

## Lab 0: Installing Python/Pyomo

### 1 Purpose of this lab

**Most of you probably already have everything you need for SA405, because we will be using the same set up that you had for SM286D and/or SA305. If for some reason you do not have everything you need, this document will help you to fill in the gaps.**

**DO NOT INSTALL A SECOND INSTANCE OF ANACONDA. If for some reason you need to reinstall Anaconda, be sure to uninstall your current version.**

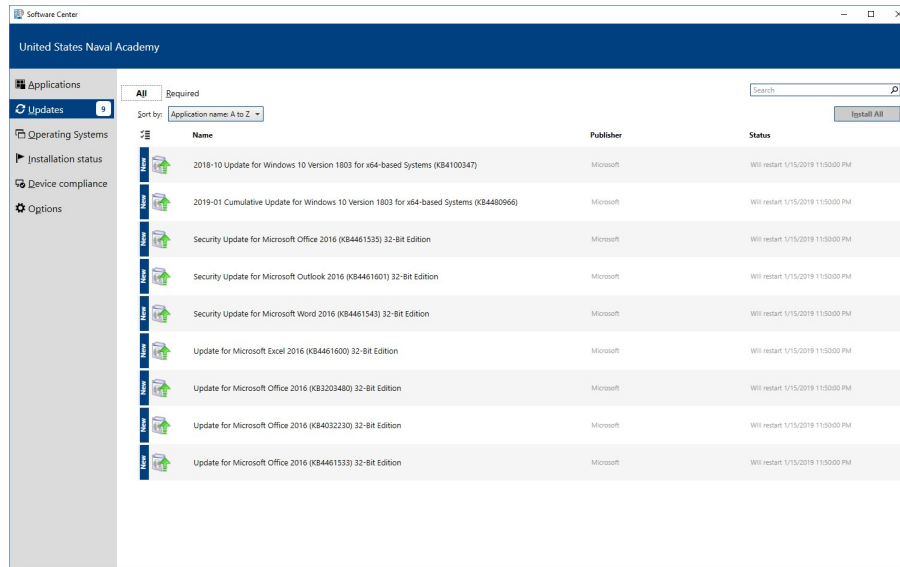
The purpose of this lab is to

1. Install Anaconda, a software management tool that let us accomplish the remaining tasks.
2. Install Pyomo, the modeling language we use to encode the linear programs we solve;
3. Install GLPK, the engine that solves the models we've formulated;

**\*\*\*Again, this document is only to help you fill in any installation gaps. It's likely that you already have what you need.\*\*\***

### 2 Getting Your Computer Ready for Installation

In order to minimize the potential for issues when installing the required Python software, please go to the USNA Software Center to make sure your computer is current with respect to required software updates. To get to the Software Center, first click on the Windows icon on the bottom left corner of your PC screen. Then type software. That should bring up a link to the software center program at USNA. Click on the Software Center link. Once Software Center is open, go to the Updates tab and click Install All at the top right corner (see the image below) to install all required updates. Once the updates have finished, restart your computer.



### 3 Installing Anaconda

In this course, we will use Anaconda3 as the default Python distribution. Follow these instructions carefully.

**Step 1.** Download the Anaconda installer. Go to the following URL to download the installer: <https://www.anaconda.com/> . Click on “Get Started”.

**Step 2** On the next page click on the “Anaconda Individual Edition”

**Step 3** On the next page click “Download”

**Step 4** On the next page (Anaconda Installers) click under Windows tab “64-Bit Graphical Installer (466 MB)”

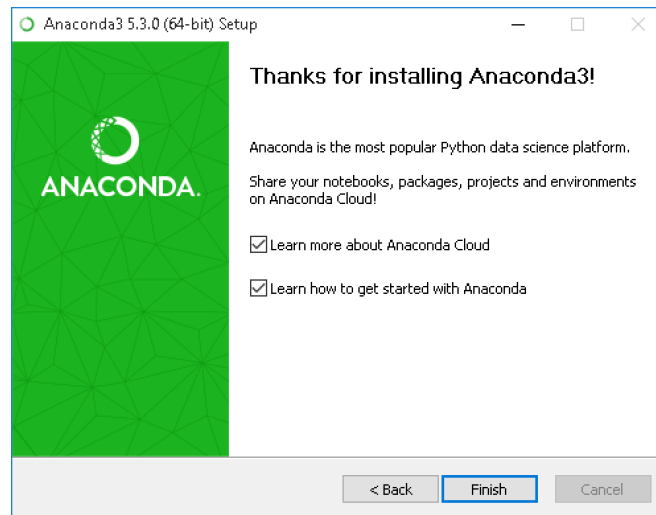
**Step 5** You will be directed to “Welcome to Anaconda” page where you can to create an account on “Anaconda Cloud” by clicking on “Create an account” (free). You can skip this step and click on the “Anaconda 3-2020.07 (64 bit) Setup” on the bottom of your screen.

