Lab 1 – Placement and Routing

- Due: 2pm, Feb. 24 (Wed)

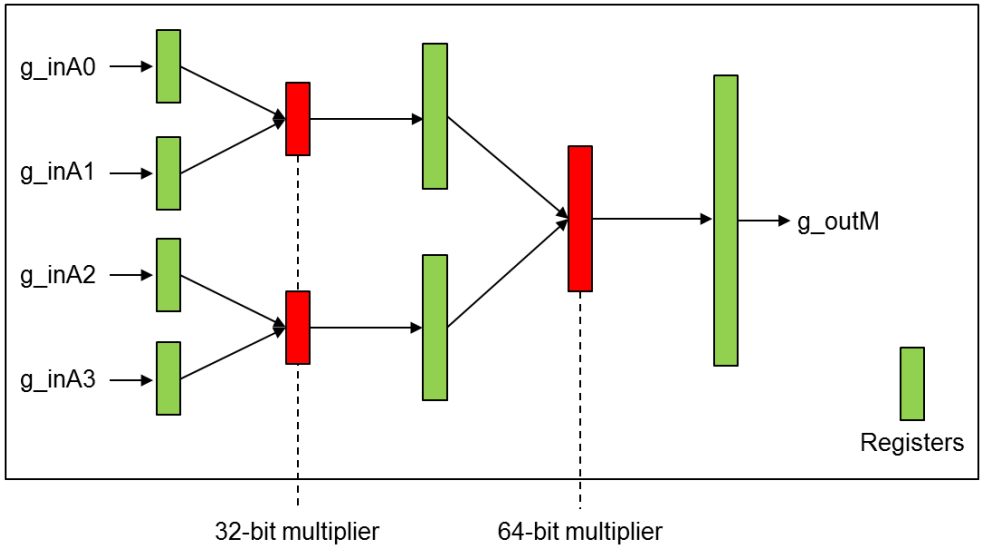
- How to submit
  - **Zip all the files and upload it in the blackboard "Lab 1" page.**
  - **Email submission will not be accepted.**

- Read the "tutorial_innovus.pdf" in the "Labs" page carefully.

- Connect to an EECS server.
- Download lab1.zip (wget https://eecs.wsu.edu/~ee434/Labs/lab1.zip)

Design

- Four-input 32-bit pipelined multiplier.



- Files: pmul32_4_fm.globals, .view, .v, .sdc

Spec

- Initial core utilization: 0.5
- Core-to-left, core-to-top, core-to-right, core-to-bottom: 5um

Procedure & What to Submit

- Chip outlining
  - (Submit) A screenshot of the layout
- P/G network design
  - Use the same setting used for the sample design.
  - (Submit) A screenshot of the layout showing the P/G rings and stripes.
- Placement
  - Use eight metal layers.
  - Place I/O pins too.
  - (Submit) A screenshot of the layout (turn off the visibility of all the metal layers)
  - (Submit) WNS and TNS (not the “reg2reg” values, but the “all” values), the layout density, the power consumption (total power only), and the wire length. Do not screen capture the values. I need “numbers” like this.
    - WNS: -XXX.XX ns
    - TNS: -XXX.XX ns
    - Density: XX.X %
    - Power: XX.XX mW
    - Wire length: XXX um

Procedure & What to Submit

- Pre-CTS optimization
  - Perform pre-CTS opt. (This will take some time, 20~30 mins)
  - (Submit) WNS, TNS, density, power
- CTS
  - Perform CTS (use the same max. transition time and skew)
  - (Submit) A screenshot of the clock tree
  - (Submit) WNS, TNS, density, power
- Post-CTS optimization
  - Perform post-CTS opt.
  - (Submit) WNS, TNS, density, power
- Routing
  - Perform routing (make sure you use only eight metal layers)
  - (Submit) A screenshot of the layout (show all the metal layers)
  - (Submit) WNS, TNS, density, power, wire length

Procedure & What to Submit

- Post-route optimization
  - Perform post-route opt.
  - (Submit) WNS, TNS, density, power, wire length
- Verification
  - Perform “Verify geometry”.
  - (Submit) # violations and its type (Cells, SameNet, Wiring, Antenna)
  - Perform “Verify connectivity”
  - (Submit) # violations and its type (Cells, SameNet, Wiring, Antenna)

Procedure & What to Submit

- How to submit
  - Copy and paste the layout images into a word file.
  - At the bottom of the file, make a table and put the values in the table.

	WNS	TNS	Density	Power	WL
Placement					
Pre-CTS opt					
CTS					
…					