Steps to Run pnrInnovus

1. git clone git@github.com:stineje/SKY130_Cadence.git

2. Set up PDK:

   (a) Configure git by signing into `https://foss-eda-tools.googlesource.com/new-password`

   (b) git submodule update –init sky130_osu_sc_t18

3. Run synthesis using Cadence Genus or Synopsys DC

   - Synthesis for CDS Genus

     (a) cd synthGenus

     (b) Add HDL to hdl subdirectory

     (c) Edit genus_script.tcl to load in correct SV files

     (d) Also modify genus_script.tcl to add the timing needed any loading or input/output delays. There are also options for loading that can be changed. Right now, a FF is assumed to be at the beginning and end of the timing to constrain the timing properly. Constraint settings are found within the constraints_top.sdc file

     (e) make synth

     (f) All output is logged to synth.out that should be checked on completion. Reports are found within the reports directory and any mapped HDL is found in the top directory.

4. Place-and-Route with Cadence Innovus

   (a) Edit setup.tcl and change the design, netlist, and sdc location. These can be found by searching for mult_seq in a text editor. These items should match the files done through synthesis.

   (b) innovus_config.tcl has plugins that allow commands to be run when needed. Right now, some plugins are enabled and some are not. This file would have be edited if one would want to do an additional command. These commands can be done before or after a step – e.g., pre_init or post_init.

   (c) To start the process, a Makefile is used. Type the following in this order: init, place, cts, postcts_hold, route, postroute, signoff. For example, you could type, make init to run through a design for the init phase. If one would want to just run through route, just type make route and the scripts should run through all the scripts until the end of route provided the other steps have not been initiated. This, of course, is provided there are no errors.

(d) Any commands run through the pnr are in the LOG subdirectory. There is one file that lists the commands (i.e., cmd) and the other that lists output from the command or the log files (i.e., .log). Reports are found in the RPT subdirectory.

(e) To pull up a placed-and-routed design from the route stage , start innovus and type: restoreDesign DBS/route.enc.dat/ mult_seq. It is important that the last argument be the top-level design indicated during the synthesis stage.