Lab 0: Installing Python/Pyomo

1 Purpose of this lab

IF YOU TOOK OR ARE TAKING SM286D, STOP. YOU HAVE ALREADY INSTALLED PYOMO! PUT THIS DOCUMENT AWAY!!!

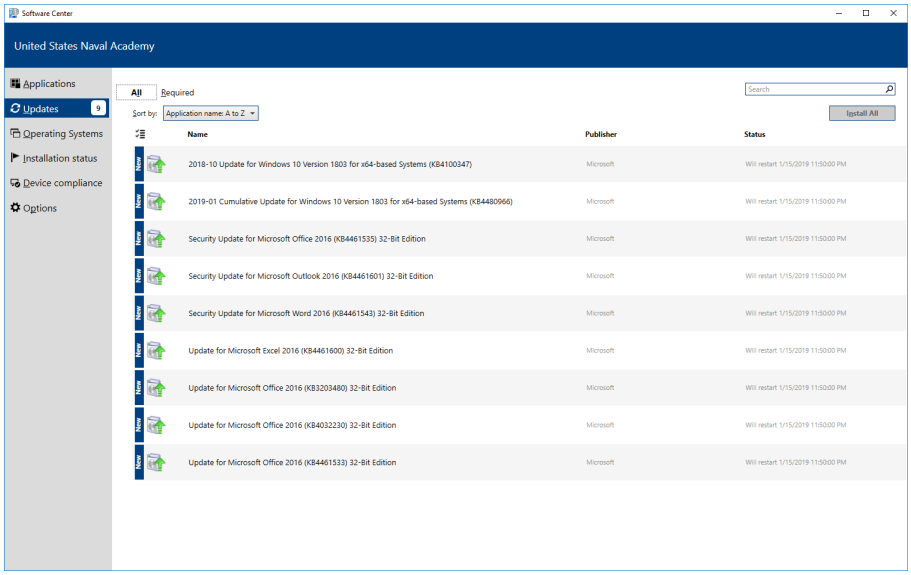
The purpose of this lab is to

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, IF YOU TOOK OR ARE TAKING SM286D, STOP. YOU HAVE ALREADY INSTALLED PYOMO! GO AWAY. STOP READING THIS NOW.

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. The instructions that follow are based on the documentation found here: `https://docs.anaconda.com/anaconda/install/windows/`.

Step 1. Download the Anaconda installer

Go to the following URL to download the installer: `https://www.anaconda.com/download/#windows`. You should select the 64 bit Python 3.7 version (which is the default if you click on the big green button labeled "Download" under the Python 3.7 version heading).

Step 2. Double click on the installer to launch

Step 3. Click Next

Step 4. Read the licensing terms and click "I agree"

Step 5. Select an install for "Just Me" and click Next

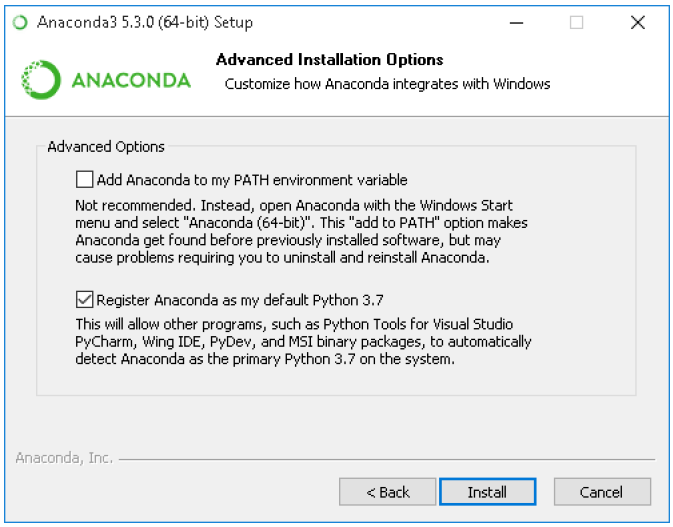
Step 6. Use the default destination folder to install Anaconda by clicking Next

For Steps 7, 8, and 9, refer to the image below.

Step 7. Choose to NOT add Anaconda to your system PATH environment variable (i.e. leave the first box unchecked).

Adding Anaconda to the PATH environment variable can interfere with other software. We will use the Anaconda software by opening Anaconda Navigator or the Anaconda Prompt from the Start Menu.

Step 8. Register Anaconda as your default Python (i.e. leave the second box checked).

