```
Applications Menu        Terminal - @ab9aa0bc9a...

Terminal - @ab9aa0bc9aa0:~/Desktop/work/tools/openlane_wor

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[root@ab9aa0bc9aa0 Desktop]# cd work/tools/
[root@ab9aa0bc9aa0 tools]# ls -ltr
total 4
drwxr-xr-x 1 root root 4096 Oct  5 12:28 openlane_working_dir
[root@ab9aa0bc9aa0 tools]# ls -ltr
total 4
drwxr-xr-x 1 root root 4096 Oct  5 12:28 openlane_working_dir
[root@ab9aa0bc9aa0 tools]# cd openlane_working_dir
[root@ab9aa0bc9aa0 openlane_working_dir]# cd pdks
[root@ab9aa0bc9aa0 pdks]# ls -ltr
total 12
drwxr-xr-x 1 root root 4096 Oct  5 11:53 skywater-pdk
drwxr-xr-x 5 root root 4096 Oct  5 11:57 open_pdks
drwxr-xr-x 1 root root 4096 Oct  5 12:02 sky130A
[root@ab9aa0bc9aa0 pdks]# cd sky130A
[root@ab9aa0bc9aa0 sky130A]# ls -ltr
total 8
drwxr-xr-x  1 root root 4096 Oct  5 12:02 libs.tech
drwxr-xr-x 13 root root 4096 Oct  5 12:02 libs.ref
[root@ab9aa0bc9aa0 sky130A]#
```

```
[root@ab9aa0bc9aa0 pdks]# cd sky130A
[root@ab9aa0bc9aa0 sky130A]# ls -ltr
total 8
drwxr-xr-x  1 root  root 4096 Oct  5 12:02 libs.tech
drwxr-xr-x 13 root  root 4096 Oct  5 12:02 libs.ref
[root@ab9aa0bc9aa0 sky130A]# cd libs.ref/
[root@ab9aa0bc9aa0 libs.ref]# ls -ltr
total 44
drwxr-xr-x 12 root  root 4096 Oct  5 12:02 sky130_fd_sc_ms
drwxr-xr-x 12 root  root 4096 Oct  5 12:02 sky130_fd_sc_ls
drwxr-xr-x 12 root  root 4096 Oct  5 12:02 sky130_fd_sc_hvl
drwxr-xr-x 12 root  root 4096 Oct  5 12:02 sky130_fd_sc_hs
drwxr-xr-x 12 root  root 4096 Oct  5 12:02 sky130_fd_sc_hdll
drwxr-xr-x  7 root  root 4096 Oct  5 12:02 sky130_fd_pr_base
drwxr-xr-x 11 root  root 4096 Oct  5 12:02 sky130_fd_io
drwxr-xr-x 12 root  root 4096 Oct  5 12:02 sky130_fd_sc_lp
drwxr-xr-x 12 root  root 4096 Oct  5 12:02 sky130_fd_sc_hd
drwxr-xr-x  5 root  root 4096 Oct  5 12:02 sky130_fd_pr_rf2
drwxr-xr-x  6 root  root 4096 Oct  5 12:02 sky130_fd_pr_rf
```

```
[root@ab9aa0bc9aa0 libs.ref]# cd ../
[root@ab9aa0bc9aa0 sky130A]# cd libs.tech/
[root@ab9aa0bc9aa0 libs.tech]# ls -ltr
total 24
drwxr-xr-x 2 root root 4096 Oct  5 12:02 qflow
drwxr-xr-x 1 root root 4096 Oct  5 12:02 openlane
drwxr-xr-x 2 root root 4096 Oct  5 12:02 ngspice
drwxr-xr-x 2 root root 4096 Oct  5 12:02 netgen
drwxr-xr-x 3 root root 4096 Oct  5 12:02 magic
drwxr-xr-x 2 root root 4096 Oct  5 12:02 klayout
[root@ab9aa0bc9aa0 libs.tech]#
```

Terminal - @ab9aa0bc9aa0:~/Desktop/work/tools/openlane_working_dir/pdks/sky130A/libs.ref/sky130_fd_sc_hd

