □ ps_gpio.hwh
- □ ps_gpio.tcl
- □ ps_gpio.xdc
- □ README.md



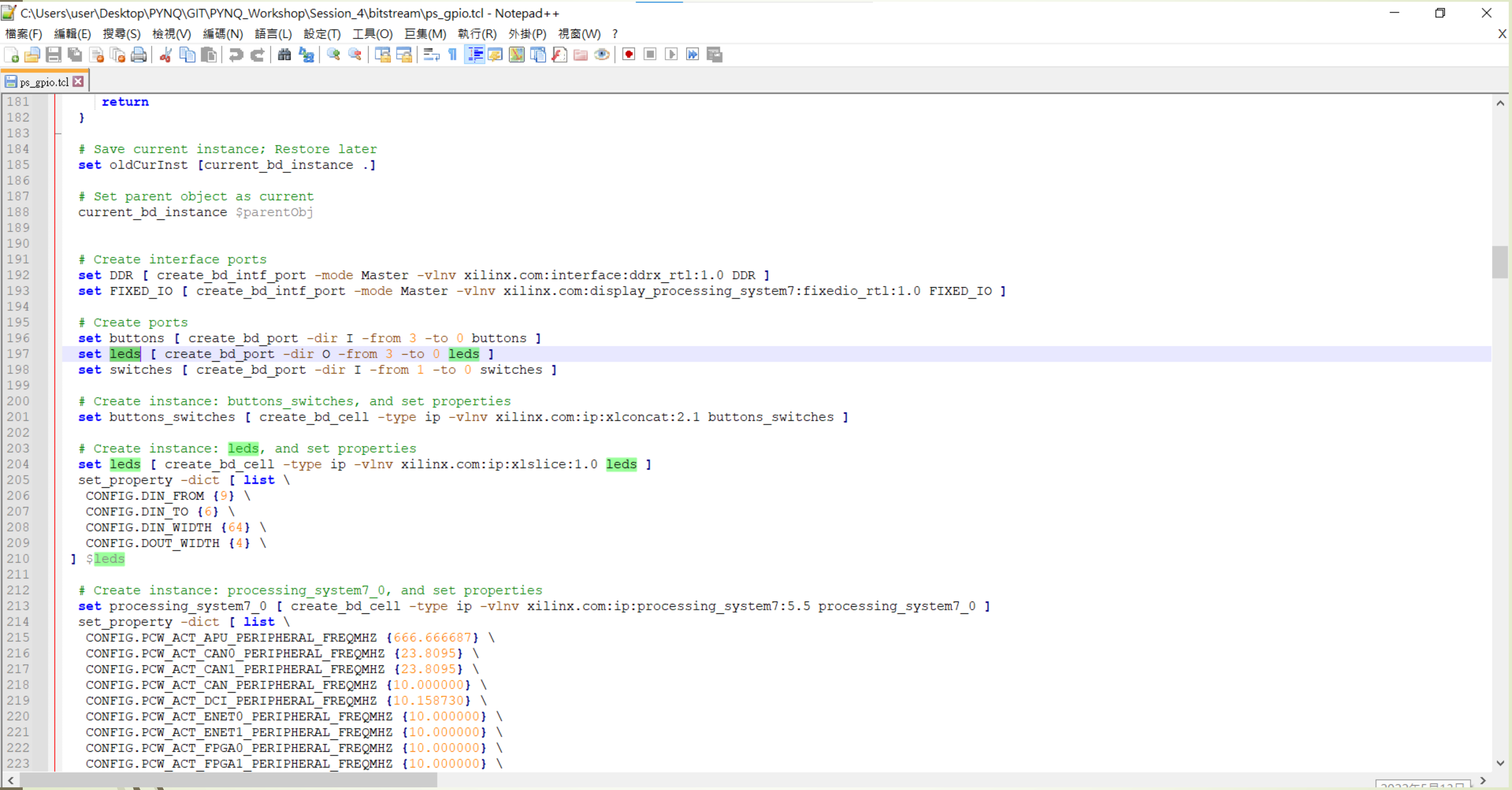
jupyter

Files Running Clusters Nbextensions

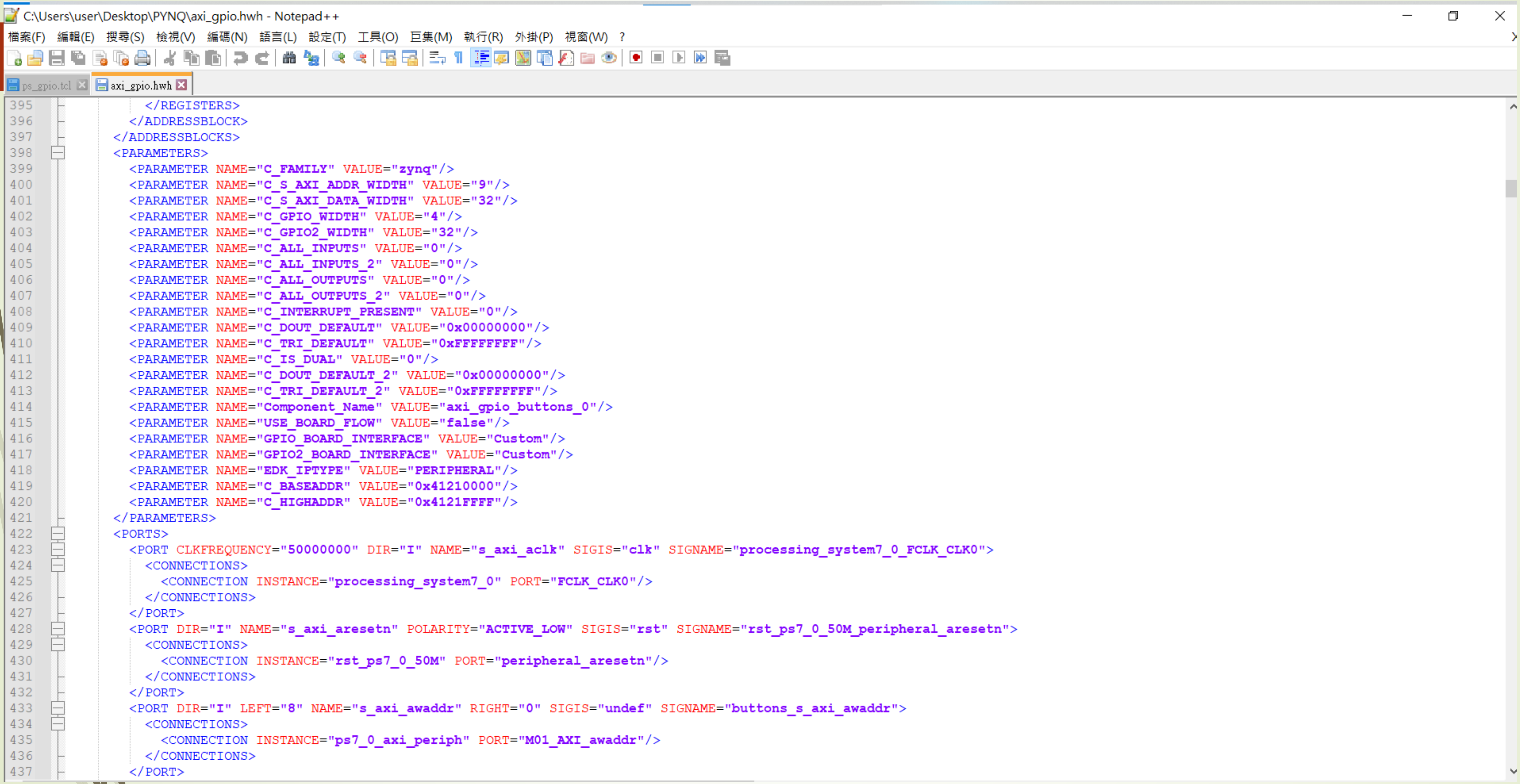
Select items to perform actions on them.

□ 0 ▾

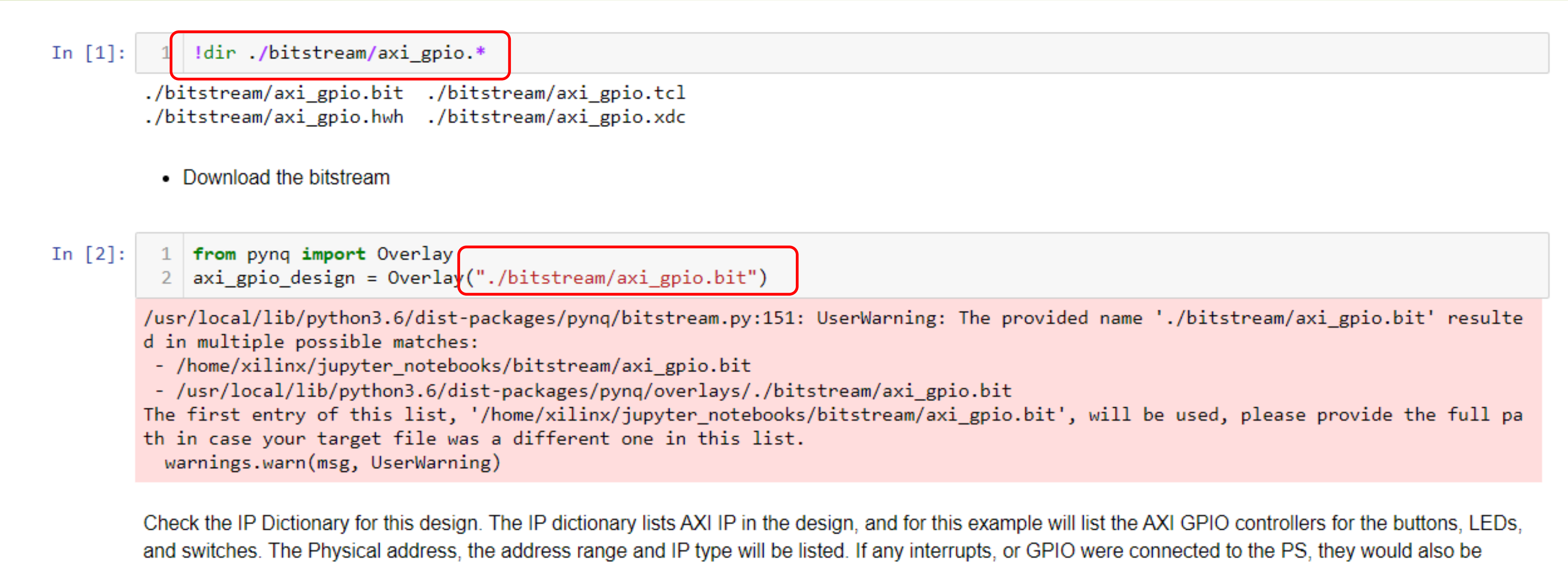
- □ base
- □ bitstream
- □ common
- □ getting_started
- □ logictools
- □ Untitled Folder
- □ 2_axi_gpio-Copy1.ipynb
- □ 2_axi_gpio.ipynb
- □ Using AXI GPIO with PYNQ.ipynb
- □ Welcome to Pynq.ipynb
- □ sds_trace_data.dat
- □ Untitled Folder\detail.csv
- □ Untitled Folder\pmod_detail.csv