**Step 6** Read the licensing terms and click “I Agree”

**Step 7** Select an install for “Just Me” and click “Next”

**Step 8** Use the default destination folder to install Anaconda by clicking “Next”

**Step 9** After a successful installation you will see the “Thanks for installing Anaconda” dialog box shown below.



**Step 10** Uncheck the two boxes and click “Finish” to complete the installation.

## **Step 11 Install packages you’ll need for SA405**

Now that Anaconda is installed, we will install some additional packages that you will need for SA405 and integer programming examples in this class. From the Windows Start menu, click on the shortcut **Anaconda Powershell Prompt**.

That should open a terminal window on your machine. Type the following code and press enter:

```
conda install -c conda-forge pyomo
```

You will see the conda package installer solve the environment, and it will then ask you if you want to make the necessary changes (some packages will be installed and some will be updated). You should type y when it asks and hit enter. This will allow the install process to continue. The conda package installer will then verify, and complete the installation.

Once this is complete, type the following code and press enter:

```
conda install -c conda-forge pyomo.extras
```

You will see the conda package installer solve the environment, and it will then ask you if you want to make the necessary changes (some packages will be installed and some will be updated). You should type y when it asks and hit enter. This will allow the install process to continue. The conda package installer will then verify, and complete the installation.

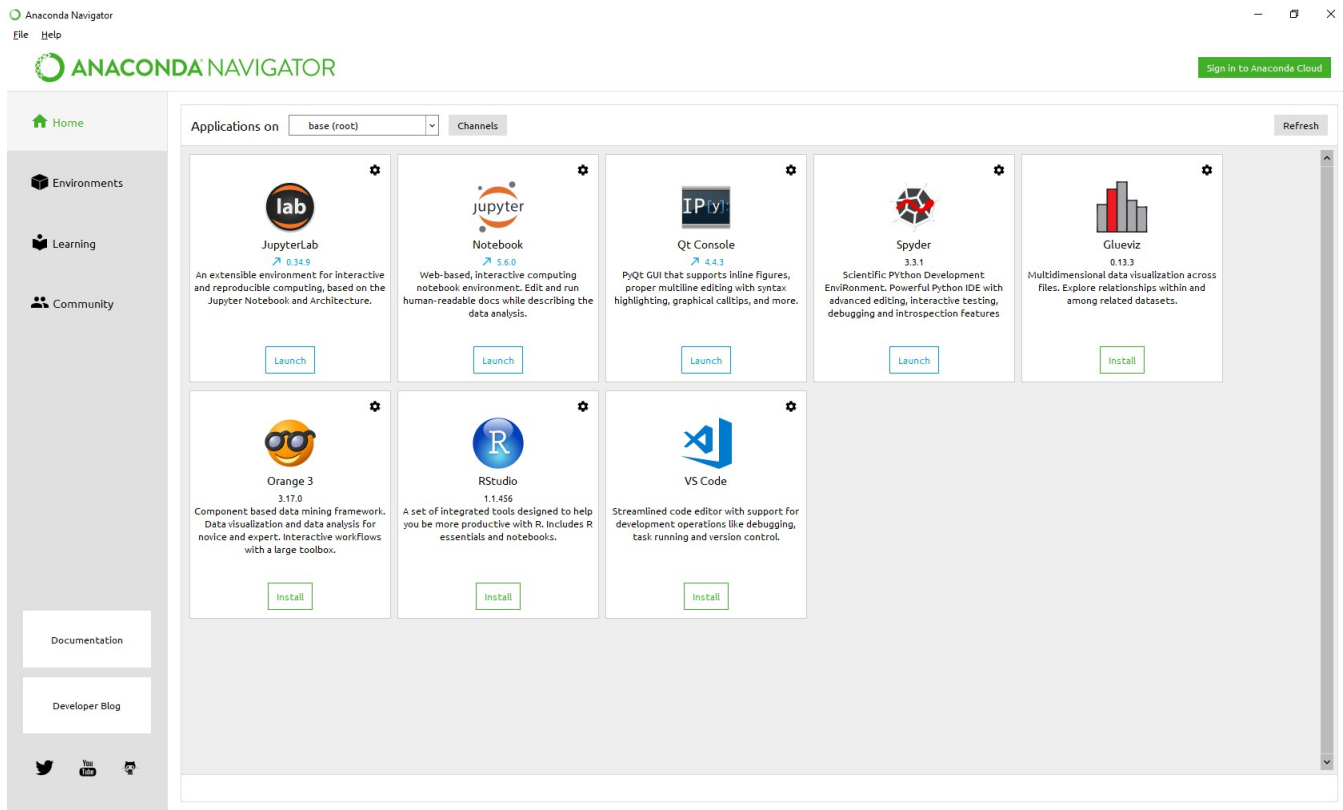
Once this is complete, type the following code and press enter:

```
conda install -c conda-forge glpk
```