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```
[root@ab9aa0bc9aa0 libs.tech]# cd ../
[root@ab9aa0bc9aa0 sky130A]# cd libs.ref/
[root@ab9aa0bc9aa0 libs.ref]# ls -ltr
total 44
drwxr-xr-x 12 root root 4096 Oct  5 12:02 sky130_fd_sc_ms
drwxr-xr-x 12 root root 4096 Oct  5 12:02 sky130_fd_sc_ls
drwxr-xr-x 12 root root 4096 Oct  5 12:02 sky130_fd_sc_hvl
drwxr-xr-x 12 root root 4096 Oct  5 12:02 sky130_fd_sc_hs
drwxr-xr-x 12 root root 4096 Oct  5 12:02 sky130_fd_sc_hdll
drwxr-xr-x  7 root root 4096 Oct  5 12:02 sky130_fd_pr_base
drwxr-xr-x 11 root root 4096 Oct  5 12:02 sky130_fd_io
drwxr-xr-x 12 root root 4096 Oct  5 12:02 sky130_fd_sc_lp
drwxr-xr-x 12 root root 4096 Oct  5 12:02 sky130_fd_sc_hd
drwxr-xr-x  5 root root 4096 Oct  5 12:02 sky130_fd_pr_rf2
drwxr-xr-x  6 root root 4096 Oct  5 12:02 sky130_fd_pr_rf
[root@ab9aa0bc9aa0 libs.ref]# cd sky130_fd_sc_hd
[root@ab9aa0bc9aa0 sky130_fd_sc_hd]# ls -ltr
total 96
drwxr-xr-x 2 root root  4096 Oct  5 12:02 verilog
drwxr-xr-x 2 root root  4096 Oct  5 12:02 techlef
drwxr-xr-x 2 root root  4096 Oct  5 12:02 spice
drwxr-xr-x 2 root root 32768 Oct  5 12:02 maglef
drwxr-xr-x 2 root root 32768 Oct  5 12:02 mag
drwxr-xr-x 2 root root  4096 Oct  5 12:02 lib
drwxr-xr-x 2 root root  4096 Oct  5 12:02 lef
drwxr-xr-x 2 root root  4096 Oct  5 12:02 gds
drwxr-xr-x 2 root root  4096 Oct  5 12:02 doc
drwxr-xr-x 2 root root  4096 Oct  5 12:02 cdl
[root@ab9aa0bc9aa0 sky130_fd_sc_hd]#
```

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```
drwxr-xr-x 2 root root   4096 Oct   5 12:02 doc
drwxr-xr-x 2 root root   4096 Oct   5 12:02 cdl
[root@ab9aa0bc9aa0 sky130_fd_sc_hd]# cd verilog
[root@ab9aa0bc9aa0 verilog]# ls -ltr
total 3120
-rw-r--r-- 1 root root 3192281 Oct   5 12:01 sky130_fd_sc_hd.v
[root@ab9aa0bc9aa0 verilog]# cd ../
[root@ab9aa0bc9aa0 sky130_fd_sc_hd]# cd lib
[root@ab9aa0bc9aa0 lib]# ls -ltr
total 332328
-rw-r--r-- 1 root root 12744857 Oct   5 11:57 sky130_fd_sc_hd__ss_n40C_1v60.lib
-rw-r--r-- 1 root root 12724810 Oct   5 11:57 sky130_fd_sc_hd__ss_n40C_1v40.lib
-rw-r--r-- 1 root root 12723260 Oct   5 11:57 sky130_fd_sc_hd__ss_100C_1v60.lib
-rw-r--r-- 1 root root 12723886 Oct   5 11:57 sky130_fd_sc_hd__ff_n40C_1v76.lib
-rw-r--r-- 1 root root 12723140 Oct   5 11:57 sky130_fd_sc_hd__tt_100C_1v80.lib
-rw-r--r-- 1 root root 12723339 Oct   5 11:57 sky130_fd_sc_hd__tt_025C_1v80.lib
-rw-r--r-- 1 root root 12723367 Oct   5 11:57 sky130_fd_sc_hd__ss_n40C_1v76.lib
-rw-r--r-- 1 root root 66673888 Oct   5 11:57 sky130_fd_sc_hd__ss_n40C_1v60_ccsnoise.lib
-rw-r--r-- 1 root root 12724342 Oct   5 11:57 sky130_fd_sc_hd__ss_n40C_1v44.lib
-rw-r--r-- 1 root root 12725269 Oct   5 11:57 sky130_fd_sc_hd__ss_n40C_1v35.lib
-rw-r--r-- 1 root root 12726061 Oct   5 11:57 sky130_fd_sc_hd__ss_n40C_1v28.lib
-rw-r--r-- 1 root root 12723302 Oct   5 11:57 sky130_fd_sc_hd__ss_100C_1v40.lib
-rw-r--r-- 1 root root 12744895 Oct   5 11:57 sky130_fd_sc_hd__ff_n40C_1v95.lib
-rw-r--r-- 1 root root 69967561 Oct   5 11:57 sky130_fd_sc_hd__ff_n40C_1v95_ccsnoise.lib
-rw-r--r-- 1 root root 12724132 Oct   5 11:57 sky130_fd_sc_hd__ff_n40C_1v65.lib
-rw-r--r-- 1 root root 12724155 Oct   5 11:57 sky130_fd_sc_hd__ff_n40C_1v56.lib
-rw-r--r-- 1 root root 12723155 Oct   5 11:57 sky130_fd_sc_hd__ff_100C_1v95.lib
-rw-r--r-- 1 root root 12723195 Oct   5 11:57 sky130_fd_sc_hd__ff_100C_1v65.lib
[root@ab9aa0bc9aa0 lib]# 
```

```
drwxr-xr-x 2 root root  4096 Oct  5 12:02 gds
drwxr-xr-x 2 root root  4096 Oct  5 12:02 doc
drwxr-xr-x 2 root root  4096 Oct  5 12:02 cdl
[root@ab9aa0bc9aa0 sky130_fd_sc_hd]# cd lef
[root@ab9aa0bc9aa0 lef]# ls -ltr
total 2112
-rw-r--r-- 1 root root 2158921 Oct  5 11:57 sky130_fd_sc_hd.lef
[root@ab9aa0bc9aa0 lef]# cd ../
[root@ab9aa0bc9aa0 sky130_fd_sc_hd]# cd techlef
[root@ab9aa0bc9aa0 techlef]# ls -ltr
total 20
-rw-r--r-- 1 root root 17597 Oct  5 11:57 sky130_fd_sc_hd.tlef
[root@ab9aa0bc9aa0 techlef]# cd ../
[root@ab9aa0bc9aa0 sky130_fd_sc_hd]# cd spice
[root@ab9aa0bc9aa0 spice]# ls -ltr
total 828
-rw-r--r-- 1 root root 846994 Oct  5 11:57 sky130_fd_sc_hd.spice
[root@ab9aa0bc9aa0 spice]# cd ../
[root@ab9aa0bc9aa0 sky130_fd_sc_hd]# cd gds
[root@ab9aa0bc9aa0 gds]# ls -ltr
total 4092
-rw-r--r-- 1 root root 4189970 Oct  5 11:57 sky130_fd_sc_hd.gds
[root@ab9aa0bc9aa0 gds]# cd ../
[root@ab9aa0bc9aa0 sky130_fd_sc_hd]# cd cdl
[root@ab9aa0bc9aa0 cdl]# ls -ltr
total 964
-rw-r--r-- 1 root root 984055 Oct  5 11:57 sky130_fd_sc_hd.cdl
[root@ab9aa0bc9aa0 cdl]# cd ../
[root@ab9aa0bc9aa0 sky130_fd_sc_hd]#
```