C:\Users\user\Desktop\PYNQ\GIT\PYNQ_Workshop\Session_4\bitstream\ps_gpio.tcl - Notepad++
檔案(F) 編輯(E) 搜尋(S) 檢視(V) 編碼(N) 語言(L) 設定(T) 工具(O) 巨集(M) 執行(R) 外掛(P) 視窗(W) ?
ps_gpio.tcl

```
     return
  }

  # Save current instance; Restore later
  set oldCurInst [current_bd_instance .]

  # Set parent object as current
  current_bd_instance $parentObj


  # Create interface ports
  set DDR [ create_bd_intf_port -mode Master -vlnv xilinx.com:interface:ddrx_rtl:1.0 DDR ]
  set FIXED_IO [ create_bd_intf_port -mode Master -vlnv xilinx.com:display_processing_system7:fixedio_rtl:1.0 FIXED_IO ]

  # Create ports
  set buttons [ create_bd_port -dir I -from 3 -to 0 buttons ]
  set leds [ create_bd_port -dir O -from 3 -to 0 leds ]
  set switches [ create_bd_port -dir I -from 1 -to 0 switches ]

  # Create instance: buttons_switches, and set properties
  set buttons_switches [ create_bd_cell -type ip -vlnv xilinx.com:ip:xlconcat:2.1 buttons_switches ]

  # Create instance: leds, and set properties
  set leds [ create_bd_cell -type ip -vlnv xilinx.com:ip:xlslice:1.0 leds ]
  set_property -dict [ list \
   CONFIG.DIN_FROM {9} \
   CONFIG.DIN_TO {6} \
   CONFIG.DIN_WIDTH {64} \
   CONFIG.DOUT_WIDTH {4} \
 ] $leds

  # Create instance: processing_system7_0, and set properties
  set processing_system7_0 [ create_bd_cell -type ip -vlnv xilinx.com:ip:processing_system7:5.5 processing_system7_0 ]
  set_property -dict [ list \
   CONFIG.PCW_ACT_APU_PERIPHERAL_FREQMHZ {666.666687} \
   CONFIG.PCW_ACT_CAN0_PERIPHERAL_FREQMHZ {23.8095} \
   CONFIG.PCW_ACT_CAN1_PERIPHERAL_FREQMHZ {23.8095} \
   CONFIG.PCW_ACT_CAN_PERIPHERAL_FREQMHZ {10.000000} \
   CONFIG.PCW_ACT_DCI_PERIPHERAL_FREQMHZ {10.158730} \
   CONFIG.PCW_ACT_ENET0_PERIPHERAL_FREQMHZ {10.000000} \
   CONFIG.PCW_ACT_ENET1_PERIPHERAL_FREQMHZ {10.000000} \
   CONFIG.PCW_ACT_FPGA0_PERIPHERAL_FREQMHZ {10.000000} \
   CONFIG.PCW_ACT_FPGA1_PERIPHERAL_FREQMHZ {10.000000} \
```


