Setting up the Environment

Lab 0

Spring 2022

1 Setting up Anaconda for ECE 351

1.1 Purpose

This lab goes through the necessary steps for installing the software students will need to successfully complete this class.

1.2 Overview

For the lab this semester, students will be using Python3.x on their own computers. (If you do not own a computer, discuss possible options with the TA. You may need to get Anaconda set up on a computer in the lab). There are a number of ways to set up Python, but one of the more straightforward methods (for the nature of work done in this lab) will be to download an Anaconda distribution of Python 3.x. Python and Anaconda, along with all included packages, are completely free. Included in an Anaconda distribution are the following:

- Python 3.x
- Spyder (used for writing all python code in this class)
- Anaconda prompt (used for installing and updating anaconda packages)
- Packages useful in this course such as scipy, math, and numpy...

The `control` package is not included in the Anaconda distribution, but will be used in this class. Setup instructions are included in this lab handout.

1.3 Anaconda

1.3.1 Installation

1. To install an Anaconda distribution package go to the following link:
   https://www.anaconda.com/download/
2. Select your operating system (i.e. Windows, MacOS, or Linux). For MacOS use this link specifically: https://docs.anaconda.com/anaconda/install/mac-os/
   Download the Python 3.x version. This is a fairly large program, so you will need a few GB of free space on your hard drive. It will take some time.

- If you have any questions about Anaconda or what is included in the download, there are some excellent resources at the bottom of the download page.

1.3.2 Verifying Successful Installation

1. Open the Anaconda Navigator application/program.
2. Open Spyder.
3. Once Spyder opens run a script with the default settings.
4. Save the script in a convenient directory (Spyder only saves when the code is run, so its a very good habit to save early and save often).
5. In Spyder type and run the following code:

```
import numpy
import matplotlib.pyplot
import scipy
```

   - To run the code click run on the toolbar or press `F5`

6. No errors should occur. If an error does occur contact your TA.

1.4 Control Package

1.4.1 Windows 10

1. Open the Anaconda prompt
2. Run the command: `pip install control`
   - This will bring up a list of Anaconda packages to upgrade/downgrade and install, requesting your confirmation.
   - Check to make sure nothing outside of the Anaconda environment are going to be modified.
3. Confirm, and the installation should commence and take some time to complete
4. The installation should now be complete.

1.4.2 MacOS

1. Open your command line utility (i.e. Terminal, Command Prompt, etc.).
2. Run the command: `conda install -c conda-forge control`
   - This will bring up a list of Anaconda packages to upgrade/downgrade and install, requesting your confirmation.
   - Check to make sure nothing outside of the Anaconda environment are going to be modified.

3. Confirm, and the installation should commence and take some time to complete
4. The installation should now be complete.
5. Run the command: `conda update --all`

1.4.3 Verifying Successful Installation

1. Open the Anaconda Navigator application/program.
2. Open Spyder.
3. Once Spyder opens run a script with the default settings.
4. Save the script in a convenient directory.
5. In Spyder type and run the following code:

```
import numpy
import matplotlib.pyplot
import scipy
import control
import pandas
```

6. No errors should occur. If an error does occur contact your TA.

1.5 GitHub

Sign up for a free GitHub account following the onscreen prompts at https://github.com. Choose any username you want, but keep in mind that the outcome for this course is to create a portfolio of coding samples and writing samples for future employment, so choose something you are willing to show to potential future employers.

1. Create two repositories one named ECE351_Code.
    - This repository will contain all .py code including a readme file with contact information and a description of the contents.
2. The second named ECE351_Reports.
    - This repository will contain all .tex code including a readme file with contact information and a description of the contents.

All necessary files must be uploaded to your GitHub by the due date.

1.6 Questions and Deliverables

1. What did you do over last summer, or what are you planning to do this upcoming summer?
2. What do you personally want to get out of this lab?

This lab does not require a formal report. Instead, create a header to use on all the .tex files that will be turned in for this lab. Then answer the questions on this handout in the same .tex file. Also, create a header with the same format in Spyder and submit both the .py and the .tex files to BBLearn. Sample headers are shown below.

1.6.1 LaTeX

```
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
%                                                                       %
% Your Name                                                             %
% Course Number and Section                                             %
% Lab Number                                                            %
% Due Date                                                              %
% Any other necessary information needed to navigate the file           %
%                                                                       %
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
```

1.6.2 Python

```
######################################################################
#                                                                    #
# Your Name                                                          #
# Course Number and Section                                          #
# Lab Number                                                         #
# Due Date                                                           #
# Any other necessary information needed to navigate the file        #
#                                                                    #
######################################################################

```