Terminal - @ab9aa0bc9aa0:~/Desktop/work/tools/openlane_working_dir/openLANE_flow

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```
lrwxrwxrwx 1 root root 14 Oct  5 12:28 openLANE_flow -> /openLANE_flow
lrwxrwxrwx 1 root root  5 Oct  5 12:28 pdks -> /pdks
[root@ab9aa0bc9aa0 openlane_working_dir]# cd openLANE_flow
[root@ab9aa0bc9aa0 openLANE_flow]# ls -ltr
total 84
-rw-r--r--  1 root root 16380 Oct  5 11:35 README.md
-rw-r--r--  1 root root 11350 Oct  5 11:35 LICENSE
drwxr-xr-x  2 root root  4096 Oct  5 11:35 doc
drwxr-xr-x 45 root root  4096 Oct  5 11:35 designs
-rw-r--r--  1 root root   408 Oct  5 11:35 CONTRIBUTING.md
-rwxr-xr-x  1 root root   966 Oct  5 11:35 clean_runs.tcl
-rw-r--r--  1 root root   687 Oct  5 11:35 AUTHORS.md
-rw-r--r--  1 root root 13235 Oct  5 11:35 run_designs.py
drwxr-xr-x  3 root root  4096 Oct  5 11:35 regression_results
-rwxr-xr-x  1 root root  4537 Oct  5 11:35 flow.tcl
drwxr-xr-x  1 root root  4096 Oct 14 11:35 configuration
drwxr-xr-x  1 root root  4096 Oct 14 11:35 scripts
[root@ab9aa0bc9aa0 openLANE_flow]# ./flow.tcl -interactive
[INFO]:
```



```
[INFO]: Version: N/A
%
```

Terminal - @ab9aa0bc9aa0:/openLANE_flow/designs

File Edit View Terminal Go Help

@ab9aa0bc9aa0:~/Desktop/work/tools/openlane_working_dir/openLAN...   @ab9aa0bc9aa0:/openLANE_flow/designs

```
-rwxr-xr-x  1 root  root   4537 Oct   5 11:35 flow.tcl
drwxr-xr-x  1 root  root   4096 Oct  14 11:35 configuration
drwxr-xr-x  1 root  root   4096 Oct  14 11:35 scripts
[root@ab9aa0bc9aa0 openLANE_flow]# cd designs
[root@ab9aa0bc9aa0 designs]# ls -ltr
total 184
drwxr-xr-x 3 root  root 4096 Oct   5 11:35 zipdiv
drwxr-xr-x 3 root  root 4096 Oct   5 11:35 y_huff
drwxr-xr-x 3 root  root 4096 Oct   5 11:35 y_dct
drwxr-xr-x 3 root  root 4096 Oct   5 11:35 xtea
drwxr-xr-x 3 root  root 4096 Oct   5 11:35 xgate_risc
drwxr-xr-x 3 root  root 4096 Oct   5 11:35 wbqspiflash
drwxr-xr-x 3 root  root 4096 Oct   5 11:35 wb_conbus_top
drwxr-xr-x 3 root  root 4096 Oct   5 11:35 usbf_device
drwxr-xr-x 3 root  root 4096 Oct   5 11:35 usb_cdc_core
drwxr-xr-x 3 root  root 4096 Oct   5 11:35 usb
drwxr-xr-x 3 root  root 4096 Oct   5 11:35 spm
drwxr-xr-x 3 root  root 4096 Oct   5 11:35 sound
drwxr-xr-x 3 root  root 4096 Oct   5 11:35 sha512
drwxr-xr-x 3 root  root 4096 Oct   5 11:35 sha3
drwxr-xr-x 3 root  root 4096 Oct   5 11:35 salsa20
-rw-r--r-- 1 root  root 9528 Oct   5 11:35 README.md
drwxr-xr-x 3 root  root 4096 Oct   5 11:35 PPU
drwxr-xr-x 3 root  root 4096 Oct   5 11:35 point_scalar_mult
drwxr-xr-x 3 root  root 4096 Oct   5 11:35 point_add
drwxr-xr-x 3 root  root 4096 Oct   5 11:35 picorv32a
drwxr-xr-x 3 root  root 4096 Oct   5 11:35 ocs_blitter
drwxr-xr-x 3 root  root 4096 Oct   5 11:35 md5
drwxr-xr-x 3 root  root 4096 Oct   5 11:35 ldpcenc
```

