

2023 超大型積體電路電腦輔助設計概論

2023 Introduction to VLSI CAD

Lab 11

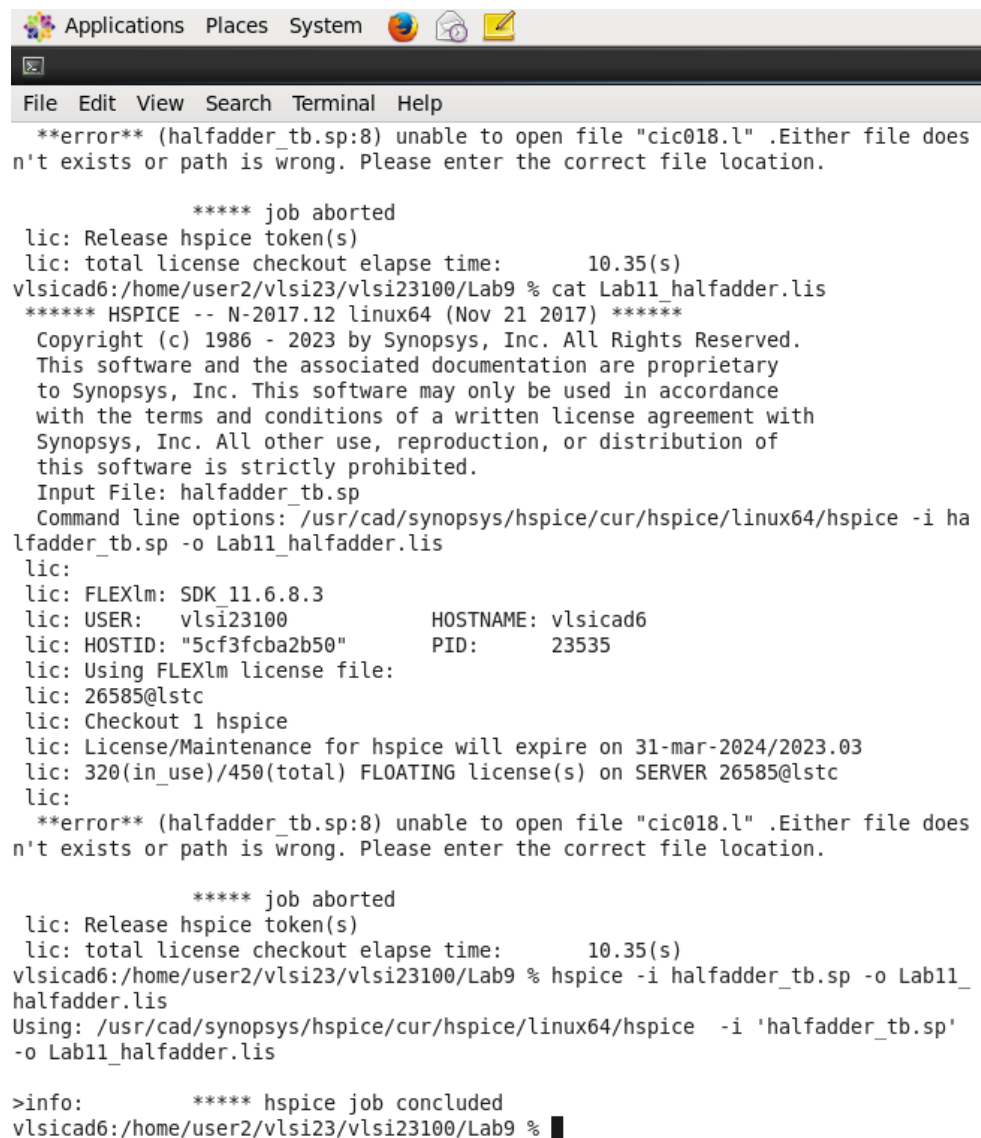
學號：E94096097

姓名：陳慕丞

※作業要求的圖請使用**電腦截圖程式**截取，請勿用手機拍照的方式繳交

※Report 檔請以 pdf 的格式繳交

- HA
 - Presim
 - 請截取 terminal 顯示 job concluded 的圖



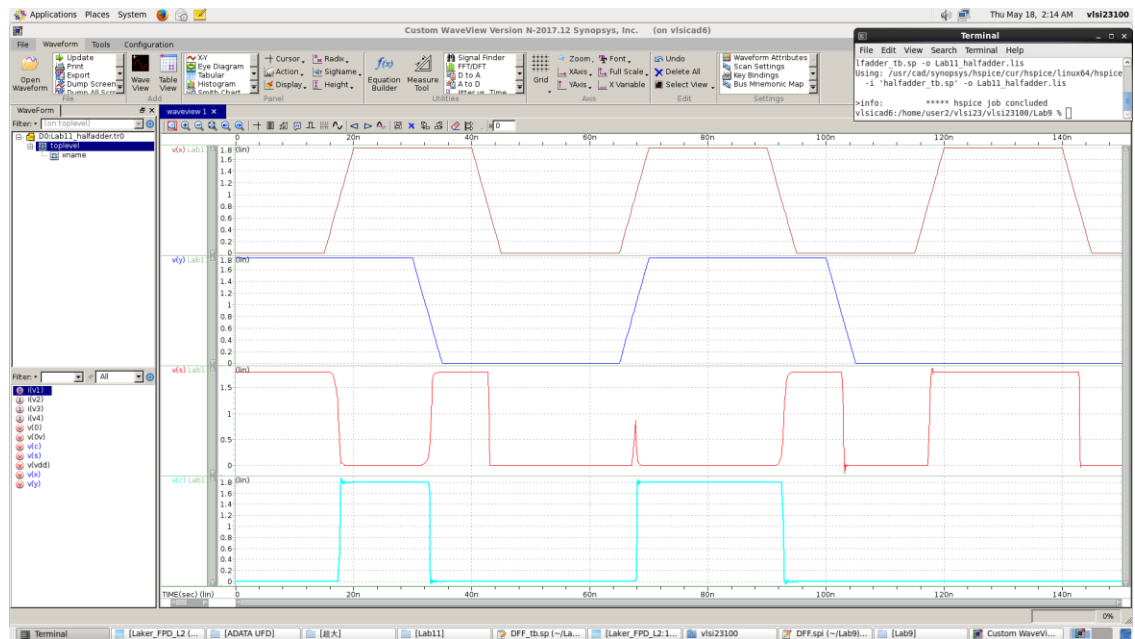
```
Applications Places System
File Edit View Search Terminal Help
**error** (halfadder_tb.sp:8) unable to open file "cic018.l" .Either file does
n't exists or path is wrong. Please enter the correct file location.

**** job aborted
lic: Release hspice token(s)
lic: total license checkout elapse time:      10.35(s)
vlsicad6:/home/user2/vlsi23/vlsi23100/Lab9 % cat Lab11_halfadder.lis
***** HSPICE -- N-2017.12 linux64 (Nov 21 2017) *****
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to Synopsys, Inc. This software may only be used in accordance
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this software is strictly prohibited.
Input File: halfadder_tb.sp