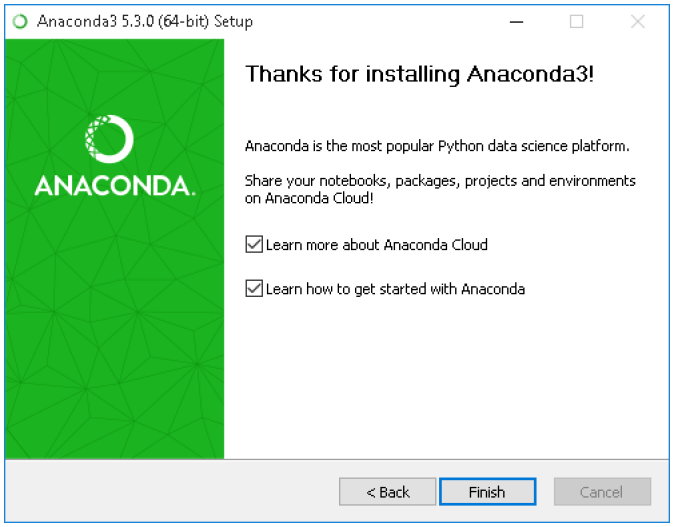


Step 9. Click the Install button.

Step 10. Click Next

Step 11. Click Skip to install Anaconda WITHOUT Microsoft VS Code.

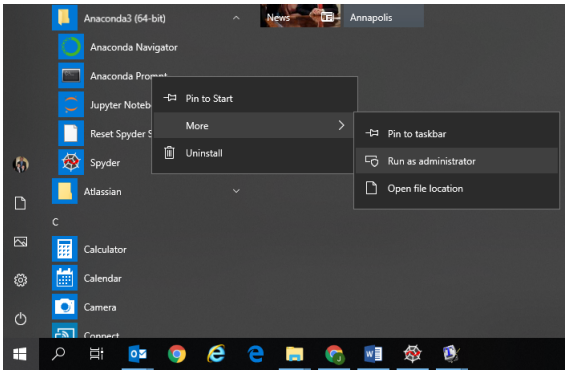
Step 12. After a successful installation you will see the "Thanks for installing Anaconda" dialog box shown below.



Step 13. Uncheck the two boxes and click Finish to complete the installation.

Step 14. Install packages you'll need for SA305

Now that Anaconda is installed, we will install some additional packages that you will need for SA305 and linear programming examples in this class. From the Windows Start menu, right-click on the shortcut Anaconda Prompt, select More, and then left-click on Run as administrator as shown in the image below.



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.

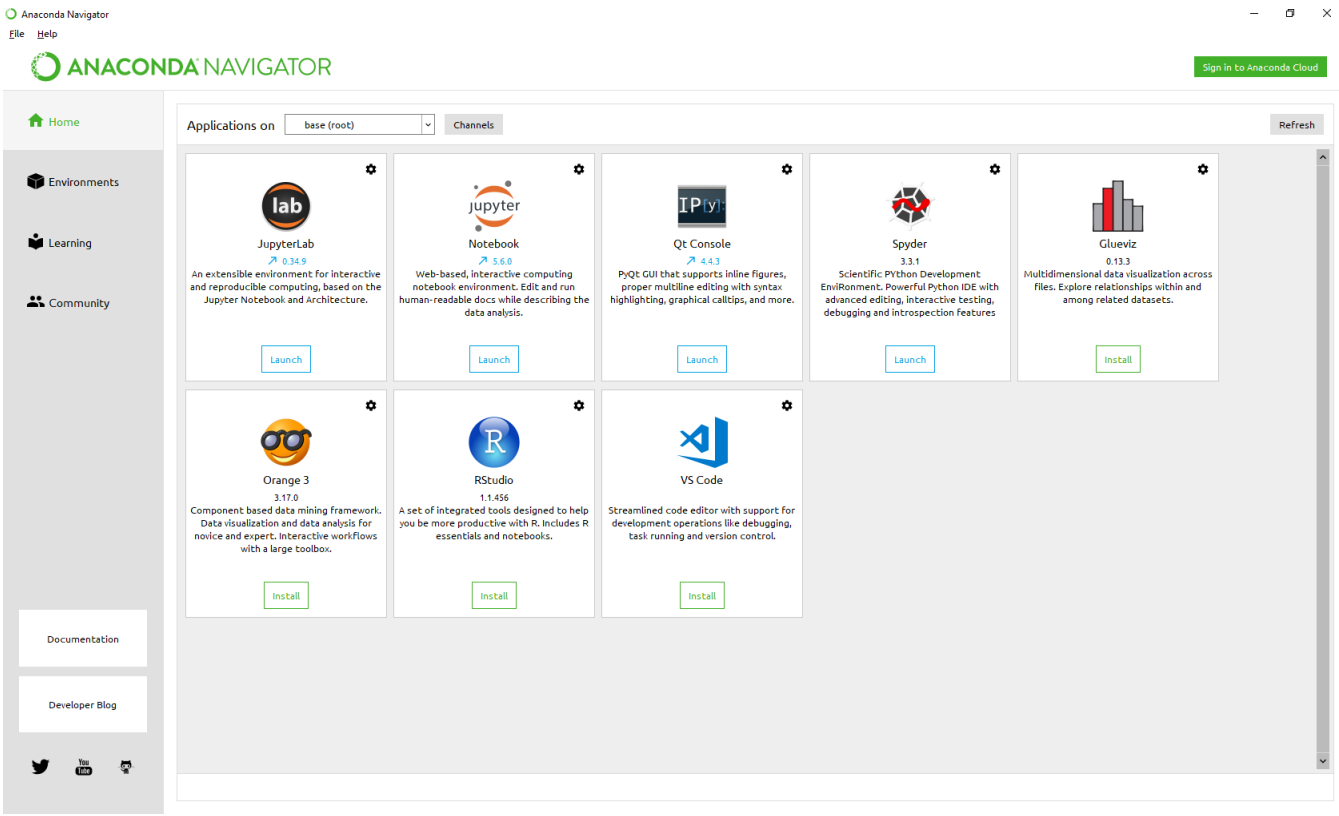
Once this is complete, type the following code and press enter:

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

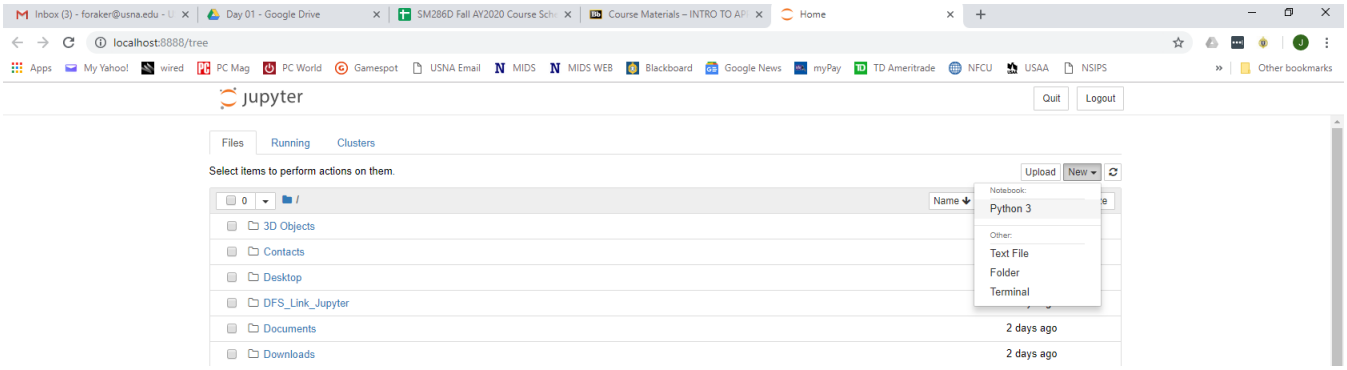
You will see the conda package installer solve the environment, and it will then ask you if you want to make the necessary changes (some packages will be installed and some will be updated). You should type `y` when it asks and hit enter. This will allow the install process to continue. The conda package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

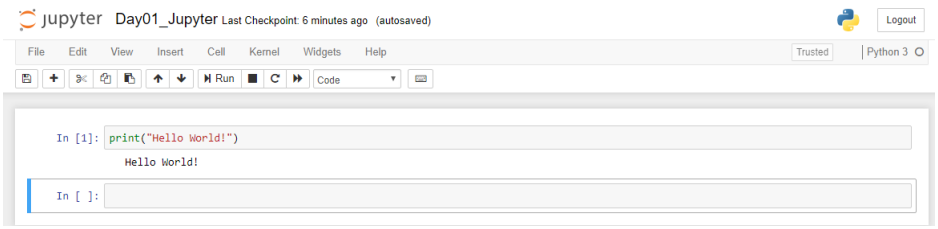


- Type the command below in the code cell of the untitled Jupyter Notebook.

```
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!