```
drwxr-xr-x 3 root root 4096 Oct  5 11:35 PPU
drwxr-xr-x 3 root root 4096 Oct  5 11:35 point_scalar_mult
drwxr-xr-x 3 root root 4096 Oct  5 11:35 point_add
drwxr-xr-x 3 root root 4096 Oct  5 11:35 picorv32a
drwxr-xr-x 3 root root 4096 Oct  5 11:35 ocs_blitter
drwxr-xr-x 3 root root 4096 Oct  5 11:35 md5
drwxr-xr-x 3 root root 4096 Oct  5 11:35 ldpcenc
drwxr-xr-x 3 root root 4096 Oct  5 11:35 ldpc_decoder_802_3an
drwxr-xr-x 3 root root 4096 Oct  5 11:35 jpeg_encoder
drwxr-xr-x 3 root root 4096 Oct  5 11:35 genericfir
drwxr-xr-x 3 root root 4096 Oct  5 11:35 digital_pll
drwxr-xr-x 3 root root 4096 Oct  5 11:35 des3
drwxr-xr-x 3 root root 4096 Oct  5 11:35 des
drwxr-xr-x 3 root root 4096 Oct  5 11:35 cic_decimator
drwxr-xr-x 3 root root 4096 Oct  5 11:35 chacha
drwxr-xr-x 3 root root 4096 Oct  5 11:35 BM64
drwxr-xr-x 3 root root 4096 Oct  5 11:35 blabla
drwxr-xr-x 3 root root 4096 Oct  5 11:35 biriscv_tcm
drwxr-xr-x 3 root root 4096 Oct  5 11:35 biriscv
drwxr-xr-x 3 root root 4096 Oct  5 11:35 APU
drwxr-xr-x 3 root root 4096 Oct  5 11:35 ao68000
drwxr-xr-x 3 root root 4096 Oct  5 11:35 aes_core
drwxr-xr-x 3 root root 4096 Oct  5 11:35 aes_cipher
drwxr-xr-x 3 root root 4096 Oct  5 11:35 aes256b
drwxr-xr-x 3 root root 4096 Oct  5 11:35 aes256
drwxr-xr-x 3 root root 4096 Oct  5 11:35 aes192
drwxr-xr-x 3 root root 4096 Oct  5 11:35 aes128
drwxr-xr-x 3 root root 4096 Oct  5 11:35 aes
[root@ab9aa0bc9aa0 designs]# cd/work/tool
```

```
[root@ab9aa0bc9aa0 designs]# cd picorv32a
[root@ab9aa0bc9aa0 picorv32a]# ls -ltr
total 12
drwxr-xr-x 2 root root 4096 Oct  5 11:35 src
-rwxr-xr-x 1 root root  267 Oct  5 11:35 sky130A_sky130_fd_sc_hd_config.tcl
-rwxr-xr-x 1 root root  439 Oct  5 11:35 config.tcl
[root@ab9aa0bc9aa0 picorv32a]# cd src
[root@ab9aa0bc9aa0 src]# ls -ltr
total 96
-rw-r--r-- 1 root root 92423 Oct  5 11:35 picorv32a.v
-rw-r--r-- 1 root root    77 Oct  5 11:35 picorv32a.sdc
[root@ab9aa0bc9aa0 src]# cd ../
[root@ab9aa0bc9aa0 picorv32a]# less config.tcl
[root@ab9aa0bc9aa0 picorv32a]# ls -ltr
total 12
drwxr-xr-x 2 root root 4096 Oct  5 11:35 src
-rwxr-xr-x 1 root root  267 Oct  5 11:35 sky130A_sky130_fd_sc_hd_config.tcl
-rwxr-xr-x 1 root root  439 Oct  5 11:35 config.tcl
[root@ab9aa0bc9aa0 picorv32a]# 
```

```
# Design
set ::env(DESIGN_NAME) "picorv32a"

set ::env(VERILOG_FILES) "./designs/picorv32a/src/picorv32a.v"
set ::env(SDC_FILE) "./designs/picorv32a/src/picorv32a.sdc"

set ::env(CLOCK_PERIOD) "5.000"
set ::env(CLOCK_PORT) "clk"


set ::env(CLOCK_NET) $::env(CLOCK_PORT)



set filename $::env(OPENLANE_ROOT)/designs/$::env(DESIGN_NAME)/$::env(PDK)_$::env(PDK_VARIANT)_confi
g.tcl
if { [file exists $filename] == 1} {
        source $filename
}
config.tcl (END)
```

```
set ::env(GLB_RT_ADJUSTMENT) 0.1
set ::env(SYNTH_STRATEGY) 2

#Routing
set ::env(ROUTING_STRATEGY) 0
# Regression
set ::env(FP_CORE_UTIL) 50
set ::env(PL_TARGET_DENSITY) 0.60
set ::env(SYNTH_STRATEGY) 2
set ::env(SYNTH_MAX_FANOUT) 6
set ::env(CLOCK_PERIOD) "10.000"
```
sky130A_sky130_fd_sc_hd_config.tcl (END)

Terminal - @ab9aa0bc9aa0:~/Desktop/work/tools/openlane_working_dir/openLANE_flow

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@ab9aa0bc9aa0:~/Desktop/work/tools/openlane_working_dir/openLAN... ✖ | @ab9aa0bc9aa0:/openLANE_flow/designs/picorv32a   ✖