Command line options: /usr/cad/synopsys/hspice/cur/hspice/linux64/hspice -i ha
lfadder_tb.sp -o Lab11_halfadder.lis
lic:
lic: FLEXlm: SDK 11.6.8.3
lic: USER:  vlsi23100      HOSTNAME: vlsicad6
lic: HOSTID: "5cf3fcba2b50"  PID:      23535
lic: Using FLEXlm license file:
lic: 26585@lstc
lic: Checkout 1 hspice
lic: License/Maintenance for hspice will expire on 31-mar-2024/2023.03
lic: 320(in_use)/450(total) FLOATING license(s) on SERVER 26585@lstc
lic:
**error** (halfadder_tb.sp:8) unable to open file "cic018.l" .Either file does
n't exists or path is wrong. Please enter the correct file location.

**** job aborted
lic: Release hspice token(s)
lic: total license checkout elapse time:      10.35(s)
vlsicad6:/home/user2/vlsi23/vlsi23100/Lab9 % hspice -i halfadder_tb.sp -o Lab11_
halfadder.lis
Using: /usr/cad/synopsys/hspice/cur/hspice/linux64/hspice -i 'halfadder_tb.sp'
-o Lab11_halfadder.lis

>info:      **** hspice job concluded
vlsicad6:/home/user2/vlsi23/vlsi23100/Lab9 %
```

