BÁO CÁO LAB 3B

Lớp L04 - nhóm 7

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Perform LEC with Conformal

Step 1: Change directory to “lec_env” folder. In this Lab 4, we will work at this place:

```
cd /home/l04group7/vlsi/2013053/work/lec_env
```

▪ Step 2: Link the RTL, Netlist and Library file from “synthesis_env” into this place:

```
ln -sf ../synthesis_env/Genus_BoundFlasher/RTL/bound_flasher.v
ln -sf ../synthesis_env/Genus_BoundFlasher/LAB1/outputs_Apr13-17\:05\:56/bound_flasher_m.v
ln -sf ../synthesis_env/Genus_BoundFlasher/LIB/slow.lib
```

▪ Step 3: Confirm there has no broken link (link files successfully):

```
[l04group7@ktmt lec_env]$ ll
total 24
lrwxrwxrwx. 1 l04group7 l04group7   81 Apr 13 17:19 bound_flasher_m.v → ../synthesis_env/Genus_BoundFlasher/LAB1/outputs_Apr13-17:05:56/bound_flasher_m.v
lrwxrwxrwx. 1 l04group7 l04group7   55 Apr 13 17:19 bound_flasher.v → ../synthesis_env/Genus_BoundFlasher/RTL/bound_flasher.v
-rw-rw-r--. 1 l04group7 l04group7  113 Apr 12 23:18 go_lec
-rw-rw-r--. 1 l04group7 l04group7 4019 Apr 13 17:09 lec.log
-rw-rw-r--. 1 l04group7 l04group7 7247 Apr 13 17:03 lec.log~
-rw-rw-r--. 1 l04group7 l04group7  263 Apr 12 23:14 lec.tcl
lrwxrwxrwx. 1 l04group7 l04group7   48 Apr 13 17:19 slow.lib → ../synthesis_env/Genus_BoundFlasher/LIB/slow.lib
[l04group7@ktmt lec_env]$
```

Step 4: Prepare the setup script for Conformal as below:

```
vi ./lec.tcl
```

File lec.tcl:

```
set_log_file lec.log -replace

read_library slow.lib -lib -revised

read_design bound_flasher.v -verilog -golden

read_design bound_flasher_m.v -verilog -revised

set_mapping_method -name only
set_system_mode lec
map_key_points

add_compared_points -all
compare
```

Step 5: Prepare the execution script as below:

```
vi ./go_lec
```

File go_lec:

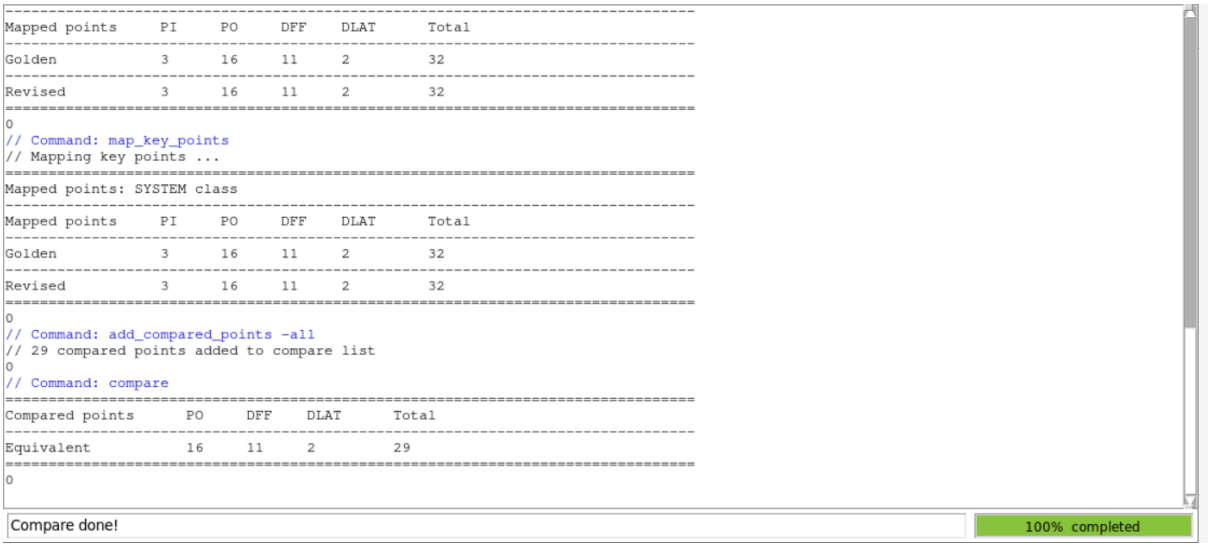
```
#!bin/bash -f

cd /home/share_file/cadence
source add_path
source add_license
cd -

lec -64 -dofile ./lec.tcl &
```

