

2022 超大型積體電路電腦輔助設計概論

2022 Introduction to VLSI CAD

Lab 10

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※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

A. XOR

1. Presim

i. 請截取 terminal 顯示 job concluded 的圖



```
File Edit View Search Terminal Help
192.168.130.10/array 736M 1624M 1536M 3110 18000 15000
vlsicad6:/home/user2/vlsi23/vlsi23100 % cd Lab9
vlsicad6:/home/user2/vlsi23/vlsi23100/Lab9 % laker &
[1] 5072
vlsicad6:/home/user2/vlsi23/vlsi23100/Lab9 % logDir = /home/user2/vlsi23/vlsi23100/Lab9/lakerlog/laker_05.11.12.54.5672
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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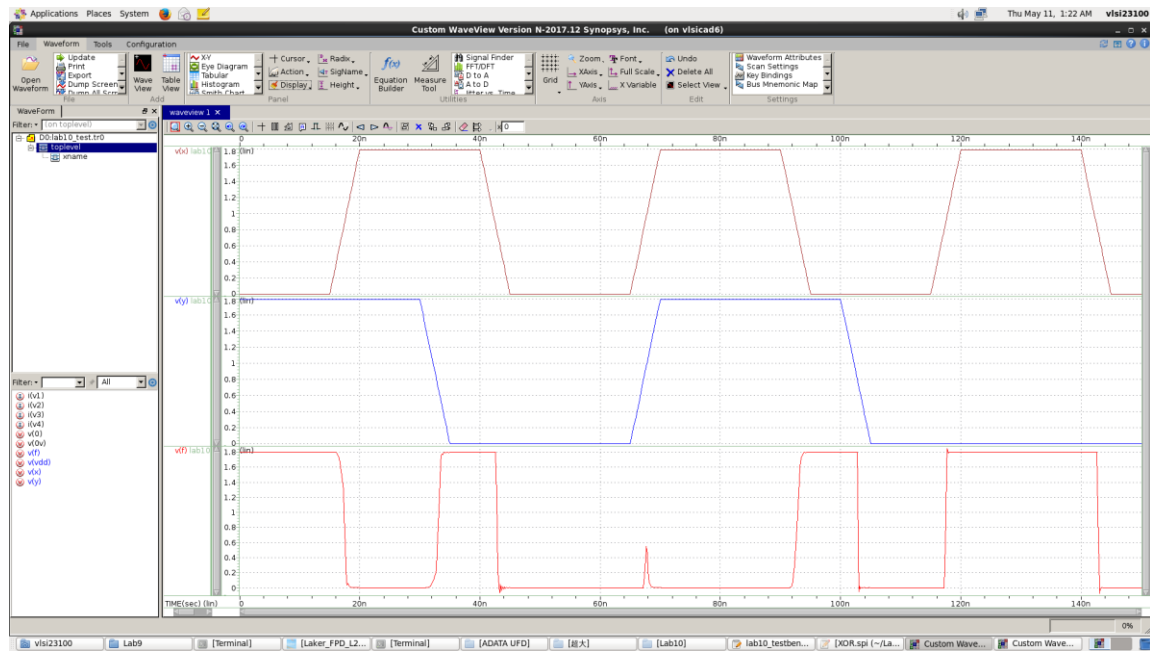
Licensed Products communicate with Synopsys servers for the purpose of providing software updates, detecting software piracy and verifying that customers are using Licensed Products in conformity with the applicable License Key for such Licensed Products. Synopsys will use information gathered in connection with this process to deliver software updates and pursue software pirates and infringers.

Display localhost:17.0 ==> 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: 0.15s)
hspice -i lab
lab10_testbench.sp- lab10_test.lis lab10_test.tr0
lab10_testbench.sp- lab10_test.pw0
lab10_test.ic0 lab10_test.st0
vlsicad6:/home/user2/vlsi23/vlsi23100/Lab9 % hspice -i lab10_testb
lab10_testbench.sp- lab10_testbench.sp
vlsicad6:/home/user2/vlsi23/vlsi23100/Lab9 % hspice -i lab10_testbench.sp -o lab10.lis
Using: /usr/cad/synopsys/hspice/cur/hspice/linux64/hspice -i 'lab10_testbench.sp' -o lab10.lis
Warning(s) associated with encrypted block(s) were suppressed due to encrypted content.

>Info: ***** hspice job concluded
vlsicad6:/home/user2/vlsi23/vlsi23100/Lab9 % wv &
[2] 24615
vlsicad6:/home/user2/vlsi23/vlsi23100/Lab9 % hspice -i lab10_testbench.sp -o lab10_test.lis
Using: /usr/cad/synopsys/hspice/cur/hspice/linux64/hspice -i 'lab10_testbench.sp' -o lab10_test.lis

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

ii. 請截取 WaveView 中的波形



2. Post-sim

i. 請截取 terminal 顯示 job concluded 的圖