- 請截取 WaveView 中的波形



- Post-sim
- 請截取 terminal 顯示 job concluded 的圖

```

Applications Places System
File Edit View Search Terminal Help
fontPath(SPS_FONT_PATH) = /usr/cad/synopsys/laker/cur/TTFont
Feature "Laker_FPD_L2" checked out successfully (Elapsed Time: 0.16s)

[1] Done laker
vlsicad6:/home/user2/vlsi23/vlsi23100/Lab9 % laker &
[1] 5320
vlsicad6:/home/user2/vlsi23/vlsi23100/Lab9 % logDir = /home/user2/vlsi23/vlsi23100/Lab9/lakerLog/laker_05_18_13_10_5320
Open default display file = /usr/cad/synopsys/laker/cur/etc/default.dsp
Laker - Custom Layout Automation System, 2016.12 64-bit (Linux x86_64/64bit) 11/25/2016

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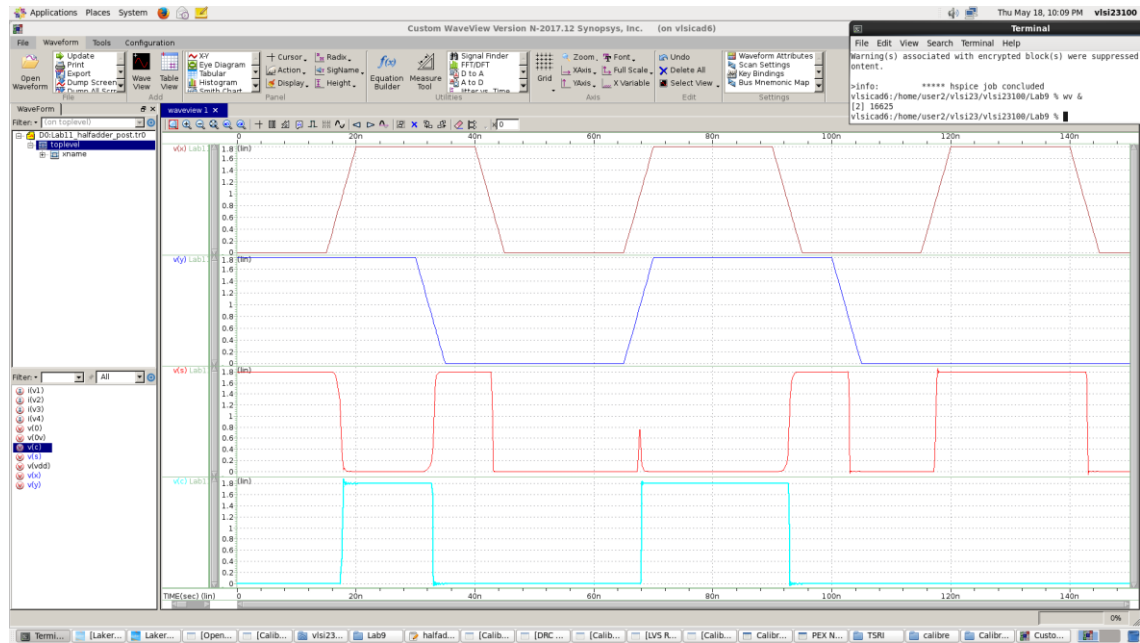
Display localhost:15.0 ==> Current mode : TrueColor
The PseudoColor mode is not available under current setting. Switch to use TrueColor mode.
*** Limitation: Blinking is not supported under TrueColor mode.
fontPath(SPS_FONT_PATH) = /usr/cad/synopsys/laker/cur/TTFont
Feature "Laker_FPD_L2" checked out successfully (Elapsed Time: 0.16s)
QClipboard::setData: Cannot set X11 selection owner for PRIMARY
QClipboard::setData: Cannot set X11 selection owner for PRIMARY
laker & hspice -i halfadder_tb.sp -o halfadder_post.lis
Using: /usr/cad/synopsys/hspice/cur/hspice/linux64/hspice -i 'halfadder_tb.sp' -o halfadder_post.lis
Warning(s) associated with encrypted block(s) were suppressed due to encrypted content.

>info:
***** hspice job concluded
vlsicad6:/home/user2/vlsi23/vlsi23100/Lab9 % hspice -i halfadder_tb.sp -o Lab1_halfadder_post.lis
Using: /usr/cad/synopsys/hspice/cur/hspice/linux64/hspice -i 'halfadder_tb.sp' -o Lab1_halfadder_post.lis
Warning(s) associated with encrypted block(s) were suppressed due to encrypted content.

>info:
***** hspice job concluded
vlsicad6:/home/user2/vlsi23/vlsi23100/Lab9 % vv &

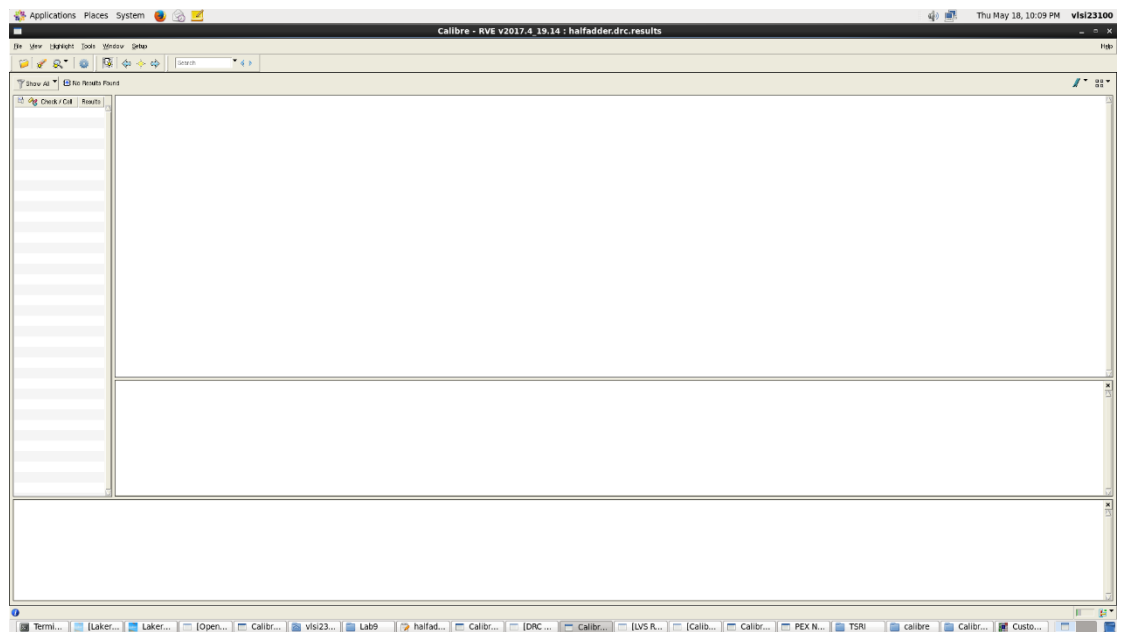
```

