Jupyter

- Notebooks
    - a vehicle to communicate your thoughts to others
    - a container for code, text, graphics
    - a Web-based IDE
- Jupyter is a notebook server
    - Server either local or in cloud
    - client usually on local machine
    - Multi-language
        - Jupyter is short for: **Ju**lia, **Pyt**hon, **R**

Preliminaries

Jupyter setup

Jupyter is part of the Anaconda distribution, which you already installed.

Let's finish setting up Jupyter by creating a directory for notebooks

```
mkdir Notebooks; cd Notebooks
```

And setting a password for the notebook server (optional on local machine; MANDATORY for cloud-based)

```
jupyter notebook --generate-config
 jupyter notebook password
```

Start jupyter

```
anaconda-navigator
```

or

```
cd Notebooks
jupyter notebook
```

Jupyter runs in your browser.

If you installed it on your local machine, the URL is `localhost:8888`

If you installed it on a cloud machine, the URL is `your_server_ip:8888`

where `your_server_ip` is the IP address of your cloud based machine.

Jupyter extensions

Jupyter has many useful extensions. It is NOT required for you to do this step but here are some extensions that I'm currently using

- Install
    - `conda install -c conda-forge jupyter_contrib_nbextensions`
- Enable

```
jupyter nbextension enable toc2/main
jupyter nbextension enable collapsible_headings/main
jupyter nbextension enable livemdpreview/livemdpreview
```

- Disable/Enable
    - http://localhost:8888/nbextensions (http://localhost:8888/nbextensions) or via tab on Jupyter Home page
        - check-box for which extensions to enable
- You can disable/enable extensions any time

Jupyter: a vehicle for communication (NOT just coding)

- Code and "mark-down"
- Lectures via Notebooks !

- Assignments
    - Your notebooks are your "lab notebook"
        - The final result is not always the most interesting part !
            - Process and what you learned on the journey is important
        - Define the problem you are working on
        - Describe and explore the data
            - what were the challenges ? Cleaning ? Transformation ?
        - Overview of your methodology/research method
        - Experiments conducted/results, both success and failure
        - Describe your steps in English, followed by code
- Code-only: limited credit !

Tip: It's a movie not a photograph !

Jupyter tour

- Jupyter dashboard (external/ipython-in-depth/examples/Notebook/Notebook%20Basics.ipynb#The-Dashboard)
- Header and body (external/ipython-in-depth/examples/Notebook/Notebook%20Basics.ipynb#The-Notebook)
- Command mode/edit mode
    - Keyboard shortcuts (external/ipython-in-depth/examples/Notebook/Notebook%20Basics.ipynb#Keyboard-Navigation)
- Types of Cells (external/mltutorial/notebooks/IPython-Tutorial/1%20-%20Notebooks%20%26%20Cells.ipynb)
    - Cells can contain either code or markdown (e.g., text)
        - Code shows your solution
        - Markdown used to tell the story of your journey

Jupyter markdown

- Markdown (external/mltutorial/notebooks/IPython-Tutorial/2%20-%20Markdown%20%26%20LATEX.ipynb)
    - Markdown cheat sheet (https://github.com/adam-p/markdown-here/wiki/Markdown-Cheatsheet)
    - Equations, categorized (http://www.equationsheet.com/)

Introspection

- TAB completion
    - Data properties
- ?
    - Function help
- ??
    - Code inspection

Sample notebook (Sample.ipynb)

Checkpoints

- Jupyter will save a snapshot ("checkpoint") each time you save your notebook
- Jupyter will auto-save your notebook as you change it
    - You can discard the auto-saved changes by reverting back to a checkpoint