

# Chapter 01 - Server, Login, Shell - TRAINING - Common

Course authors (Git file)



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# Server and user credentials

The PC environment for the course will be provided by IHP.

- Your PC in front of you must be connected to a server
- You will then work in a Ubuntu 24 Linux system
- The desktop GUI will be Gnome



## Connect to the IHP server

### Follow these steps:

- 1 Open ThinLinc on the host PC (Windows?)
- 2 Go to the Options and set “Fullscreen on this monitor”
- 3 Connect with the login data, given to you by IHP
- 4 Ubuntu with Gnome desktop should start in ThinLinc

### For Log out:

- 1 Just “Log out”. Don’t Power Off.
- 2 This will take you back to the host system.

### Notice:

- Please ask if there is questions!
- We’ll try to do this for all participants first, before proceeding to the next steps of the training.

# Search, start and close programs

## Create and save a textfile:

- 1 Search for a texteditor (gedit)
- 2 Open gedit
- 3 Write a litte (your name or anything else)
- 4 Save the textfile with a name and the suffix .txt
- 5 To a new dirctory: Documents/myfiles
- 6 Close the texteditor (gedit)



# Tab-switching between programs

## Tab-switch between opened programs:

- 1 Search and open at least three different programs (office, gedit, document viewer?)
- 2 Tab between the programs (with ALT+TAB on the keyboard)
- 3 It is a circle. After three Tabs you should be at the first again.
- 4 Close all programs



# Download and unpack

## Get the course data

- Get the latest release download package:

<https://github.com/OS-EDA/Course/releases>

- Create a directory for the course slides.
- In Linux the ~/Documents is a good place to create the directory. Maybe create the directory Documents/course
- Unpack the course into this directory.



# Look around in the course data

The screenshot shows a GitHub repository named 'ThorKn' with a README slide update. The repository has 161 commits and was last updated 1 hour ago. The directory structure is as follows:

File/Folder	Commit Message	Time Ago
.github/workflows	switch to pandoc:extra	3 months ago
Chapter_00_Preparations	c01 components icons	3 months ago
Chapter_01_Introduction	q8 links	3 days ago
Chapter_02_OpenROAD_tools	q8 links	3 days ago
Chapter_03_Verilog	q8 links	3 days ago
Chapter_04_OpenROAD_first_run	q8 links	3 days ago
Chapter_05_PDK	q8 links	3 days ago
Chapter_06_OpenROAD_gui	q6 training+	12 hours ago
Chapter_07_OpenROAD_flow_scripts	q6 lecture ready	12 hours ago
Chapter_08_Tapeout	q8 ready	18 hours ago
build	q6 training+	12 hours ago
icons	pandoc pic resize fixed	3 months ago
pandoc/templates	structure and content update	3 days ago
pics	structure and content update	3 days ago
LICENSE	Initial commit	last year
README.md	README slide update	1 hour ago
authors.md	structure and content update	3 days ago
generate_slides.sh	q6 lecture ready	12 hours ago

On the right side of the repository page, there is an 'About' section with the following information:

- Home of the open-source EDA course.
- Readme
- Apache-2.0 license
- Activity
- Custom properties
- 27 stars
- 9 watching
- 7 forks
- Report repository

Below the 'About' section, there are sections for 'Releases' (1 tag, Create a new release) and 'Packages' (No packages published, Publish your first package). At the bottom, there is a 'Languages' section showing 'Shell' at 100.0%.

Figure 1: Course directory structure



# The chapters and slides

You will find the slides in the build directory.

- If sorted alphabetical, it makes most sense.
- COX is the chapter number.
- In each chapter:
  - Start with the lecture
  - Cheasheet (if available) is a single slide
  - Trainings in the order commcon, advanced and bonus
  - Questions are for the next day (mornings)

## Task:

- Examine the build directory.
- Open and close some of the pdf files.
- Become comfortable with the course structure.

## Links from the slides

This might be outdated for the course, please try yourself.

- An issue with the linux document viewer and snap browsers.
- Links from slides don't open in the browser.