- 請截取 WaveView 中的波形

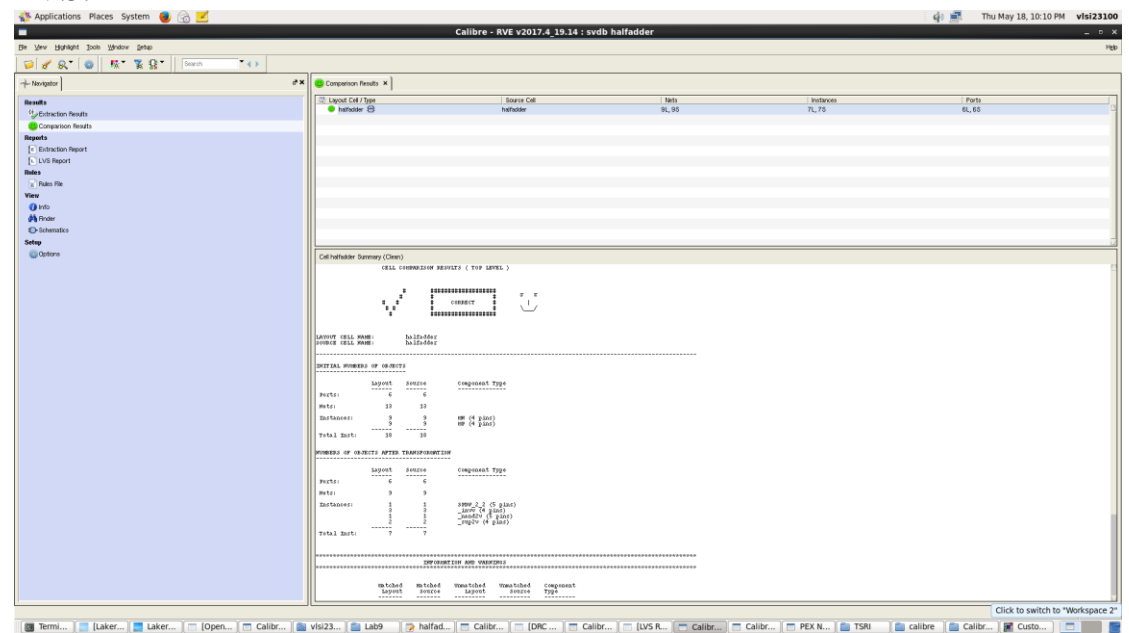


- DRC/LVS 結果

DRC:



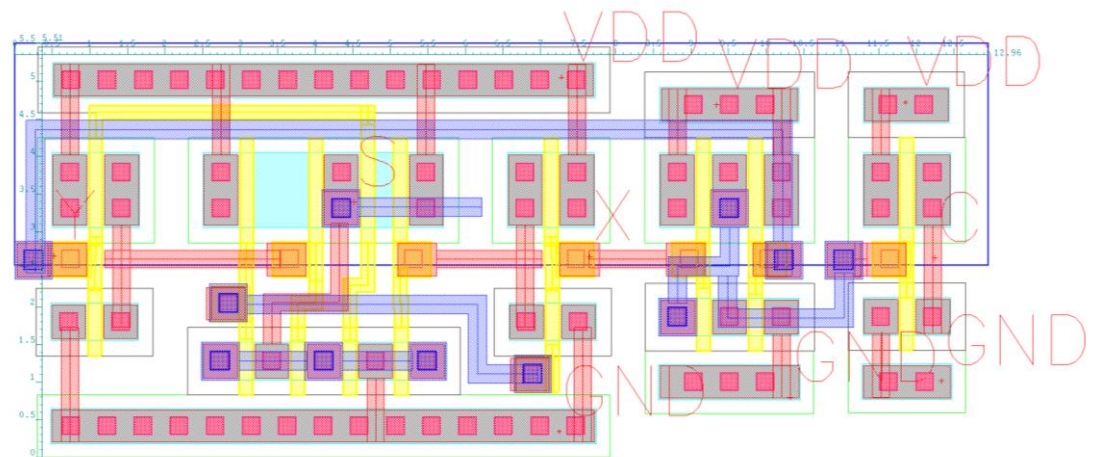
LVS:



- Layout 截圖(顯示長寬)

長:12.96

寬:5.51



- 嘗試簡單說明 Presim 與 Post-sim 結果比較

Presim 和 Post-sim 的波形幾乎一樣，只差在 Presim 的 output

波形的直角轉角處震盪較 Post-sim 的劇烈一點點。

- DFF
 - Presim
- 請截取 terminal 顯示 job concluded 的圖

```

Applications Places System
Terminal
File Edit View Search Terminal Help
this software is strictly prohibited.
Input File: halfadder.tb.sp
Command line options: /usr/cad/synopsys/hspice/cur/hspice/linux64/hspice -i ha
lfadder.tb.sp -o Lab11_halfadder.lis
lic:
lic: FLEXlm: SDK 11.6.8.3
lic: USER: vlsi23100 HOSTNAME: vlsicad6
lic: HOSTID: "5cf3fcb2b50" PID: 23535
lic: Using FLEXlm license file:
lic: 26585@lstc
lic: Checkout 1 hspice
lic: License/Maintenance for hspice will expire on 31-mar-2024/2023.03
lic: 329(in_use)/458(total) FLOATING license(s) on SERVER 26585@lstc
lic:
***error** (halfadder.tb.sp:8) unable to open file "cic018.l". Either file does
n't exists or path is wrong. Please enter the correct file location.

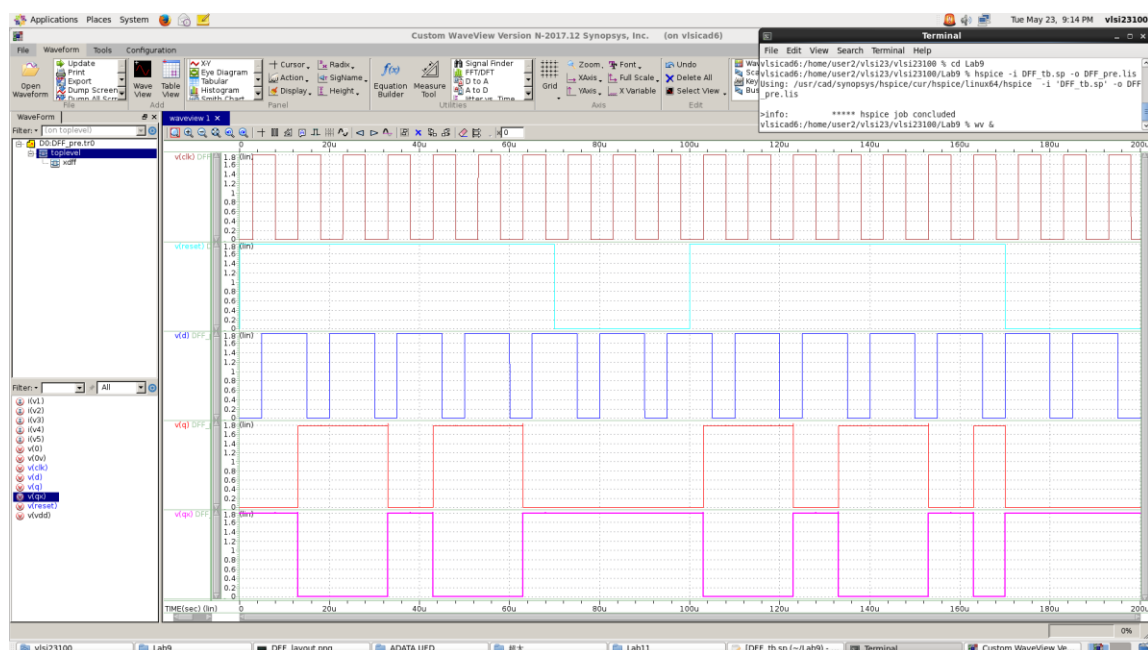
**** job aborted
lic: Release hspice token(s)
lic: total license checkout elapse time: 10.35(s)
vlsicad6:/home/user2/vlsi23/vlsi23100/Lab9 % hspice -i halfadder.tb.sp -o Lab11_
halfadder.lis
Using /usr/cad/synopsys/hspice/cur/hspice/linux64/hspice -i 'halfadder.tb.sp'
-o Lab11_halfadder.lis

>info: **** hspice job concluded
vlsicad6:/home/user2/vlsi23/vlsi23100/Lab9 % vv &
[3] 26002
vlsicad6:/home/user2/vlsi23/vlsi23100/Lab9 % gedit DFF.spi &
[4] 15920
vlsicad6:/home/user2/vlsi23/vlsi23100/Lab9 %
[4] Done gedit DFF.spi
vlsicad6:/home/user2/vlsi23/vlsi23100/Lab9 %