Step 6: Execute:

```
source go_lec
```

Step 7: It will automatically open the GUI and execute processes that we described in file “lec.tcl”

Result:



Don’t have any Non-equivalent points => Netlist equivalent vs RTL

Debug Non-equivalent point

Step 1: Copy Netlist into this place:

```
rm -rf bound_flasher_m.v
```

```
cp -rf ../synthesis_env/Genus_BoundFlasher/LAB1/outputs_Apr13-17\:05\:56/bound_flasher_m.v ./
```

Step 2: Confirm Netlist already copied (not link):

```
[l04group7@ktmt lec_env]$ ll
total 28
-rw-rw-r--. 1 l04group7 l04group7 11259 Apr 13 17:30 bound_flasher_m.v
lrwxrwxrwx. 1 l04group7 l04group7    55 Apr 13 17:19 bound_flasher.v -> ../synthesis_env/Genus_BoundFlasher/RTL/bound_flasher.v
-rw-rw-r--. 1 l04group7 l04group7   113 Apr 12 23:18 go_lec
-rw-rw-r--. 1 l04group7 l04group7  4019 Apr 13 17:23 lec.log
-rw-rw-r--. 1 l04group7 l04group7  4019 Apr 13 17:09 lec.log~
-rw-rw-r--. 1 l04group7 l04group7   263 Apr 12 23:14 lec.tcl
lrwxrwxrwx. 1 l04group7 l04group7    48 Apr 13 17:19 slow.lib -> ../synthesis_env/Genus_BoundFlasher/LIB/slow.lib
[l04group7@ktmt lec_env]$
```

Step 3: Modify Netlist to make a “bug” intentionally:

```
vi bound_flasher_m.v
```

```
      .QN (UNCONNECTED0));
  TLATNXL FLICKED_AT_5_reg(.GN (n_131), .D (n_110), .Q (FLICKED_AT_5),
      .QN (UNCONNECTED1));
  NOR3X8 g4749__9945(.A (n_120), .B (n_118), .C (n_126), .Y (n_134));
  CLKAND2X4 g4754__2883(.A (n_125), .B (n_132), .Y (n_135));
  NOR2BX1 g4747__2346(.AN (n_132), .B (n_124), .Y (n_131));
  NAND3BXL g4748__1666(.AN (n_111), .B (n_121), .C (n_129), .Y (n_130));
  OAI211X1 g4751__5477(.A0 (n_123), .A1 (n_122), .B0 (n_113), .C0
      (n_121), .Y (n_124));
  //LAB3B INVX1 g4760(.A (n_118), .Y (n_119));
  BUFX2 g4760(.A (n_118), .Y (n_119));
  NOR2X8 g4775__2398(.A (n_109), .B (n_107), .Y (n_120));
  NAND2BX1 g4767__6260(.AN (n_113), .B (n_122), .Y (n_129));
  AND2X1 g4766__8428(.A (n_109), .B (n_108), .Y (n_110));
  NOR2X6 g4764__5526(.A (n_75), .B (n_108), .Y (n_118));
  NAND2X4 g4778__6783(.A (n_85), .B (n_106), .Y (n_107));
  OAI21X4 g4782__3680(.A0 (n_101), .A1 (n_105), .B0 (n_102), .Y
```

Step 4: Re-execute:

```
source go_lec
```

Step 5: When execution is done, “Non-equivalent” points will appear:

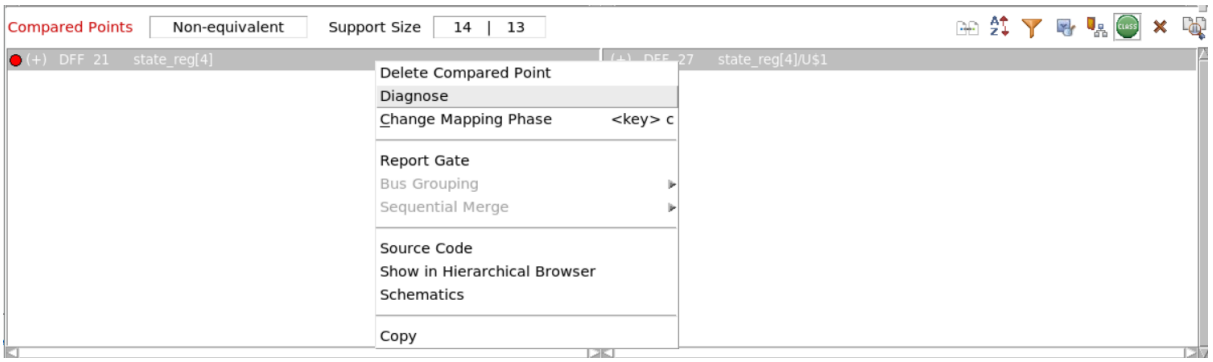
```
Revised           3      16     11     2         32
================================================================================
0
// Command: add_compared_points -all
// 29 compared points added to compare list
0
// Command: compare
================================================================================
Compared points      PO     DFF    DLAT      Total
--------------------------------------------------------------------------------
Equivalent           16     10     2         28
--------------------------------------------------------------------------------
Non-equivalent       0      1      0         1
================================================================================
0
```

Compare done! 100% completed

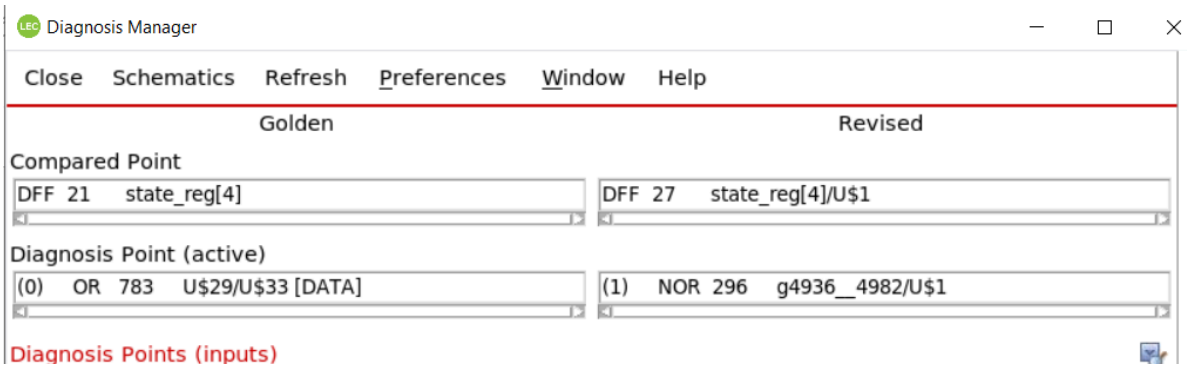
Step 6: There are many ways for debugging nonequivalent points. The following part is the debugging example using “Diagnosis Manager” and “Schematics Viewer” in GUI:

- Mapping Manager:

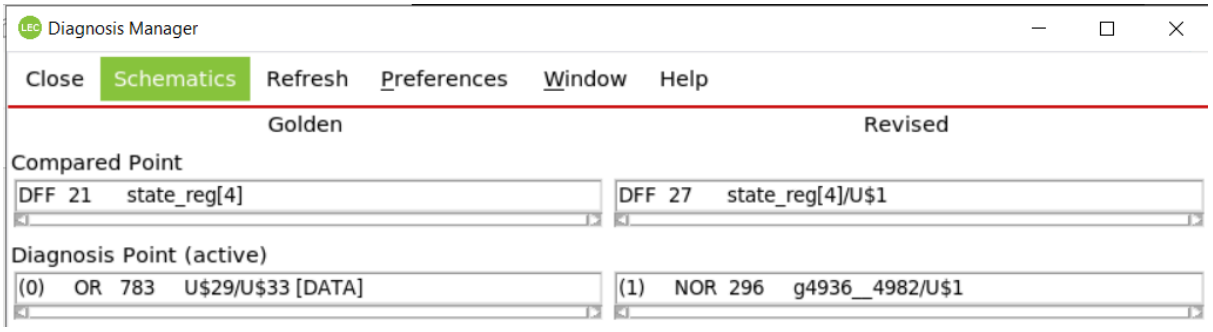
- Open Diagnosis Manager



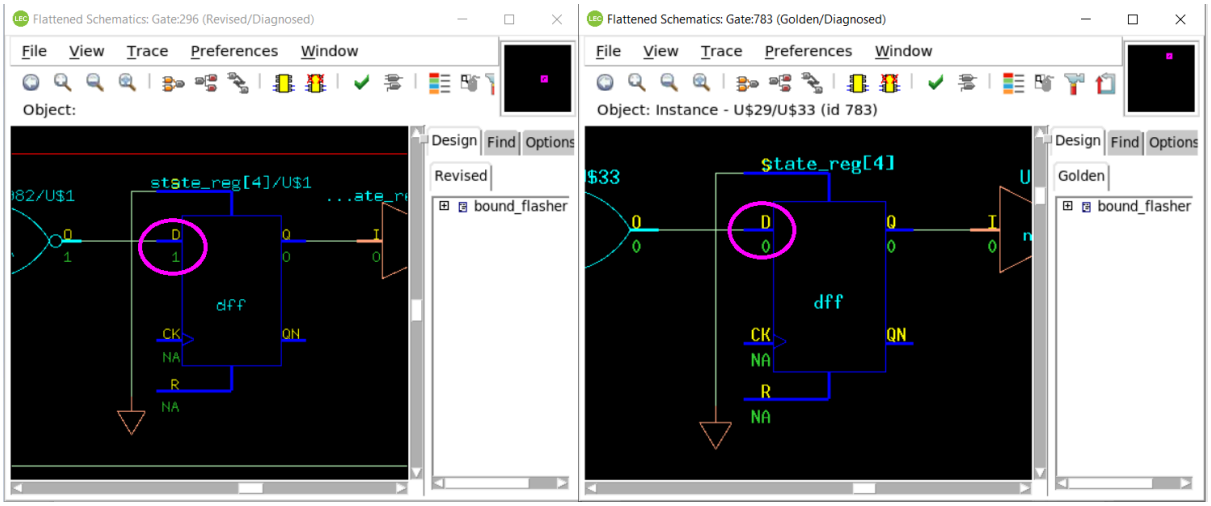
- Diagnosis Manager:



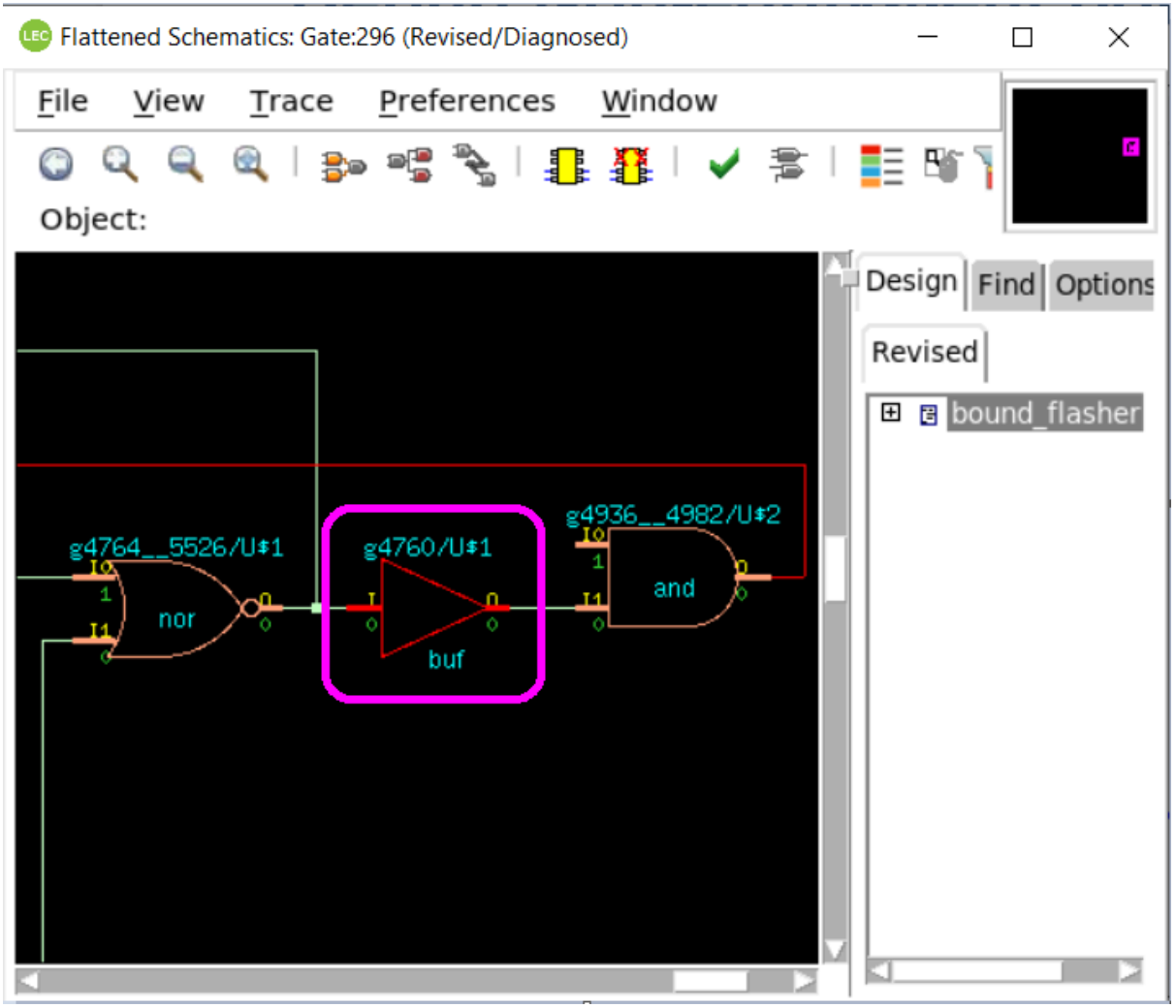
- Open Schematics Viewer



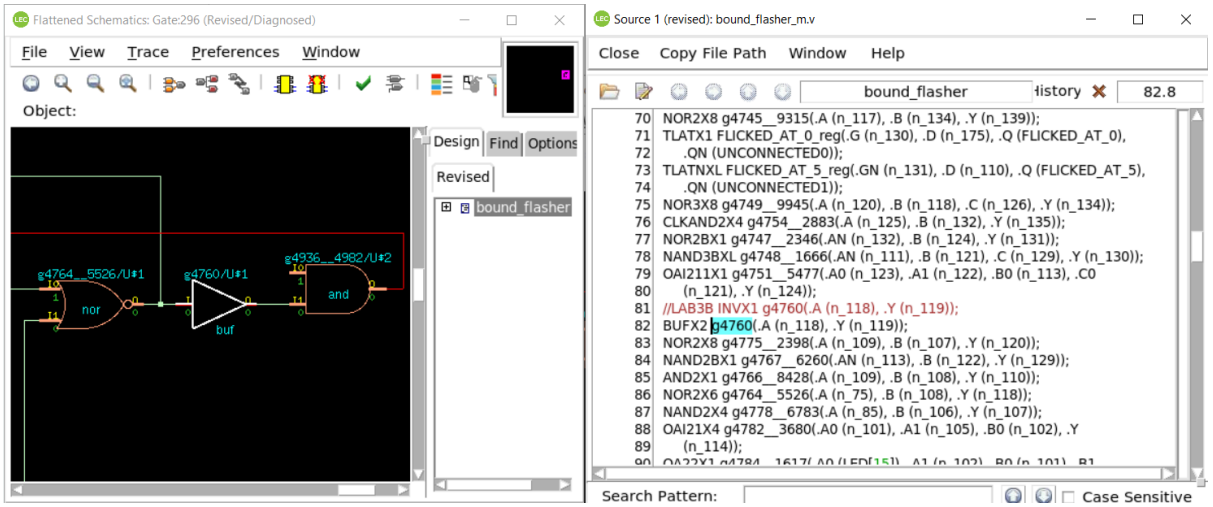
- Schematics Viewer:



The endpoint simulation (pink circle) is 1, while the Golden is 0.



After trace back, the root cause is BUF-gate (pink rectangle) in Revised design.



Double-click to the error gate (BUF gate) in Revised design, the corresponding source code will be opened.

Nhóm có sửa code sau khi phát hiện có non-equivalent.