```
% prep -design picorv32a
[INFO]: Using design configuration at /openLANE_flow/designs/picorv32a/config.tcl
mergeLef.py : Merging LEFs
sky130_fd_sc_hd.lef: SITEs matched found: 0
sky130_fd_sc_hd.lef: MACROs matched found: 437
mergeLef.py : Merging LEFs complete
padLefMacro.py : Padding technology lef file
Derived SITE width (microns): 0.46
Derived SITE height (microns): 5.44
Right cell padding (microns): 3.68
Left cell padding (microns): 0.0
Top cell padding (microns): 0.0
Bottom cell padding (microns): 0.0
Skipping LEF padding for MACRO   sky130_fd_sc_hd__tap_2
Skipping LEF padding for MACRO   sky130_fd_sc_hd__tapvgnd2_1
Skipping LEF padding for MACRO   sky130_fd_sc_hd__fill_4
Skipping LEF padding for MACRO   sky130_fd_sc_hd__fill_8
Skipping LEF padding for MACRO   sky130_fd_sc_hd__decap_6
Skipping LEF padding for MACRO   sky130_fd_sc_hd__tapvgnd_1
Skipping LEF padding for MACRO   sky130_fd_sc_hd__decap_12
Skipping LEF padding for MACRO   sky130_fd_sc_hd__decap_3
Skipping LEF padding for MACRO   sky130_fd_sc_hd__tapvpwrvgnd_1
Skipping LEF padding for MACRO   sky130_fd_sc_hd__fill_2
Skipping LEF padding for MACRO   sky130_fd_sc_hd__decap_8
Skipping LEF padding for MACRO   sky130_fd_sc_hd__decap_4
Skipping LEF padding for MACRO   sky130_fd_sc_hd__fill_1
Skipping LEF padding for MACRO   sky130_fd_sc_hd__tap_1
padLefMacro.py : Finished
[INFO]: Preparation complete
```

```
[root@ab9aa0bc9aa0 src]# cd ../
[root@ab9aa0bc9aa0 picorv32a]# less config.tcl
[root@ab9aa0bc9aa0 picorv32a]# ls -ltr
total 12
drwxr-xr-x 2 root root 4096 Oct  5 11:35 src
-rwxr-xr-x 1 root root  267 Oct  5 11:35 sky130A_sky130_fd_sc_hd_config.tcl
-rwxr-xr-x 1 root root  439 Oct  5 11:35 config.tcl
[root@ab9aa0bc9aa0 picorv32a]# less config.tcl
[root@ab9aa0bc9aa0 picorv32a]# cd sky130A_sky130_fd_sc_hd_config.tcl
bash: cd: sky130A_sky130_fd_sc_hd_config.tcl: Not a directory
[root@ab9aa0bc9aa0 picorv32a]# cd ../
[root@ab9aa0bc9aa0 designs]# cd picorv32a
[root@ab9aa0bc9aa0 picorv32a]# less sky130A_sky130_fd_sc_hd_config.tcl
[root@ab9aa0bc9aa0 picorv32a]#
[root@ab9aa0bc9aa0 picorv32a]# cd ../../
[root@ab9aa0bc9aa0 openLANE_flow]# cd designs
[root@ab9aa0bc9aa0 designs]# cd picorv32a
[root@ab9aa0bc9aa0 picorv32a]# ls -ltr
total 12
drwxr-xr-x 2 root root 4096 Oct  5 11:35 src
-rwxr-xr-x 1 root root  267 Oct  5 11:35 sky130A_sky130_fd_sc_hd_config.tcl
-rwxr-xr-x 1 root root  439 Oct  5 11:35 config.tcl
[root@ab9aa0bc9aa0 picorv32a]# ls -ltr
total 16
drwxr-xr-x 2 root root 4096 Oct  5 11:35 src
-rwxr-xr-x 1 root root  267 Oct  5 11:35 sky130A_sky130_fd_sc_hd_config.tcl
-rwxr-xr-x 1 root root  439 Oct  5 11:35 config.tcl
drwxr-xr-x 3 root root 4096 Oct 16 13:55 runs
[root@ab9aa0bc9aa0 picorv32a]#
```

```
bash: cd: sky130A_sky130_fd_sc_hd_config.tcl: Not a directory
[root@ab9aa0bc9aa0 picorv32a]# cd ../
[root@ab9aa0bc9aa0 designs]# cd picorv32a
[root@ab9aa0bc9aa0 picorv32a]# less sky130A_sky130_fd_sc_hd_config.tcl
[root@ab9aa0bc9aa0 picorv32a]#
[root@ab9aa0bc9aa0 picorv32a]# cd ../../
[root@ab9aa0bc9aa0 openLANE_flow]# cd designs
[root@ab9aa0bc9aa0 designs]# cd picorv32a
[root@ab9aa0bc9aa0 picorv32a]# ls -ltr
total 12
drwxr-xr-x 2 root root 4096 Oct  5 11:35 src
-rwxr-xr-x 1 root root  267 Oct  5 11:35 sky130A_sky130_fd_sc_hd_config.tcl
-rwxr-xr-x 1 root root  439 Oct  5 11:35 config.tcl
[root@ab9aa0bc9aa0 picorv32a]# ls -ltr
total 16
drwxr-xr-x 2 root root 4096 Oct  5 11:35 src
-rwxr-xr-x 1 root root  267 Oct  5 11:35 sky130A_sky130_fd_sc_hd_config.tcl
-rwxr-xr-x 1 root root  439 Oct  5 11:35 config.tcl
drwxr-xr-x 3 root root 4096 Oct 16 13:55 runs
[root@ab9aa0bc9aa0 picorv32a]# cd runs
[root@ab9aa0bc9aa0 runs]# ls -ltr
total 4
drwxr-xr-x 6 root root 4096 Oct 16 13:55 16-10_13-55
[root@ab9aa0bc9aa0 runs]#
```

Applications Menu | Terminal - @ab9aa0bc9a... | 14:01

Terminal - @ab9aa0bc9aa0:/openLANE_flow/designs/picorv32a/runs/16-10_13-55/tmp

File   Edit   View   Terminal   Go   Help

@ab9aa0bc9aa0:~/Desktop/work/tools/openlane_working_dir/openLAN... | @ab9aa0bc9aa0:/openLANE_flow/designs/picorv32a/runs/16-10_13-55/...