** (gedit:31847): WARNING **: Set document metadata failed: Setting attribute metadata::gedit-spell-language not supported
** (gedit:31847): WARNING **: Set document metadata failed: Setting attribute metadata::gedit-encoding not supported
** (gedit:31847): WARNING **: Set document metadata failed: Setting attribute metadata::gedit-spell-language not supported
** (gedit:31847): WARNING **: Set document metadata failed: Setting attribute metadata::gedit-encoding not supported
** (gedit:31847): WARNING **: Set document metadata failed: Setting attribute metadata::gedit-spell-language not supported
** (gedit:31847): WARNING **: Set document metadata failed: Setting attribute metadata::gedit-encoding not supported
** (gedit:31847): WARNING **: Set document metadata failed: Setting attribute metadata::gedit-spell-language not supported
** (gedit:31847): WARNING **: Set document metadata failed: Setting attribute metadata::gedit-encoding not supported
** (gedit:31847): WARNING **: Set document metadata failed: Setting attribute metadata::gedit-spell-language not supported
** (gedit:31847): WARNING **: Set document metadata failed: Setting attribute metadata::gedit-encoding not supported
** (gedit:31847): WARNING **: Set document metadata failed: Setting attribute metadata::gedit-spell-language not supported
** (gedit:31847): WARNING **: Set document metadata failed: Setting attribute metadata::gedit-encoding not supported
gedit DFF.spi & hspice -i DFF.tb.sp -o Lab11_DFF.lis
Using /usr/cad/synopsys/hspice/cur/hspice/linux64/hspice -i 'DFF.tb.sp' -o Lab11_DFF.lis

>info: **** hspice job concluded
vlsicad6:/home/user2/vlsi23/vlsi23100/Lab9 % █
Terminal [Laker_FPD_L2 (...)] [ADATA UFD] [Lab11] DFF.tb.sp (~/La...