Possible workaround:

- Right click the link and copy
- Open browser
- Paste link to URL line



# Workspace arrangement

## Suggestions or Options:

- Arrange windows next to each other
- ALT+TAB between programs (tasks)
- Close unwanted windows after the completion of a chapter



## Short command list of a linux shell

- `ls` (list content of directory)
- `ls -al` (list with option for more information)
- `cd directoryname` (change to directory)
- `cd ..` (change to upper directory)
- `mkdir` (make directory)
- `touch` (make file)
- `mv` (move)
- `cp` (copy)
- `nano` (opens the nano file editor)



# Man pages

If unsure how to use a command, read the man-page:

```
1 | man <command>
```

## Task:

- Open the man pages of all the commands in the above list (last slide)
- Find the syntax for the commands (it is given on the top of the man page)
- What are OPTION, SOURCE and DEST ?
- Find the definition of the option `-al` for the command `ls`



# IMPORTANT Tasks

To get ready for working with the open-source EDA tools, you must run (execute) a shell script in your shell terminal.

**This is absolutely necessary for the rest of the course**

There are two options to do this:

- 1 Every time you open a shell and want to work with the tools
- 2 Once in the bashrc



## Option 1: Source every time in the shell

### Task: Setup the linux tool environment

- Open a shell terminal
- Run `source /eda/or2/env.sh`
- Do this every time you open a new shell.
- It doesn't hurt if you do it multiple times. Nothing breaks.
- It will lead to strange behaviour and not results if it is not done.

You should get a message like `copied flow directory` or `flow directory already there`



## Option 2: Source in the bashrc

### Task: Modify .bashrc with source command

- Open the file .bashrc in a texteditor. (.bashrc is in your home directory)
- At the bottom line, add the command `source /eda/or2/env.sh`
- Save the file and close the editor
- In a shell terminal: reload bashrc with the command `. ~/.bashrc`

You should get a message like `copied flow directory` or `flow directory already there`





# Check the environment

- Check if the setup was successful.
- **Don't continue if the following checks are erroneous, but ask for help from the trainer**

## Task: Check the environment

- Open a shell terminal
- Run `source /eda/or2/env.sh`
- See if the tools are sourced (available) with getting their versions:
  - `openroad -version` should give you the version number
  - `yosys --version` should give you the version number
  - `klayout -v` should give you the version number



# Congratulations!

## Congratulations:

**You have succesfully run some of the open-source EDA tools on a linux server.**

- You did run openroad, yosys and klayout.
- They did not do much, but giving you their version numbers.
- But it is the needed base for the rest of the course.

**You are on a good way**



# Linux Power settings

By default the screen goes black after 5 minutes of idle. Additionally the screen locks and you have to enter your password again.

This is good and intended. But might be a little too annoying for the course.

## Task: Disable screen black out

- Find the linux “power settings”
- Disable the “screen black after 5 mins” or higher the value.



# Flow directory

The last step (the important one) created a directory in your linux home directory:

- The flow directory

This is the most important directory for the course!



# Examine the flow directory

## Task: Examine the flow directory

- Open a shell terminal
- Run `source /eda/or2/env.sh`
- Navigate to the flow directory as you learned before
- List the content with `ls -al`
- Find:
  - The Makefile
  - The `/flow/designs/src` directory. What is inside?
  - The `flow/designs/ihp-sg13g2` directory. What is inside?



# The Makefile

## Task: Open the Makefile

- Open the Makefile in a texteditor (with gedit)
- What is inside the Makefile?
- What could be the meaning of
  - `DESIGN_CONFIG=....`
  - `#DESIGN_CONFIG=-----`
- Close texteditor without changes in the Makefile



# Online shell tutorial

To learn some Linux shell, you should find a tutorial that matches good to you.  
I found this one simple and good to follow for me while learning Linux shell:

<https://community.linuxmint.com/tutorial/view/100>



# Makefile

OpenROAD flow scripts use Makefiles. So you might want to learn some basics about Makefiles.

Again here is the tutorial that has helped me most:

<https://makefiletutorial.com/>





# Tips and tricks

- shell: TAB for autocompletion
- shell: 2xTAB for all choices of autocompletion
- Open a new shell terminal with the mouse:
  - Right click on an empty space in the directory window
  - Choose “open in Terminal”