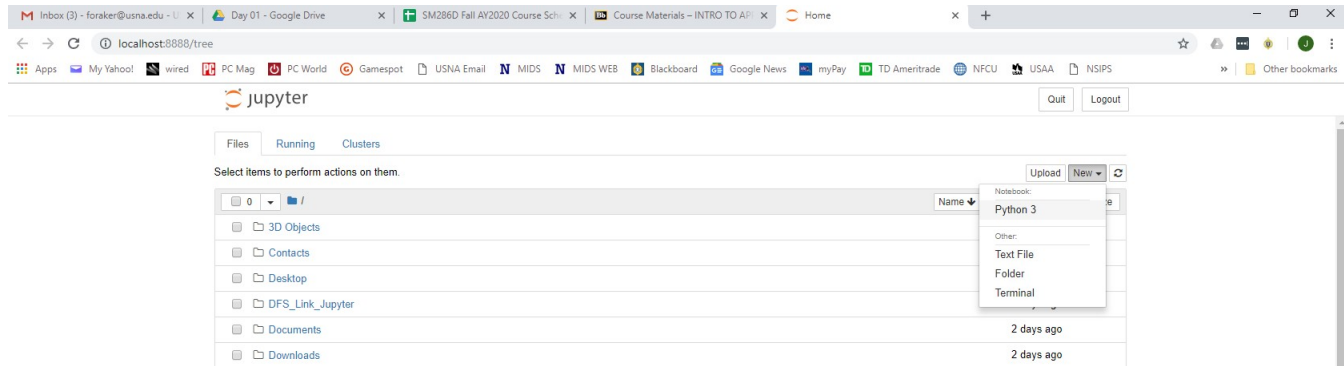
You will see the conda package installer solve the environment, and it will then ask you if you want to make the necessary changes (some packages will be installed and some will be updated). You should type y when it asks and hit enter. This will allow the install process to continue. The conda package installer will then verify, and complete the installation. Then you can close the window.

## 4 A sample Python program using Jupyter Notebook

Jupyter Notebook is an open-source web application that allows you to create and share documents that contain live code, equations, visualizations, and text. You can read more about how to work with Jupyter Notebook here: <https://www.dataquest.io/blog/jupyter-notebook-tutorial/>. In order to write the Python program, we need to open Jupyter Notebook. You can open Jupyter Notebook from the Anaconda Navigator by clicking Launch (shown below), or you can open it directly from the Windows Start menu under the Anaconda3 (64-bit) shortcut.

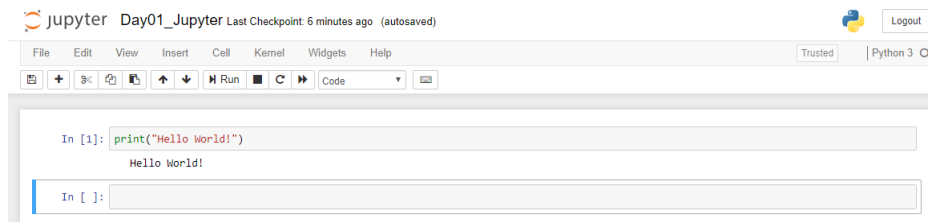


- Jupyter Notebook will open in your default web browser. Once it is open, use the menu at the top and click on New > Python 3 as shown below.



- Type the command below in the code cell of the untitled Jupyter Notebook.  

```
print("Hello World!")
```
- Click on **File > Save as...** to save your first program. Enter a file name you want to use, and click on **Save**.
- Click on **Run** or use **Ctrl + Enter** on your keyboard to run your code. You should see the output, **Hello World!**, below the code cell. As shown below.



- Congratulations on writing your first Python program in Jupyter Notebook!