```
Applications Places System
Terminal
File Edit View Search Terminal Help
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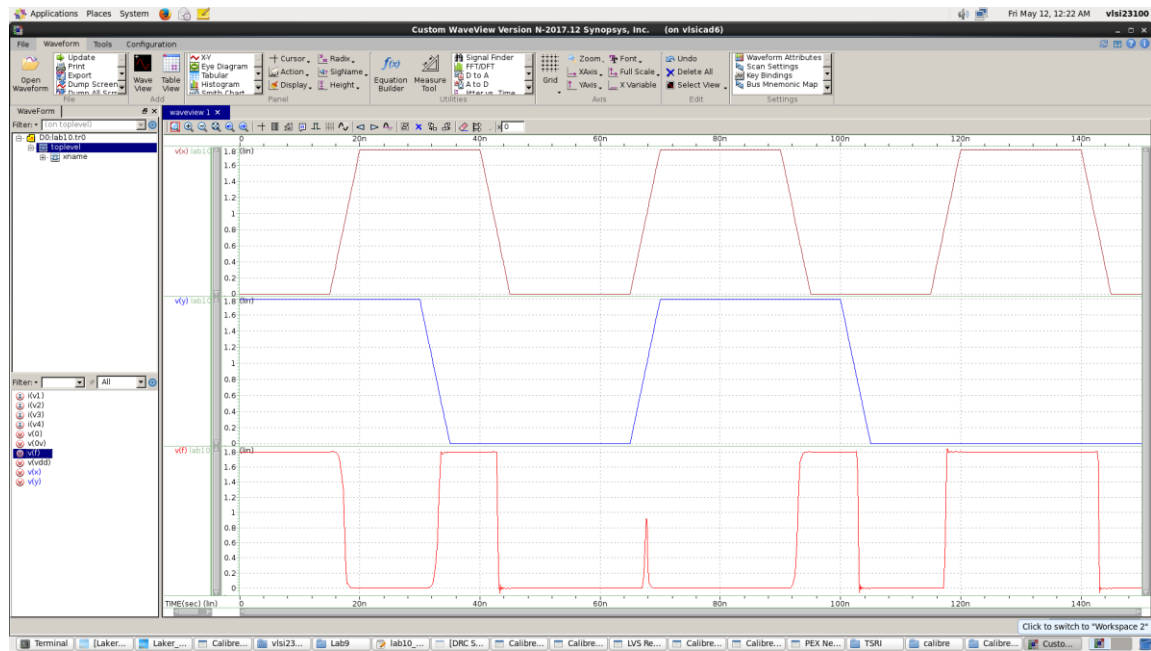
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Display localhost:17.0 ==> Current mode : TrueColor
The PseudoColor mode is not available under current setting. Switch to use TrueColor mode.
*** Limitation: BLinking is not supported under TrueColor mode.
fontPath(SPS_FONT_PATH) = /usr/cad/synopsys/Laker/cur/TTFont
Feature "Laker_FPD_L2" checked out successfully (Elapsed Time: 0.15s)
hspice -i lab10_testbench.sp -lab10_test.tr0 -lab10_test.pa0 -lab10_test.sio
visiCad6:/home/user2/vlsi23/vlsi23180/lab9 % hspice -i lab10_testbench.sp -lab10_testbench.sp -lab10_testbench.sp
visiCad6:/home/user2/vlsi23/vlsi23180/lab9 % hspice -i lab10_testbench.sp -o lab10_testbench.p -o lab10_testbench.p
Warning(s) associated with encrypted block(s) were suppressed due to encrypted content.