C:\Users\user\Desktop\PYNQ\axi_gpio.hwh - Notepad++
檔案(F) 編輯(E) 搜尋(S) 檢視(V) 編碼(N) 語言(L) 設定(T) 工具(O) 巨集(M) 執行(R) 外掛(P) 視窗(W) ?
ps_gpio.tcl
axi_gpio.hwh

```
        </REGISTERS>
      </ADDRESSBLOCK>
    </ADDRESSBLOCKS>
    <PARAMETERS>
      <PARAMETER NAME="C_FAMILY" VALUE="zynq"/>
      <PARAMETER NAME="C_S_AXI_ADDR_WIDTH" VALUE="9"/>
      <PARAMETER NAME="C_S_AXI_DATA_WIDTH" VALUE="32"/>
      <PARAMETER NAME="C_GPIO_WIDTH" VALUE="4"/>
      <PARAMETER NAME="C_GPIO2_WIDTH" VALUE="32"/>
      <PARAMETER NAME="C_ALL_INPUTS" VALUE="0"/>
      <PARAMETER NAME="C_ALL_INPUTS_2" VALUE="0"/>
      <PARAMETER NAME="C_ALL_OUTPUTS" VALUE="0"/>
      <PARAMETER NAME="C_ALL_OUTPUTS_2" VALUE="0"/>
      <PARAMETER NAME="C_INTERRUPT_PRESENT" VALUE="0"/>
      <PARAMETER NAME="C_DOUT_DEFAULT" VALUE="0x00000000"/>
      <PARAMETER NAME="C_TRI_DEFAULT" VALUE="0xFFFFFFFF"/>
      <PARAMETER NAME="C_IS_DUAL" VALUE="0"/>
      <PARAMETER NAME="C_DOUT_DEFAULT_2" VALUE="0x00000000"/>
      <PARAMETER NAME="C_TRI_DEFAULT_2" VALUE="0xFFFFFFFF"/>
      <PARAMETER NAME="Component_Name" VALUE="axi_gpio_buttons_0"/>
      <PARAMETER NAME="USE_BOARD_FLOW" VALUE="false"/>
      <PARAMETER NAME="GPIO_BOARD_INTERFACE" VALUE="Custom"/>
      <PARAMETER NAME="GPIO2_BOARD_INTERFACE" VALUE="Custom"/>
      <PARAMETER NAME="EDK_IPTYPE" VALUE="PERIPHERAL"/>
      <PARAMETER NAME="C_BASEADDR" VALUE="0x41210000"/>
      <PARAMETER NAME="C_HIGHADDR" VALUE="0x4121FFFF"/>
    </PARAMETERS>
    <PORTS>
      <PORT CLKFREQUENCY="50000000" DIR="I" NAME="s_axi_aclk" SIGIS="clk" SIGNAME="processing_system7_0_FCLK_CLK0">
        <CONNECTIONS>
          <CONNECTION INSTANCE="processing_system7_0" PORT="FCLK_CLK0"/>
        </CONNECTIONS>
      </PORT>
      <PORT DIR="I" NAME="s_axi_aresetn" POLARITY="ACTIVE_LOW" SIGIS="rst" SIGNAME="rst_ps7_0_50M_peripheral_aresetn">
        <CONNECTIONS>
          <CONNECTION INSTANCE="rst_ps7_0_50M" PORT="peripheral_aresetn"/>
        </CONNECTIONS>
      </PORT>
      <PORT DIR="I" LEFT="8" NAME="s_axi_awaddr" RIGHT="0" SIGIS="undef" SIGNAME="buttons_s_axi_awaddr">
        <CONNECTIONS>
          <CONNECTION INSTANCE="ps7_0_axi_periph" PORT="M01_AXI_awaddr"/>
        </CONNECTIONS>
      </PORT>
```



```
In [1]: !dir ./bitstream/axi_gpio.*
```

```
./bitstream/axi_gpio.bit  ./bitstream/axi_gpio.tcl
./bitstream/axi_gpio.hwh  ./bitstream/axi_gpio.xdc
```