```
[root@ab9aa0bc9aa0 runs]# ls -ltr
total 4
drwxr-xr-x 6 root root 4096 Oct 16 13:55 16-10_13-55
[root@ab9aa0bc9aa0 runs]# cd 16-10_13-55
[root@ab9aa0bc9aa0 16-10_13-55]# LS -LTR
bash: LS: command not found
[root@ab9aa0bc9aa0 16-10_13-55]# ls -ltr
total 24
-rw-r--r-- 1 root root  941 Oct 16 13:55 cmds.log
drwxr-xr-x 9 root root 4096 Oct 16 13:55 tmp
drwxr-xr-x 9 root root 4096 Oct 16 13:55 results
drwxr-xr-x 9 root root 4096 Oct 16 13:55 reports
drwxr-xr-x 9 root root 4096 Oct 16 13:55 logs
-rw-r--r-- 1 root root 2759 Oct 16 13:55 config.tcl
[root@ab9aa0bc9aa0 16-10_13-55]# cd tmp
[root@ab9aa0bc9aa0 tmp]# ls -ltr
total 5352
-rw-r--r-- 1 root root 1724161 Oct 16 13:55 merged.lef
-rw-r--r-- 1 root root 2165688 Oct 16 13:55 merged_unpadded.lef
-rw-r--r-- 1 root root 1555067 Oct 16 13:55 trimmed.lib
-rw-r--r-- 1 root root     201 Oct 16 13:55 tracks_copy.info
drwxr-xr-x 2 root root    4096 Oct 16 13:55 synthesis
drwxr-xr-x 2 root root    4096 Oct 16 13:55 floorplan
drwxr-xr-x 2 root root    4096 Oct 16 13:55 routing
drwxr-xr-x 2 root root    4096 Oct 16 13:55 placement
drwxr-xr-x 2 root root    4096 Oct 16 13:55 cts
drwxr-xr-x 2 root root    4096 Oct 16 13:55 magic
drwxr-xr-x 2 root root    4096 Oct 16 13:55 lvs
[root@ab9aa0bc9aa0 tmp]#
```

VERSION 5.7 ;

BUSBITCHARS "[]" ;
DIVIDERCHAR "/" ;

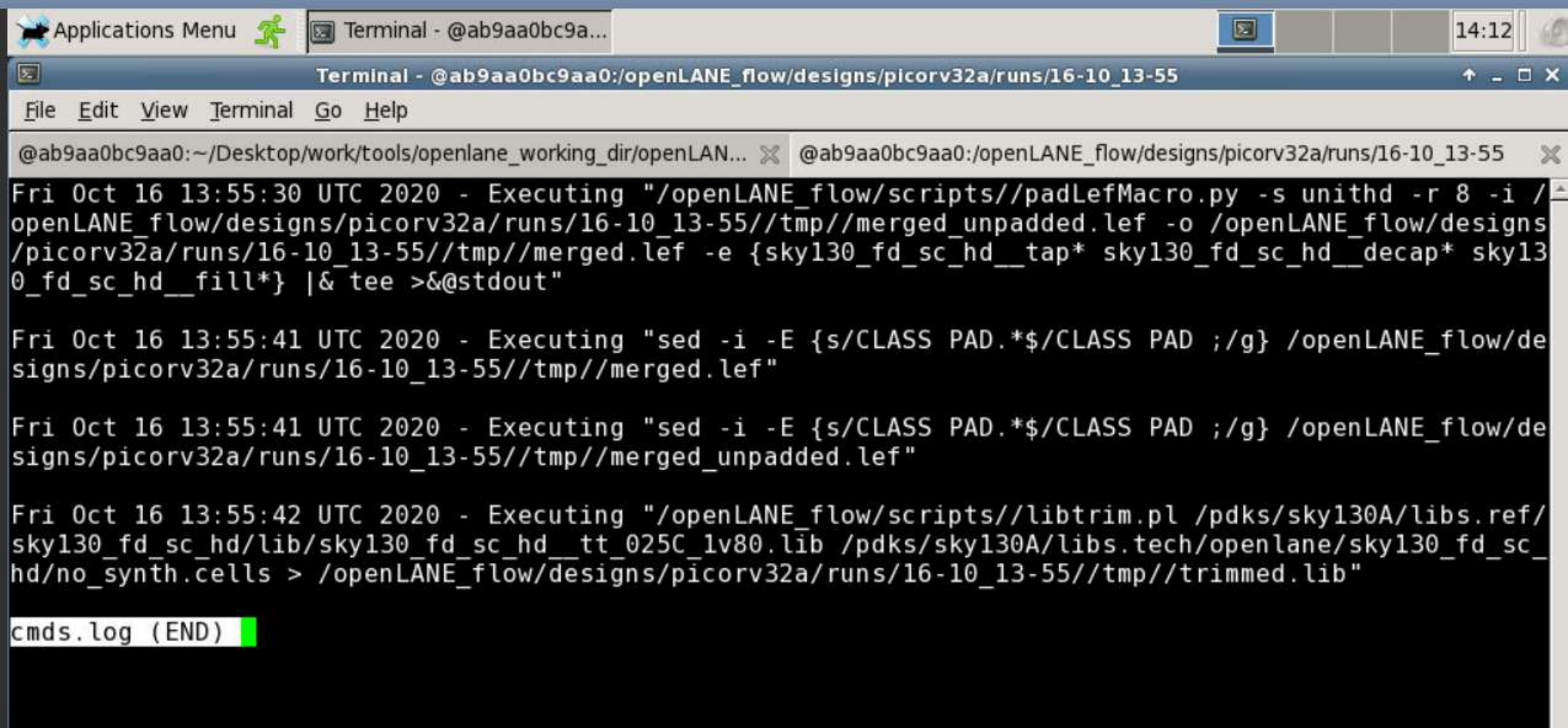UNITS
  TIME NANOSECONDS 1 ;
  CAPACITANCE PICOFARADS 1 ;
  RESISTANCE OHMS 1 ;
  DATABASE MICRONS 1000 ;
END UNITS

merged.lef