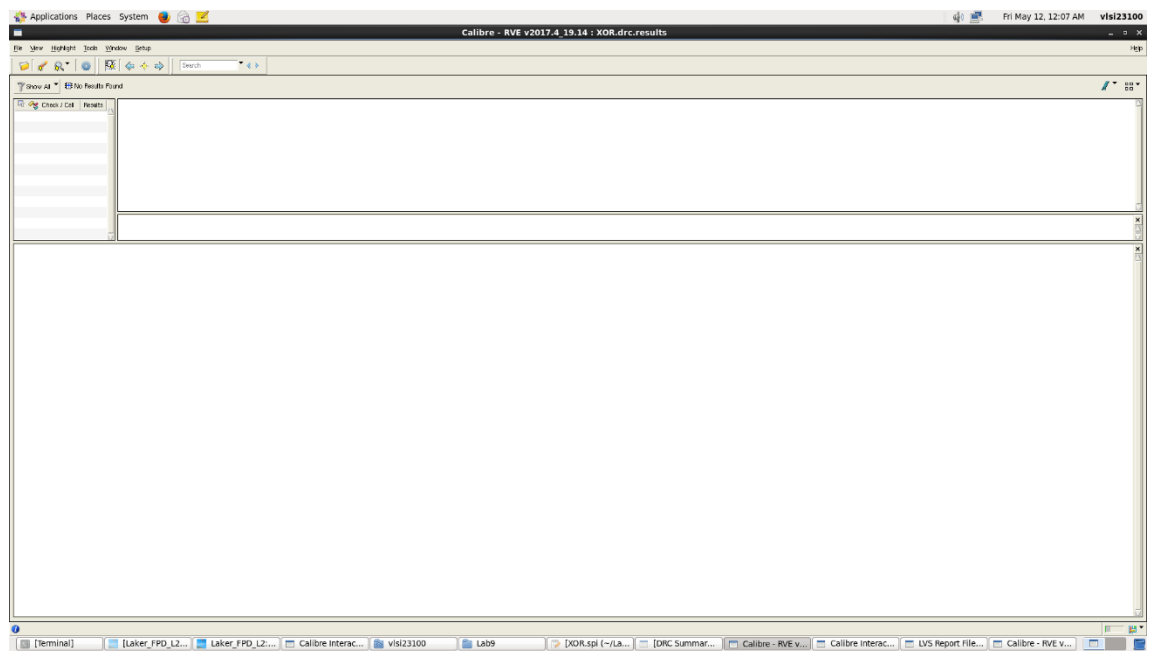
>info:
**** hspice job concluded
visiCad6:/home/user2/vlsi23/vlsi23180/lab9 %
```

ii. 請截取 WaveView 中的波形

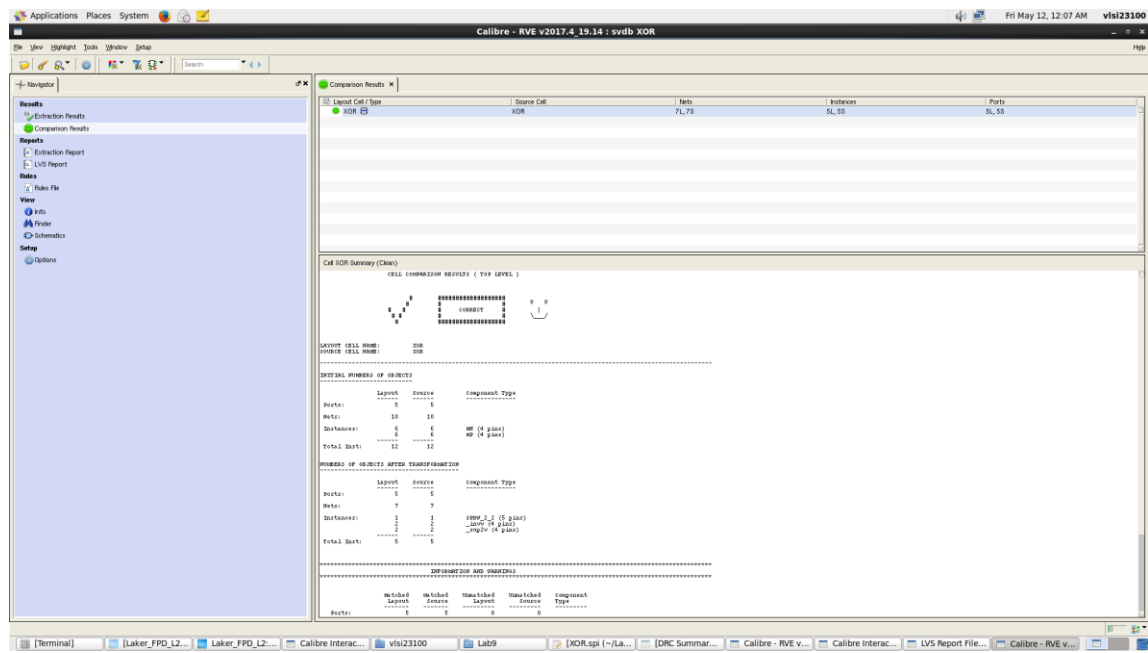


iii. DRC/LVS 結果

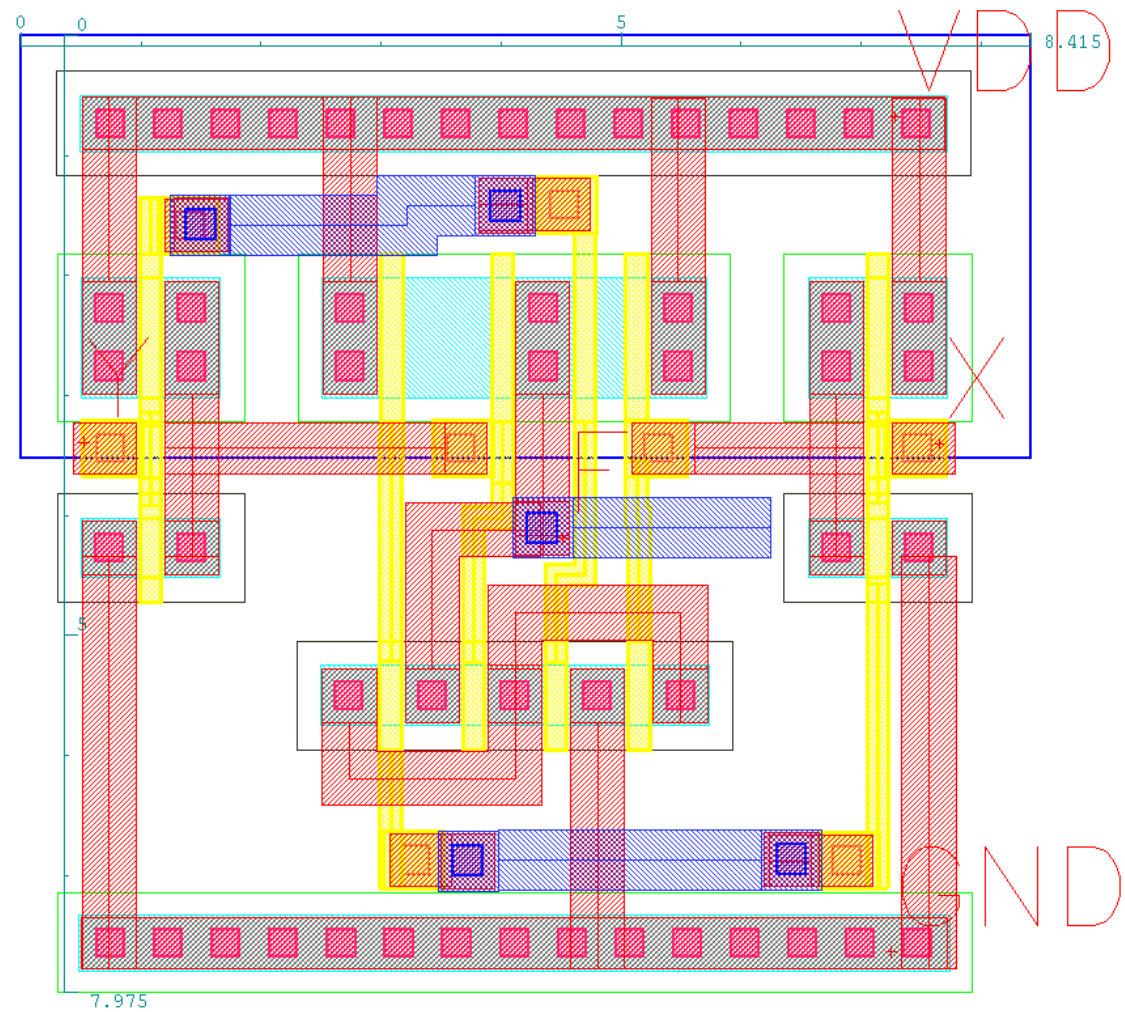
DRC:



LVS:



iv. Layout 截圖(顯示長寬)



3. 嘗試簡單說明 Presim 與 Post-sim 結果比較

在 F(output)的波形中，Post-sim 在波的直角處較 Presim 垂直且較多震盪，當 X 和 Y 同時上升時 Post-sim 的 F 的突波較 Presim 的明顯。

B. 心得討論

這次 lab 體驗到如何盡可能的縮小面積，也學會如何架第二層 metal，學習到如果是有共用的 Drain 或 Source 端可以利用 Laker 中內建的多個 NMos 和 PMos 來畫，進而減少成本。