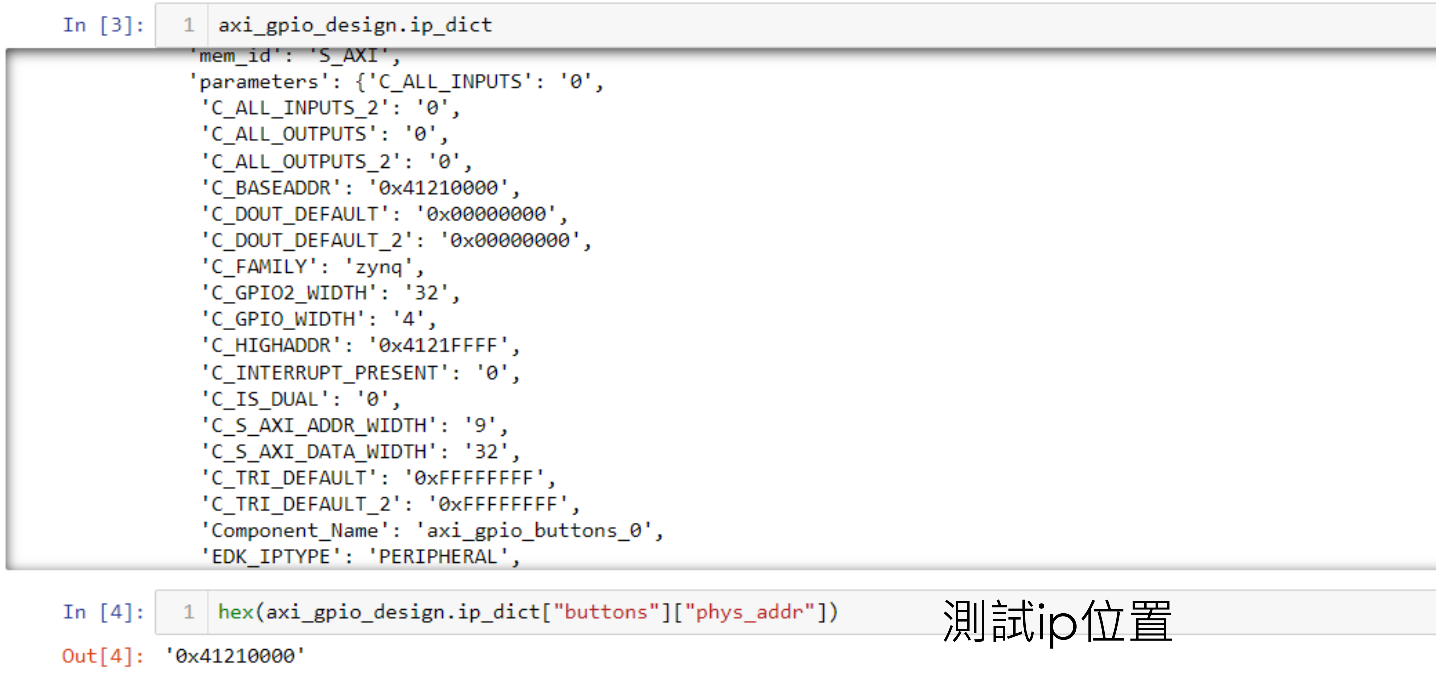
- Download the bitstream

```
In [2]: from pynq import Overlay
        axi_gpio_design = Overlay("./bitstream/axi_gpio.bit")
```

```
/usr/local/lib/python3.6/dist-packages/pynq/bitstream.py:151: UserWarning: The provided name './bitstream/axi_gpio.bit' resulte
d in multiple possible matches:
 - /home/xilinx/jupyter_notebooks/bitstream/axi_gpio.bit
 - /usr/local/lib/python3.6/dist-packages/pynq/overlays/./bitstream/axi_gpio.bit
The first entry of this list, '/home/xilinx/jupyter_notebooks/bitstream/axi_gpio.bit', will be used, please provide the full pa
th in case your target file was a different one in this list.
  warnings.warn(msg, UserWarning)
```

Check the IP Dictionary for this design. The IP dictionary lists AXI IP in the design, and for this example will list the AXI GPIO controllers for the buttons, LEDs, and switches. The Physical address, the address range and IP type will be listed. If any interrupts, or GPIO were connected to the PS, they would also be reported.

檔案名稱避免重疊

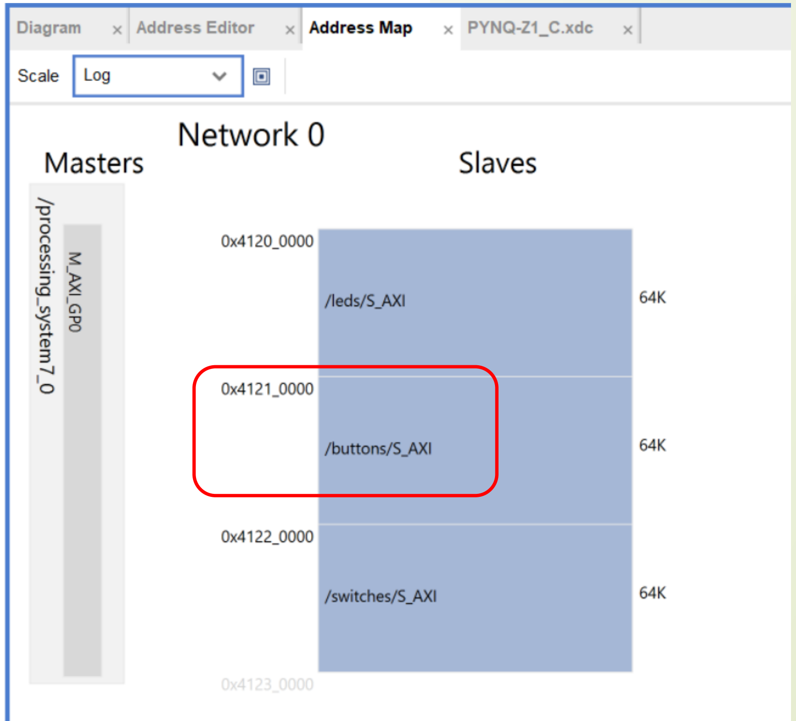


```
In [3]: axi_gpio_design.ip_dict
```

