Virtual Machine for CAS 741 and Drasil

Spencer Smith

September 13, 2020

This document summarizes the steps for setting up a software development environment for use in CAS 741. Instructions are also give for forking Drasil. A virtual machine is used so that the set-up will not interfere with your native machine. Besides the benefit of not creating problems on the native machine, starting from a clean slate means that the steps presented do not have to worry about headaches caused by existing software and libraries. The steps are given rather than simply creating a full image for your use (such as with Docker), since reproducing the installation provides a greater opportunity for learning.

The steps emphasize command line (terminal) interaction, rather than using a GUI. The advantage of using the command line is that it can provide a deeper understanding of what is actually happening on your machine.

Working at the command line requires understanding directories (folders), files, commands, permissions, etc. If you need to improve your background in these topics, you may find the following links useful:

- `https://ubuntu.com/tutorials/command-line-for-beginners#1-overview`
- `https://maker.pro/linux/tutorial/basic-linux-commands-for-beginners`
- `https://ryanstutorials.net/linuxtutorial/`
- `http://swcarpentry.github.io/shell-novice/`

To create a virtual machine, install typical software development tools, and fork Drasil, follow these steps:

1. Install a virtualization environment to create an environment that exists as software emulation, but appears as bare metal hardware to other applications.
    - VirtualBox is recommended: https://www.virtualbox.org/

2. Install the Linux guest operating system inside the VirtualBox virtual environment using Machine/New, as described in the manual. The following options are recommended:
   - Name: whatever you prefer (cas741?)
   - Machine Folder: where you prefer (default is probably fine)
   - Type: Linux
   - Version: Ubuntu (64-bit)
   - Memory size: 2 Gig (2048 MB)
   - Hard disk file type: VDI (VirtualBox Disk Image)
   - Storage on physical hard disk: dynamically allocated
   - Hard drive size: 30 GBytes
3. Download the iso image for your Linux distribution. Recommend Bodhi Linux (`https://www.bodhilinux.com/download/`). The Standard release is fine.
4. Start the VM (The Green arrow in the top bar of VirtualBox)
5. Select the iso image for your Linux distribution, click start
6. Select "Install Bodhi Linux"
7. Follow installation steps. You can generally go with the suggested defaults. One potential addition is under "Updates and other software", where you may want to select "Install third-party software for graphics and wi-fi hardware".
8. Update the OS by typing the following in a terminal `sudo apt update && sudo apt dist-upgrade` (When prompted, select Y for updating the files (instead of the default N))
9. To enable copying between your virtual machine and your native machine, install Guest Additions: (How to Install VirtualBox Guest Additions)
10. Follow the instructions from the web-page above to enable copy and paste through VirtualBox How to Enable Copy and Paste in Oracle VirtulaBox
11. At this point you may want to change the screen resolution on your virtual linux box. You can do this with the xrandr
12. Install git: `sudo apt install git`

13. Install LaTeX: `sudo apt install texlive-latex-extra`

14. Install doxygen: `sudo apt-get install doxygen`

15. Install dot (for doxygen): `sudo apt-get install graphviz`

16. Install Java Runtime Environment (JRE): `sudo apt install default-jre`

17. Install Java Development Kit (JDL): `sudo apt install default-jdk`

18. You will need a text editor for LaTeX and for source code. A popular option is Sublime text, which can be installed following these instructions.

19. Instructions for setting up Sublime for LaTeX are here. Part of the instructions request installation of Evince for a document viewer. You can use the Bodhi App-Centre to install Evince.

20. Decide on a home for your repos. For instance, you could create a folder name `Repos`. You can create a folder using `mkdir`.

21. In your Repos folder, clone the course repo:
    `git clone https://gitlab.cas.mcmaster.ca/smiths/cas741.git`

22. For those doing the Drasil version, fork the Drasil repo, by clicking on the fork option in the upper right hand corner.

23. In your Repos folder, clone your forked version of Drasil:
    `git clone https://github.com/[your account here]/Drasil.git`

24. Install Stack following these Installation Instructions. This will likely involve installing `curl` via `sudo apt install curl`

25. Run Drasil by following the quick start instructions at https://github.com/JacquesCarette/Drasil (It will take a long time the first time.)

26. The Drasil repo has Continuous Integration (CI) set-up through Travis. To enable CI on your forked repo, follow the Travis CI Tutorial