AA 274: Principles of Robotic Autonomy
Section 1: OS Setup, Git, Python

Our goals for this section:

1. Review OS configuration options for the class.

2. Learn how to use Git to pull assignments.

3. Start working with Python and Jupyter.

1 OS Setup

For this class, we recommend natively installing Python 2.7 on your local operating system. For the first two homeworks, there will be no ROS component and you should be able to develop and test code locally on your machine. For later homeworks, you will be accessing ROS on a server that we've set up for the class.

A second option is to natively install Linux alongside your normal OS as a dual boot. This may give better performance, especially for graphics rendering.

A third option is to install a Linux virtual machine (VM) using the instructions found here. Do note that the performance of a VM won't be as snappy or responsive as a dual boot.

As a final option, you can consider logging in remotely to Stanford FarmShare. You can find information on how to log in securely here. Because you'll be logged in remotely, there'll be a few additional steps required to transfer files back-and-forth and to locally render a Jupyter notebook running remotely.

2 Using Git

Git is a source control tool that allows us to share code with you. To obtain code for this section, type the following into your terminal:

```
1 | git clone https://github.com/PrinciplesofRobotAutonomy/aa274-sections.git
```

For the sake of time, if you have trouble installing Git locally, then we suggest that you simply download the zip file for the repository off of the same website. By next week's section, please try and have Git installed.

You will use this folder to store all section material for the remainder of the class. So, to update this repo at the start of each section, type:

```
1 | git pull
```

3   Python

Since our class is composed of students from AA, EE/ME, and CS, we will not assume that you have comprehensive Python knowledge. Therefore, the main purpose of this section is to get your Python coding skills spun up so you can work on the homework. If you know this material already, please help someone who doesn't know it as well.

For this class, we'll be using Python 2.7. To get started, let's start by installing a version of Python 2.7 on your local machine (make sure not to install Python 3.X!) As a further caveat, we also encourage you to setup a Conda environment; Conda allows you to created an "isolated" Python environment just for AA 274 without interfering with other versions of Python that you may already have installed.

In order to complete this part of our section, please switch to the scripts included in the code for this section.

Once you have had a look through the code, played around with Python a bit, and are aware of the capabilities that Python and its packages offer, complete the following problems:

1. **Define a** sin **function using NumPy**

2. **Find the minimum of the function using SciPy**

3. **Integrate the function from** $[0, 1]$ **using SciPy**

4. **Plot the function using Matplotlib from** $[0, 2\pi]$

Once you have done this, please submit your results *and code* in one writeup file on Gradescope.

4   Jupyter

As the final module in this section, we'll be installing Jupyter notebook, an interactive browser-based platform to run scripts and more easily visualize and develop code. You can install Jupyter here. To make sure it's working, simply run:

```
1 | jupyter notebook
```

Jupyter still relies on a Python 2.7 kernel, so if you have multiple Python versions installed make sure to set the kernel to the right version.