

SDR Notes

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1 Introduction

Hello! My name is Luke Ragan. At the time of this writing, I am a senior electrical engineering student at Liberty University. I am writing these notes to document the approach that I have taken to set up Dr. Bae's software defined radios (SDR). It is my hope that this guide will help future researchers to go further and achieve more. If at any point, you have questions about my work please feel free to send me an email at LARagan1@liberty.edu. Without further ado, please enjoy!

2 Setting up the Laptops

The first step in this process has been to set up the Lenovo T410 Thinkpads that belong to Dr. Bae. These machines have had Ubuntu 24.04.02 installed on them. This procedure was fairly straightforward, and one could easily repeat this by result by navigating to ubuntu downloads and following the instructions.

The next steps were to install GNU Radio, visual studio code, and latex on the laptops. To install GNU Radio follow the instructions at the link below.

<https://wiki.gnuradio.org/index.php?title=InstallingGR>

To install visual studio code, please use the app center included on the ubuntu machine.

To install LaTeX, please follow the instructions at the link below.

<https://github.com/James-Yu/LaTeX-Workshop/wiki/Install>

Please note, I used TinyTeX as the LaTeX distribution on this laptop.

Resources for how to use LaTeX can be found at the following addresses.

- https://www.overleaf.com/learn/latex/Learn_LaTeX_in_30_minutes
- <https://www.learnlatex.org/en/>
- <https://ctan.math.illinois.edu/info/lshort/english/lshort.pdf>

3 GNU Radio Tutorials

I have begun my learning exercises for SDR by going through the tutorials for GNU Radio [here](#). All of these tutorials are fairly self-explanatory. Additionally, the initial tutorials even cover how to launch GNU radio companion.

4 Ettus Research Tutorial

In addition to the GNU Radio Tutorials, I also started a starter course that Ettus Research has published at [this site](#).

Note: On page 100, there are a couple things that should be corrected.

1. python-mako should be python3-mako instead
2. python-docutils should be python3-docutils instead
3. The third line should be corrected to git clone `https://github.com/EttusResearch/uhd.git`
4. Many of the commands need sudo to work
5. You should probably run "sudo apt upgrade" before the cmake process
6. Instead of using `release003009005` as they suggested, I just made a new branch. I used " `sudo git checkout -b LARagan1/customBranch`

Notice that the ethernet connection of the laptop needs to be set to 192.168.10.1 with a net mask of 255.255.255.0

As I am writing this, I have not done so since I need Wi-Fi connectivity.