```
@ab9aa0bc9aa0:~/Desktop/work/tools/openlane_working_dir/openLAN...    @ab9
[root@ab9aa0bc9aa0 16-10_13-55]# ls -ltr
total 24
-rw-r--r-- 1 root root  941 Oct 16 13:55 cmds.log
drwxr-xr-x 9 root root 4096 Oct 16 13:55 tmp
drwxr-xr-x 9 root root 4096 Oct 16 13:55 results
drwxr-xr-x 9 root root 4096 Oct 16 13:55 reports
drwxr-xr-x 9 root root 4096 Oct 16 13:55 logs
-rw-r--r-- 1 root root 2759 Oct 16 13:55 config.tcl
[root@ab9aa0bc9aa0 16-10_13-55]# cd results
[root@ab9aa0bc9aa0 results]# ls -ltr
total 28
drwxr-xr-x 2 root root 4096 Oct 16 13:55 synthesis
drwxr-xr-x 2 root root 4096 Oct 16 13:55 floorplan
drwxr-xr-x 2 root root 4096 Oct 16 13:55 routing
drwxr-xr-x 2 root root 4096 Oct 16 13:55 placement
drwxr-xr-x 2 root root 4096 Oct 16 13:55 cts
drwxr-xr-x 2 root root 4096 Oct 16 13:55 magic
drwxr-xr-x 2 root root 4096 Oct 16 13:55 lvs
[root@ab9aa0bc9aa0 results]# cd synthesis
[root@ab9aa0bc9aa0 synthesis]# ls
[root@ab9aa0bc9aa0 synthesis]# cd ../
[root@ab9aa0bc9aa0 results]#
```

```
@ab9aa0bc9aa0:~/Desktop/work/tools/openlane_working_dir/openLAN... ✕    @ab

drwxr-xr-x 9 root root 4096 Oct 16 13:55 results
drwxr-xr-x 9 root root 4096 Oct 16 13:55 reports
drwxr-xr-x 9 root root 4096 Oct 16 13:55 logs
-rw-r--r-- 1 root root 2759 Oct 16 13:55 config.tcl
[root@ab9aa0bc9aa0 16-10_13-55]# cd results
[root@ab9aa0bc9aa0 results]# ls -ltr
total 28
drwxr-xr-x 2 root root 4096 Oct 16 13:55 synthesis
drwxr-xr-x 2 root root 4096 Oct 16 13:55 floorplan
drwxr-xr-x 2 root root 4096 Oct 16 13:55 routing
drwxr-xr-x 2 root root 4096 Oct 16 13:55 placement
drwxr-xr-x 2 root root 4096 Oct 16 13:55 cts
drwxr-xr-x 2 root root 4096 Oct 16 13:55 magic
drwxr-xr-x 2 root root 4096 Oct 16 13:55 lvs
[root@ab9aa0bc9aa0 results]# cd synthesis
[root@ab9aa0bc9aa0 synthesis]# ls
[root@ab9aa0bc9aa0 synthesis]# cd ../
[root@ab9aa0bc9aa0 results]# cd ../
[root@ab9aa0bc9aa0 16-10_13-55]# cd reports
[root@ab9aa0bc9aa0 reports]# ls -ltr
total 28
drwxr-xr-x 2 root root 4096 Oct 16 13:55 synthesis
drwxr-xr-x 2 root root 4096 Oct 16 13:55 floorplan
drwxr-xr-x 2 root root 4096 Oct 16 13:55 routing
drwxr-xr-x 2 root root 4096 Oct 16 13:55 placement
drwxr-xr-x 2 root root 4096 Oct 16 13:55 cts
drwxr-xr-x 2 root root 4096 Oct 16 13:55 magic
drwxr-xr-x 2 root root 4096 Oct 16 13:55 lvs
[root@ab9aa0bc9aa0 reports]#
```

File   Edit   View   Terminal   Go   Help

@ab9aa0bc9aa0:~/Desktop/work/tools/openlane_working_dir/openLAN...   @ab9aa0bc9aa0:/openLANE_flow/designs/picorv32a/runs/16-10_13-55

```
Fri Oct 16 13:55:30 UTC 2020 - Executing "/openLANE_flow/scripts//padLefMacro.py -s unithd -r 8 -i /
openLANE_flow/designs/picorv32a/runs/16-10_13-55//tmp//merged_unpadded.lef -o /openLANE_flow/designs
/picorv32a/runs/16-10_13-55//tmp//merged.lef -e {sky130_fd_sc_hd__tap* sky130_fd_sc_hd__decap* sky13
0_fd_sc_hd__fill*} |& tee >&@stdout"

Fri Oct 16 13:55:41 UTC 2020 - Executing "sed -i -E {s/CLASS PAD.*$/CLASS PAD ;/g} /openLANE_flow/de
signs/picorv32a/runs/16-10_13-55//tmp//merged.lef"