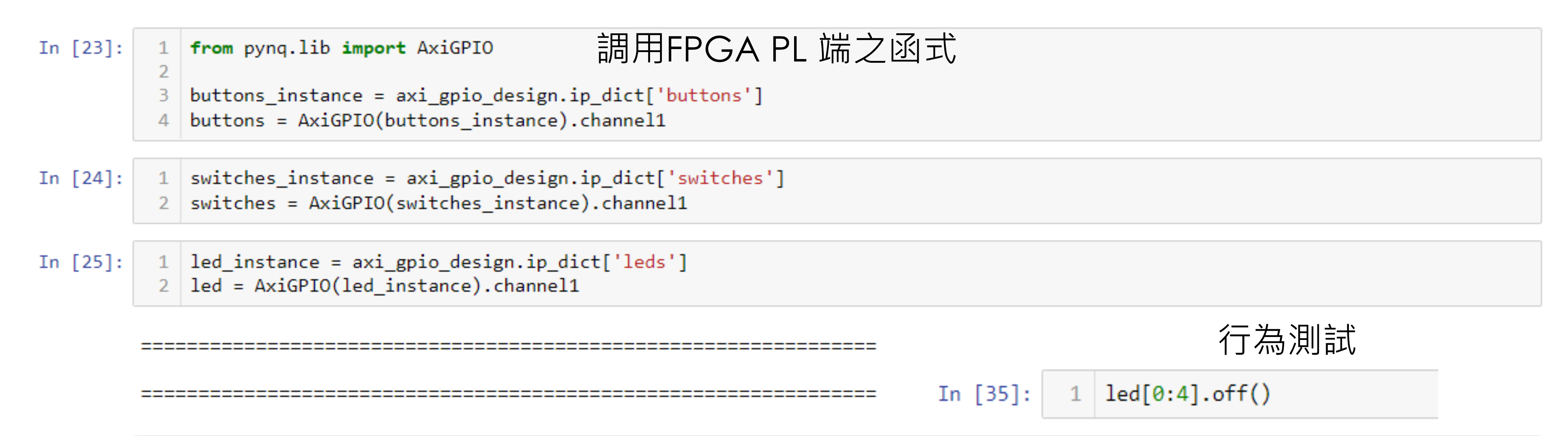
```
  'mem_id': 'S_AXI',
  'parameters': {'C_ALL_INPUTS': '0',
   'C_ALL_INPUTS_2': '0',
   'C_ALL_OUTPUTS': '0',
   'C_ALL_OUTPUTS_2': '0',
   'C_BASEADDR': '0x41210000',
   'C_DOUT_DEFAULT': '0x00000000',
   'C_DOUT_DEFAULT_2': '0x00000000',
   'C_FAMILY': 'zynq',
   'C_GPIO2_WIDTH': '32',
   'C_GPIO_WIDTH': '4',
   'C_HIGHADDR': '0x4121FFFF',
   'C_INTERRUPT_PRESENT': '0',
   'C_IS_DUAL': '0',
   'C_S_AXI_ADDR_WIDTH': '9',
   'C_S_AXI_DATA_WIDTH': '32',
   'C_TRI_DEFAULT': '0xFFFFFFFF',
   'C_TRI_DEFAULT_2': '0xFFFFFFFF',
   'Component_Name': 'axi_gpio_buttons_0',
   'EDK_IPTYPE': 'PERIPHERAL',
```

```
In [4]: hex(axi_gpio_design.ip_dict["buttons"]["phys_addr"])
Out[4]: '0x41210000'
```

測試ip位置



調用FPGA PL 端之函式



```
In [23]: from pynq.lib import AxiGPIO

         buttons_instance = axi_gpio_design.ip_dict['buttons']
         buttons = AxiGPIO(buttons_instance).channel1
```

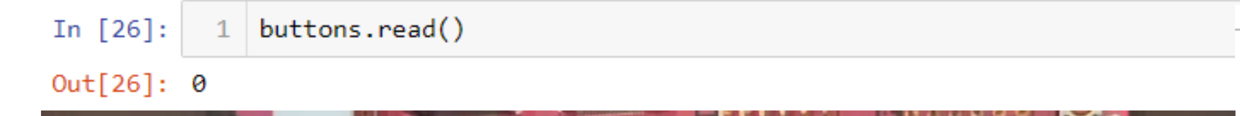
```
In [24]: switches_instance = axi_gpio_design.ip_dict['switches']
         switches = AxiGPIO(switches_instance).channel1
```

```
In [25]: led_instance = axi_gpio_design.ip_dict['leds']
         led = AxiGPIO(led_instance).channel1
```