```

- 請截取 WaveView 中的波形



- Post-sim
- 請截取 terminal 顯示 job concluded 的圖

```

應用程式 位置 系統
檔案(F) 編輯(E) 檢視(V) 搜尋(S) 終端機(T) 求助(H)
Open default display file = /usr/cad/synopsys/laker/cur/etc/default.dsp
Laker - Custom Layout Automation System, 2016.12 64-bit (Linux x86_64/64bit) 11/
25/2016

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ts in conformity with
the applicable License Key for such Licensed Products. Synopsys will use informa
tion gathered in
connection with this process to deliver software updates and pursue software pir
ates and infringers.

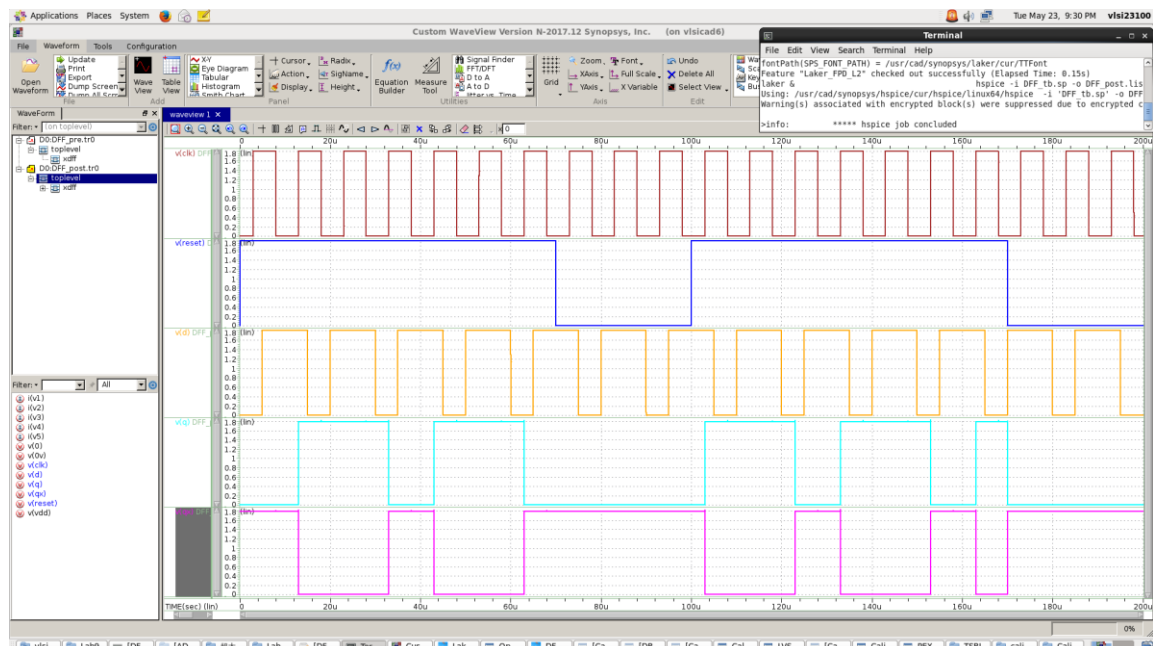
Display localhost:29.0 ==> Current mode : TrueColor
The PseudoColor mode is not available under current setting. Switch to use Tr
ueColor mode.
*** Limitation: Blinking is not supported under TrueColor mode.
fontPath(SPS_FONT_PATH) = /usr/cad/synopsys/laker/cur/TTFont
Feature "Laker_FPD_L2" checked out successfully (Elapsed Time: 0.16s)
QClipboard::setData: Cannot set X11 selection owner for PRIMARY
QClipboard::setData: Cannot set X11 selection owner for PRIMARY
laker & hspice -i DFF_tb.sp -o DFF_post.lis

Using: /usr/cad/synopsys/hspice/cur/hspice/linux64/hspice -i 'DFF_tb.sp' -o DFF
_post.lis
Warning(s) associated with encrypted block(s) were suppressed due to encrypted c
ontent.

>info: ***** hspice job concluded
vlsicad6: /home/user2/vlsi23/vlsi23100/Lab9 %

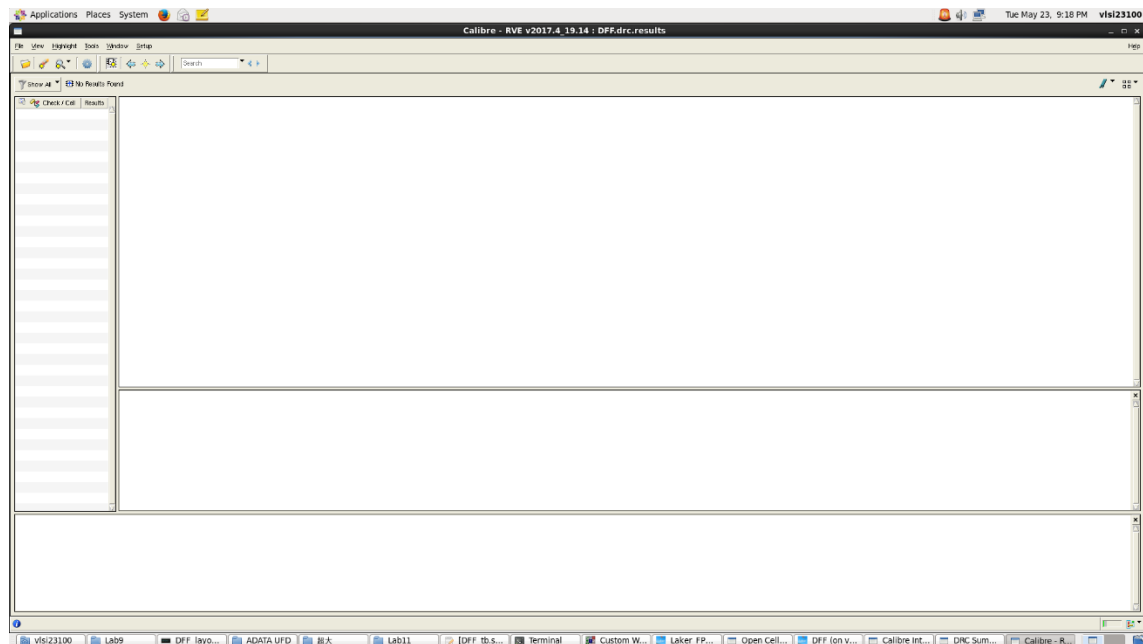
```

