Chapter 7 - OpenROAD flow scripts - TRAINING - Common

Course authors (Git file)

1. Save the ready examples
2. Multiple runs
3. Reports
4. LFSR: parameterized version
5. LFSR (param version) optimize
6. LFSR IOPads
7. gcd | LFSR | TT: Area change

Save the ready examples

- Some design runs were done in the previous chapters.

Task: Rename them

- To a backup save of all these designs by renaming their directories.
- How to rename them is described in C7-S3.
- Try to find meaningfull renames:
  - date, time
  - versioning
  - optimization param

Multiple runs

- The lecture slides of C7-S3 explain how to do multiple runs (one after another) on the same design.

Task: Two runs - Same design

- Make two runs with a different DENSITY for the gdc design
- Compare the runs via their final GDS
- Save both GDS as png images

Reports

The reports for power and area are needed for the upcoming training sessions.

Task: Read reports

- Look up for the TCL commands for different reports, at least power and area.
- Try the commands in the GUI TCL console with any already made design.

LFSR: parameterized version

Task: LFSR width as parameter

- Rewrite the LFSR Verilog with a parameter for the register width
- Maybe parameterize the index of the feedback bits.
- Run to get a GDS of this.

LFSR (param version) optimize

Optimize the LFSR param version in three different ways.

Task: Min clock period

- Fix the length (make it long!)
- Find the minimal clockperiod for your design.

Task: Max length

- Fix the area
- Find the maximum length for the LFSR

Task: Max density

- Fix the length and area
- Find the max density

LFSR IOPads

The LFSR has only very few inputs and outputs. This might be the most simple design for starting with to create a Padring with IOPads.

Task: footprint.tcl

- Take the floorplan.tcl from masked_aes as an example
- Create a floorplan.tcl for the LFSR
- Run to a GDS

gcd | LFSR | TT: Area change

For this Task, use one (or more, one after another) of these designs:

- gcd
- LFSR
- TinyTapeout
- Some other own design

Task: Compare two areas

- Keep the density fixed (Not too high, more relaxed)
- Change the core area and rerun
- Compare the GDS of two different versions

gcd | LFSR | TT: Free area

For this Task, use one (or more, one after another) of these designs:

- gcd
- LFSR
- TinyTapeout
- Some other own design

Task: Free area, changing the density

- No contraint for an area. (Comment it out)
- Experiment with a wide range of density.
- How hogh/low can the desity be?
- Does the power estimation change much?

gcd | LFSR | TT: Uniform distributed heatmap

For this Task, use one (or more, one after another) of these designs:

- gcd
- LFSR
- TinyTapeout
- Some other own design

Task: heatmap optimization

- Choose one of the heatmaps in GUI
- Make a suggestion of how to find a most uniform distributed heatmap design.
- Try to build a GDS of that.
- Compare to the “not optimized” version. Did you achive your goal?