Fri Oct 16 13:55:41 UTC 2020 - Executing "sed -i -E {s/CLASS PAD.*$/CLASS PAD ;/g} /openLANE_flow/de
signs/picorv32a/runs/16-10_13-55//tmp//merged_unpadded.lef"

Fri Oct 16 13:55:42 UTC 2020 - Executing "/openLANE_flow/scripts//libtrim.pl /pdks/sky130A/libs.ref/
sky130_fd_sc_hd/lib/sky130_fd_sc_hd__tt_025C_1v80.lib /pdks/sky130A/libs.tech/openlane/sky130_fd_sc_
hd/no_synth.cells > /openLANE_flow/designs/picorv32a/runs/16-10_13-55//tmp//trimmed.lib"

cmds.log (END)
```

Applications Menu   Terminal - @ab9aa0bc9a...   14:14

Terminal - @ab9aa0bc9aa0:/openLANE_flow/designs/picorv32a/runs/16-10_13-55

File   Edit   View   Terminal   Go   Help

@ab9aa0bc9aa0:~/Desktop/work/tools/openlane_working_dir/openLAN...   @ab9aa0bc9aa0:/openLANE_flow/designs/picorv32a/runs/16-10_13-55

```
# General config
set ::env(PDK) sky130A
set ::env(PDK_VARIANT) sky130_fd_sc_hd
set ::env(PDK_ROOT) /pdks
set ::env(CELL_PAD) 8
set ::env(MERGED_LEF) /openLANE_flow/designs/picorv32a/runs/16-10_13-55//tmp//merged.lef
set ::env(MERGED_LEF_UNPADDED) /openLANE_flow/designs/picorv32a/runs/16-10_13-55//tmp//merged_unpadd
ed.lef
set ::env(TRACKS_INFO_FILE) /openLANE_flow/designs/picorv32a/runs/16-10_13-55//tmp//tracks_copy.info
set ::env(TECH_LEF) /pdks/sky130A/libs.ref/sky130_fd_sc_hd/techlef/sky130_fd_sc_hd.tlef
# Design config
set ::env(CLOCK_PERIOD) 10.000
# Synthesis config
set ::env(LIB_SYNTH) /openLANE_flow/designs/picorv32a/runs/16-10_13-55//tmp//trimmed.lib
set ::env(LIB_SYNTH_COMPLETE) /pdks/sky130A/libs.ref/sky130_fd_sc_hd/lib/sky130_fd_sc_hd__tt_025C_1v
80.lib
set ::env(SYNTH_DRIVING_CELL) sky130_fd_sc_hd__inv_8
set ::env(SYNTH_CAP_LOAD) 17.65
set ::env(SYNTH_MAX_FANOUT) 6
set ::env(SYNTH_NO_FLAT) 0
set ::env(SYNTH_MAX_TRAN) [expr {0.1*10.000}]
set ::env(LIB_MIN) /pdks/sky130A/libs.ref/sky130_fd_sc_hd/lib/sky130_fd_sc_hd__ss_100C_1v60.lib
set ::env(LIB_MAX) /pdks/sky130A/libs.ref/sky130_fd_sc_hd/lib/sky130_fd_sc_hd__ff_n40C_1v95.lib
set ::env(LIB_TYPICAL) /pdks/sky130A/libs.ref/sky130_fd_sc_hd/lib/sky130_fd_sc_hd__tt_025C_1v80.lib
set ::env(SYNTH_SCRIPT) /openLANE_flow/scripts//synth.tcl
set ::env(SYNTH_STRATEGY) 2
set ::env(CLOCK_BUFFER_FANOUT) 16
# Floorplan config
config.tcl
```

Applications Menu   Terminal - @ab9aa0bc9a...   14:17

Terminal - @ab9aa0bc9aa0:~/Desktop/work/tools/openlane_working_dir/openLANE_flow   ↑ _ □ X

File   Edit   View   Terminal   Go   Help

@ab9aa0bc9aa0:~/Desktop/work/tools/openlane_working_dir/openLAN...   @ab9aa0bc9aa0:/openLANE_flow/designs/picorv32a/runs/16-10_13-55

```
                    0.04      0.00      8.35 v  _24120_/B (sky130_fd_sc_hd__or2_4)
                    0.04      0.15      8.50 v  _24120_/X (sky130_fd_sc_hd__or2_4)
        3    0.01                               _03081_ (net)
                    0.04      0.00      8.50 v  _24123_/B (sky130_fd_sc_hd__and2_4)
                    0.03      0.11      8.61 v  _24123_/X (sky130_fd_sc_hd__and2_4)
        1    0.01                               _03083_ (net)
                    0.03      0.00      8.61 v  _24125_/B (sky130_fd_sc_hd__nor3_4)
                    0.08      0.09      8.70 ^  _24125_/Y (sky130_fd_sc_hd__nor3_4)
        1    0.00                               _00063_ (net)
                    0.08      0.00      8.70 ^  _31530_/D (sky130_fd_sc_hd__dfxtp_4)
                                        8.70     data arrival time

                    0.00     10.00     10.00     clock clk (rise edge)
                             0.00      10.00     clock network delay (ideal)
                             0.00      10.00     clock reconvergence pessimism
                                       10.00 ^  _31530_/CLK (sky130_fd_sc_hd__dfxtp_4)
                             -0.04      9.96     library setup time
                                        9.96     data required time
        -------------------------------------------------------------------------------
                                        9.96     data required time
                                       -8.70     data arrival time
        -------------------------------------------------------------------------------
                                        1.27     slack (MET)


tns 0.00
wns 0.00
[INFO]: Synthesis was successful
%
```