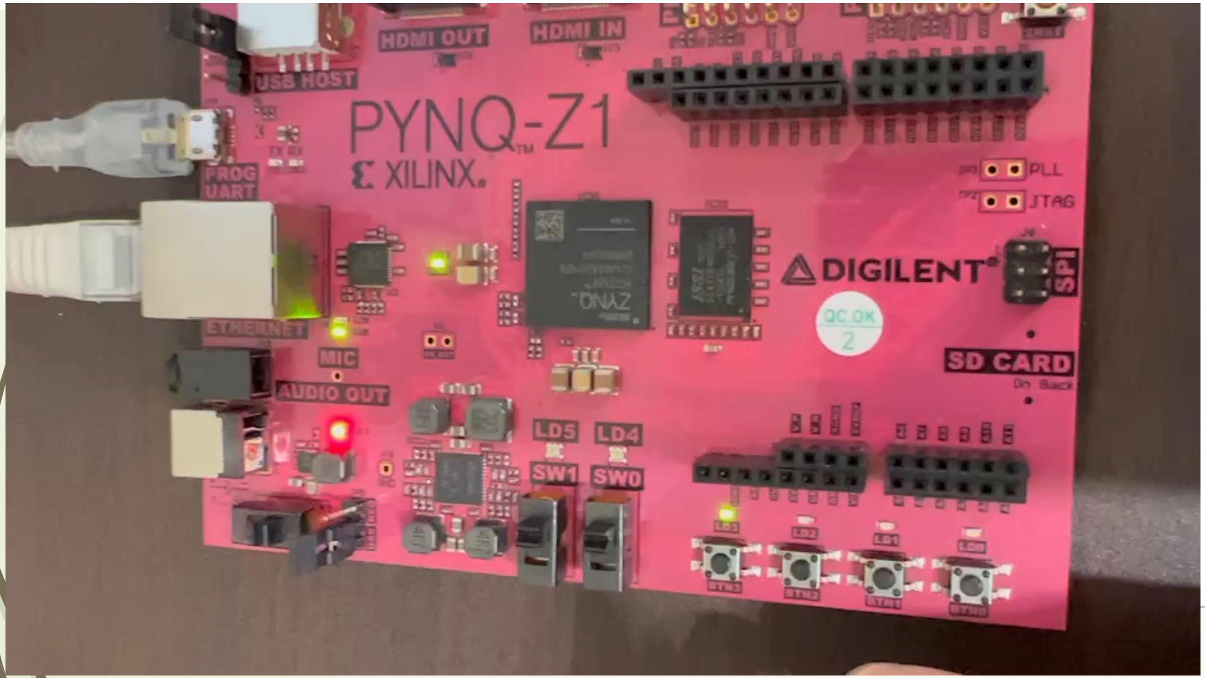
```
=====================================================================

=====================================================================
```

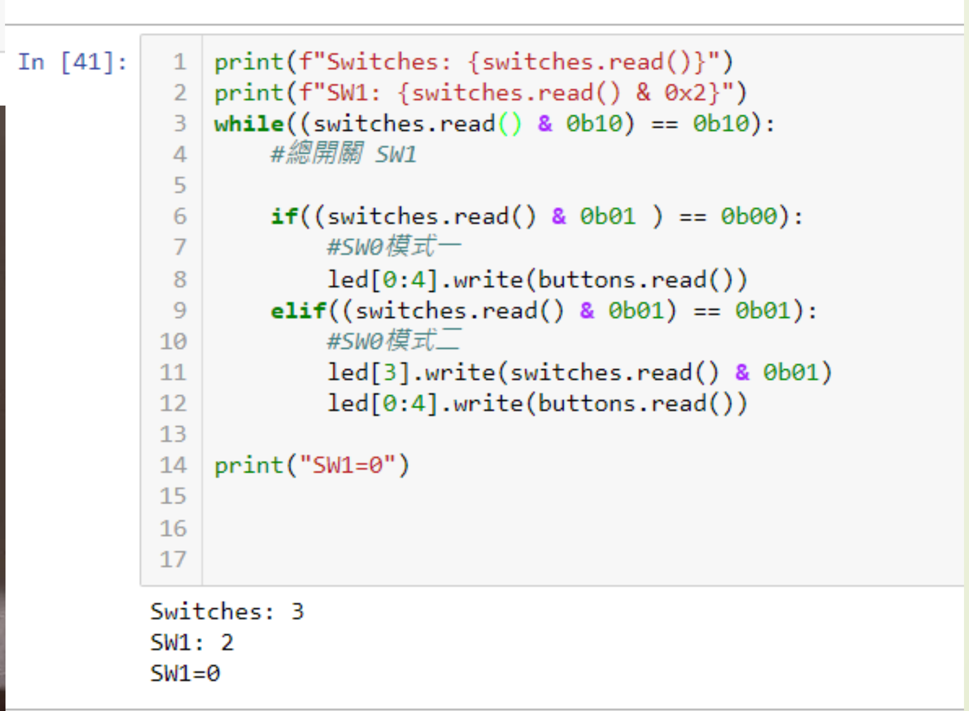
行為測試

```
In [35]: led[0:4].off()
```



```
In [26]: buttons.read()
Out[26]: 0
```