- 請截取 WaveView 中的波形

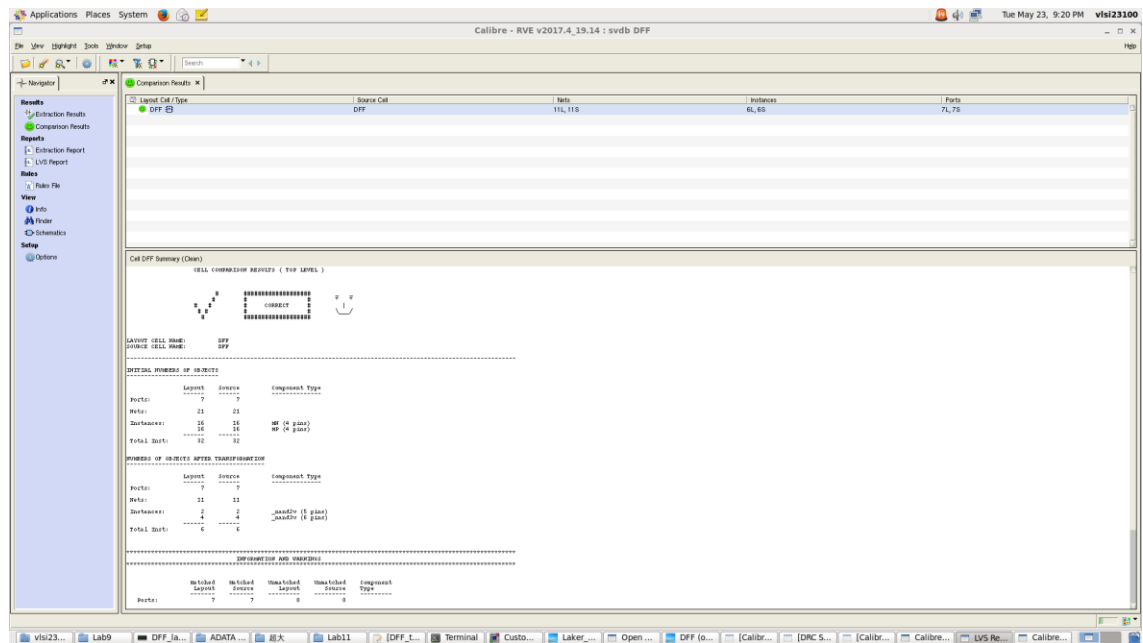


- DRC/LVS 結果

DRC:



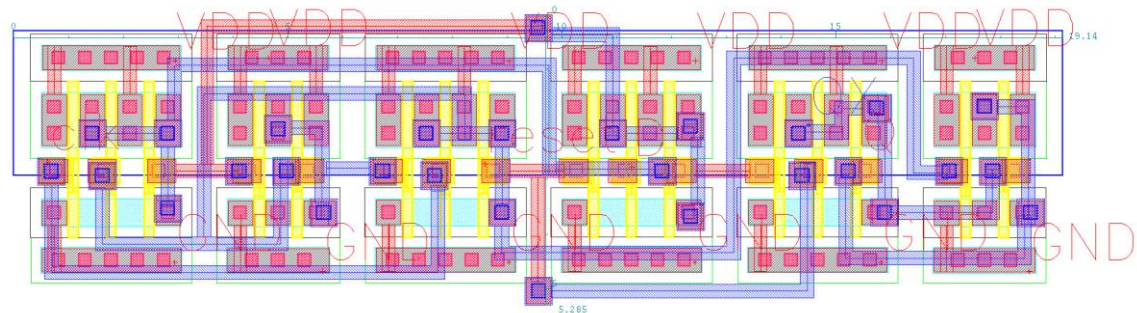
LVS:



- Layout 截圖(顯示長寬)

長:19.14

寬:5.285



- 嘗試簡單說明 Presim 與 Post-sim 結果比較

Presim 和 Post-sim 的波形幾乎一樣，只差在 Post-sim 的

output 波形的雜訊較 Presim 的多一點點。

- 心得討論

畫 layout 時若是由多個小元件組成一個大元件可以先畫出小元件

再兜出大元件會比較省時並且比較容易縮面積。我也學到原來

gate 和 body 可以安排在相鄰的空間與 VDD 和 GND 可以分割成

多段不用連接在一起。