**Report -> for Physical Training Labs**

Contents

[Digital tool ASIC flow 1](#_Toc107016147)

[How to talk computer 1](#_Toc107016148)

[Open-source digital ASIC Flow 2](#_Toc107016149)

[RTL to GDS Flow 2](#_Toc107016150)

[Open Lane flow 2](#_Toc107016151)

[Synthesis 3](#_Toc107016152)

[Floor Planning 4](#_Toc107016153)

[Placement 5](#_Toc107016154)

[Open layout for one standrad cell and clone it . 6](#_Toc107016155)

[Run extraction 7](#_Toc107016156)

[Run SPICE 7](#_Toc107016157)

[Calculate rise transition and fall transitions from waveforms 8](#_Toc107016158)

[Creating LEF 8](#_Toc107016159)

# Digital tool ASIC flow

## How to talk computer

Graphical user interface, diagram

Description automatically generated with medium confidence

## Open-source digital ASIC Flow

A picture containing diagram

Description automatically generated

## RTL to GDS Flow

Diagram

Description automatically generated

## Open Lane flow

Design Name: picorv32a:

/home/kunalg123/Desktop/work/tools/openlane\_working\_dir/pdks/sky130A/libs.ref/sky130\_fd\_sc\_hd

Directory presents inside this:

cdl doc gds lef lib mag maglef spice techlef Verilog

**Design Preparation:**

Example for config.tcl

Text

Description automatically generated

**Command to preparation data:**

./flow.tcl -interactive

prep -design picorv32a : merging the LEF

Text

Description automatically generated

## Synthesis

**Command used -> Run\_synthesis**

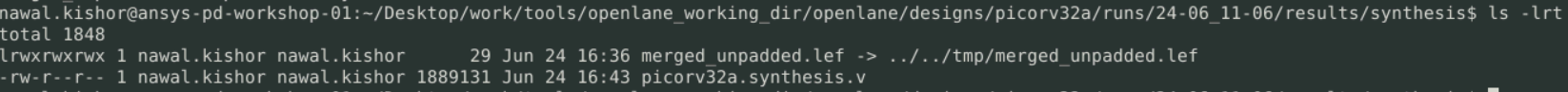
**Results:**

Summary of synthesis and Flop ratio =10%

Text

Description automatically generated

Files created after synthesis.



.v file and mapping has been done in synthesis stage:

Text

Description automatically generated

Report files:

nawal.kishor@ansys-pd-workshop-01:~/Desktop/work/tools/openlane\_working\_dir/openlane/designs/picorv32a/runs/24-06\_11-06/reports/synthesis$ ls

1-yosys\_4.chk.rpt 1-yosys\_dff.stat 2-opensta.min\_max.rpt 2-opensta.slew.rpt 2-opensta\_tns.rpt

1-yosys\_4.stat.rpt 1-yosys\_pre.stat 2-opensta.rpt 2-opensta.timing.rpt 2-opensta\_wns.rpt

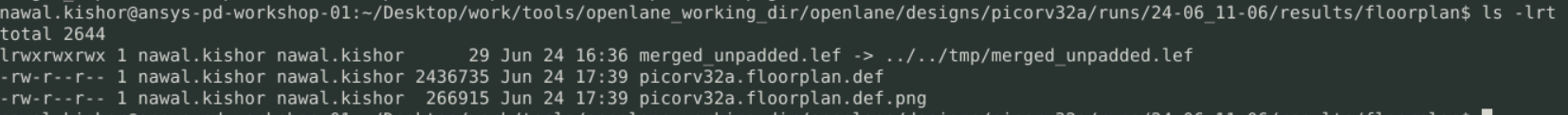
## Floor Planning

Inside README file there is all command are given for all stages and set parameters based on that.  
**Example:** Text

Description automatically generated

Priorities for the config files. Default config -> design config.tcl -> hdk .config.tcl

**Results file:**



Layout seen:

Open Layout in magic and query inside the GUI:

Graphical user interface, text, application

Description automatically generated

Standard cell placed at the lower side of the LEF.

Diagram

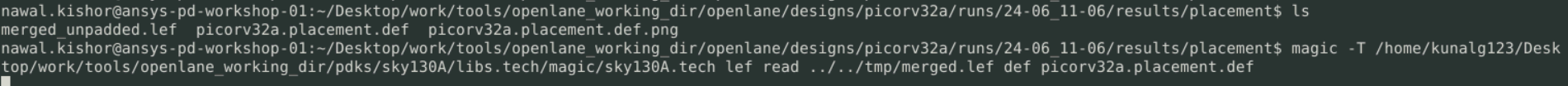
Description automatically generated with medium confidenceA picture containing table

Description automatically generated

Can change the floorplan and any stage by changing the variable:

## Placement

Command used for to open layout in magic :



GUI design after placement: Standard cells are placed and without DRC rule checks.

Graphical user interface, qr code

Description automatically generated Diagram, timeline

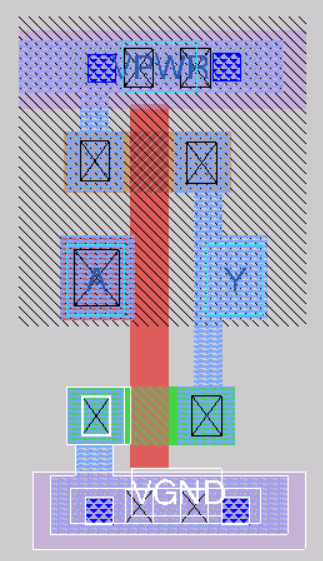
Description automatically generated

## Open layout for one standrad cell and clone it .

Text

Description automatically generated

See the connections and cell layout after deleting the Geoms:

Diagram

Description automatically generated with low confidence

## Run extraction

Graphical user interface, text

Description automatically generated

## Run SPICE

Text

Description automatically generated

Command: extspice

Text

Description automatically generated

A picture containing diagram

Description automatically generated

## Calculate rise transition and fall transitions from waveforms

**Rise transition: 0.5e-09 similarly can calculate the fall transition**

x0 = 2.23704e-09, y0 = 2.60161

x0 = 2.18134e-09, y0 = 0.659574

## Creating LEF

created the LEF file command used : lef write   
/home/nawal.kishor/Desktop/work/tools/openlane\_working\_dir/openlane/vsdstdcelldesign/sky130\_vsdinv.lef