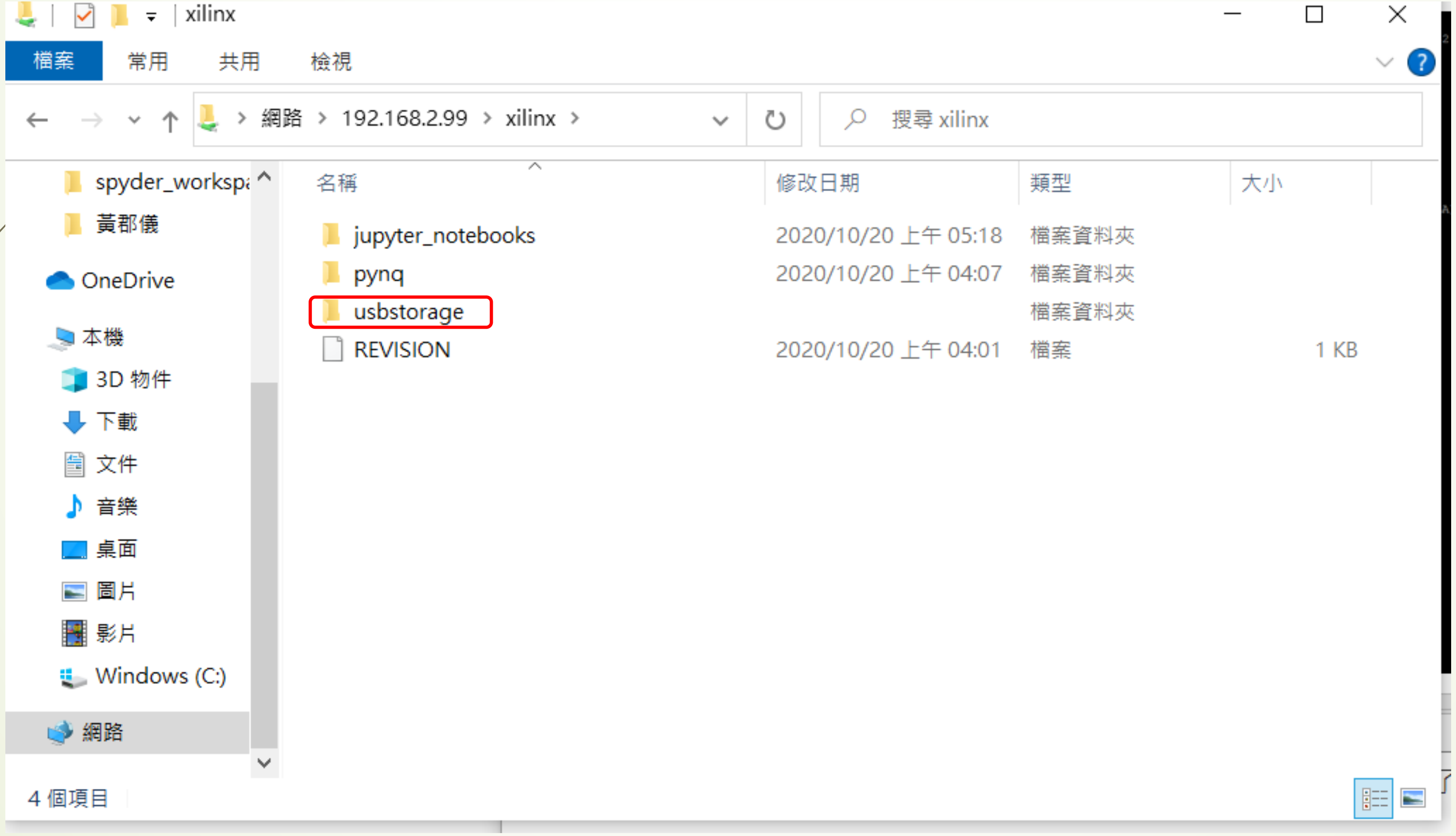


```
In [41]: print(f"Switches: {switches.read()}")
         print(f"SW1: {switches.read() & 0x2}")
         while((switches.read() & 0b10) == 0b10):
             #總開關 SW1

             if((switches.read() & 0b01 ) == 0b00):
                 #SW0模式一
                 led[0:4].write(buttons.read())
             elif((switches.read() & 0b01) == 0b01):
                 #SW0模式二
                 led[3].write(switches.read() & 0b01)
                 led[0:4].write(buttons.read())

         print("SW1=0")
```

```
Switches: 3
SW1: 2
SW1=0
```

Linux mount usb至指定資料夾

sudo mkdir /usbstorage



名稱	修改日期	類型	大小
jupyter_notebooks	2020/10/20 上午 05:18	檔案資料夾	
pynq	2020/10/20 上午 04:07	檔案資料夾	
usbstorage		檔案資料夾	
REVISION	2020/10/20 上午 04:01	檔案	1 KB

4 個項目