

Getting Started with Cadence at UNL-CSE

This handout points out the differences in the setup at UNL-CSE from that at Harvey-Mudd. The instructions in the Lab handouts provided by David Harris apply to the Harvey-Mudd setup, hence cannot be used verbatim to finish these labs. This handout tells you all the changes you need to be aware of for completing Lab 1.

You must have X11 installed on your computer. Macs already have X11; Windows machines may have to download and install it.

1. Log in to Cherokee on campus using:
 - `ssh -Y cherokee.unl.edu -l <Your cse login name>`
 - Password: `<Your cse password>`
2. Copy `.cshrc` to your home directory and source it:
 - `cp /.cshrc .`
 - `source .cshrc`
3. Copy `cds.lib` file to your home directory (it defines the libraries accessible to you in Cadence)
 - `cp /opt/home/balkir/cds.lib .`
4. Text edit the last line of the above file to reflect your own absolute home path (you can obtain it by the `pwd` command of Unix in your home directory) before the "mudd/Worklib". For example in my `cds.lib` file the last line is as follows:
 - `/export/fac/seth/mudd/WorkLib`
5. Create a directory named "mudd" in your home directory ("`mkdir mudd`" command) and change your locus to this directory ("`cd mudd`" command). This will be the directory for storing the cadence designs. It is the equivalent of "`~/IC_CAD/cadence`" directory the author used on page 2 of Lab1 handout. We use simply "mudd" instead, so here is the first deviation from the labs instructions.
6. Now copy the following files from `/opt/home/balkir/mudd` to your own mudd directory, using the `cp` command repeatedly as in Step 3.
 - `.cdsenv`
 - `.cdsinit`
 - `.simrc`
 - `cds.lib`
 - `mudd.rc`
7. Once this is done, you will need to run "`source mudd.rc`" command for the Cadence environment to be established each time you log into Cherokee for using Cadence tools.

If you want to avoid having to do this each time, you can also include the command “source mudd/mudd.rc” as the last line in your .cshrc file in your home directory.

8. At this point you can start using Cadence by issuing the command: “icfb &”. (That is, in contrast to what is stated in the Lab 1 handout, the Cadence working directory is “~/mudd” as opposed to “~/IC_CAD/cadence” and “icfb” replaces the “cad-ncsu” command.)
9. Now on to copying lab files, as on page 6 of the Lab 1 handout. Again, there is a difference in our environment. The “/courses/e158/10/” path is changed to “/doppler/cadence/mudd_labs/lab1”.
10. Similarly, the simulator command “sim-nc” on bottom of page 6 in the handout is replaced by “ncverilog”. The GUI option of this command, which you might prefer after some experience, is: “ncverilog +gui +access+r nand2.sv”.

These instructions suffice for you to follow the Lab 1 instructions. There are a few additional differences for Lab 2 that will be added to this document later on.

Lab 2:

11. On p. 2, middle of the page, the directory path for the three files to be copied should be changed from: /courses/e158/10/lab2 to **/doppler/cadence/mudd_labs/lab2**. In addition to the three files indicated, be sure to copy also HMC_Sheets_8ths from the same directory.
12. Include in your mudd.rc file the following line, if it does not already have it:

```
setenv CDS_Netlisting_Mode Analog
```

Lab 3:

Note that this lab will not be exactly duplicated because (a) we will be using a Cadence synthesis tool instead of Synopsys’ in Section III and (b) specific versions of Cadence utilities used may differ from one school to another. Therefore, unlike the previous labs, the deviations from the lab handout provided by the textbook author are substantial. These are indicated in two ways: by edit marks on the pdf file of the Lab3.pdf handout and by substitute steps indicated below.

Section III (Synthesis)

13. Copy and replace the old mudd.rc in your home directory with the new one using the following command:

```
cp /Zoppler/cadence/mudd_labs/mudd.rc ~/.
```

This file updates the old mudd.rc by including a pointer to the Cadence’s RTL compiler, which we will use instead of the Synopsys’ compiler mentioned in the handout.

14. Ignore all Synopsys related instructions in the Lab 3 handout.

15. Create the new directory named “synth” under your mudd (and not IC_CAD as in the handout) directory by using the command:

```
mkdir ~/mudd/synth
```

16. We use a new .tcl script for invoking the Cadence RTL compiler to the directory “synth”:

```
cp /doppler/cadence/mudd_labs/lab3/Start.tcl ~/mudd/synth/
```

17. Also copy the “mips.sv” file from Lab 2 to the directory ~/mudd/synth/.

18. Change to the directory “synth” and invoke the Cadence’s RTL compiler by typing the command “rc” from the command line. After a few moments, you will be in the system prompt of the Cadence RTL compiler, which looks like “rc1>”.

19. From this prompt (under the newly formed “synth” directory), type the command:

```
source Start.tcl
```

This will invoke the RTL-to-logic synthesis of the design description in “mips.sv”.

20. Once successfully executed, the RTL compiler will produce two important files that are mentioned in the last paragraph of Section III of the handout. The .v file is the structural Verilog netlist which is synthesized by the RTL compiler and the .sdc is the timing constraint file for the place and route.

Section IV (Place & Route)

21. Follow the instructions in the “lab3-changes.pdf” document, linked to the class web page to run Encounter. The rest of the flow in pages 5 and 6, until Section V, should work correctly. The Lab 3 handout has been edited with PDF markings to reflect the changes.

Section V (Importing the synthesized controller into Virtuoso)

22. Follow the instructions in the “lab3-changes.pdf” document, linked to the class web page. The Lab 3 handout has been edited with PDF markings to reflect the changes.