

ADASS 2017 Tutorial

Jupyter Notebooks for Astronomical Data Analysis

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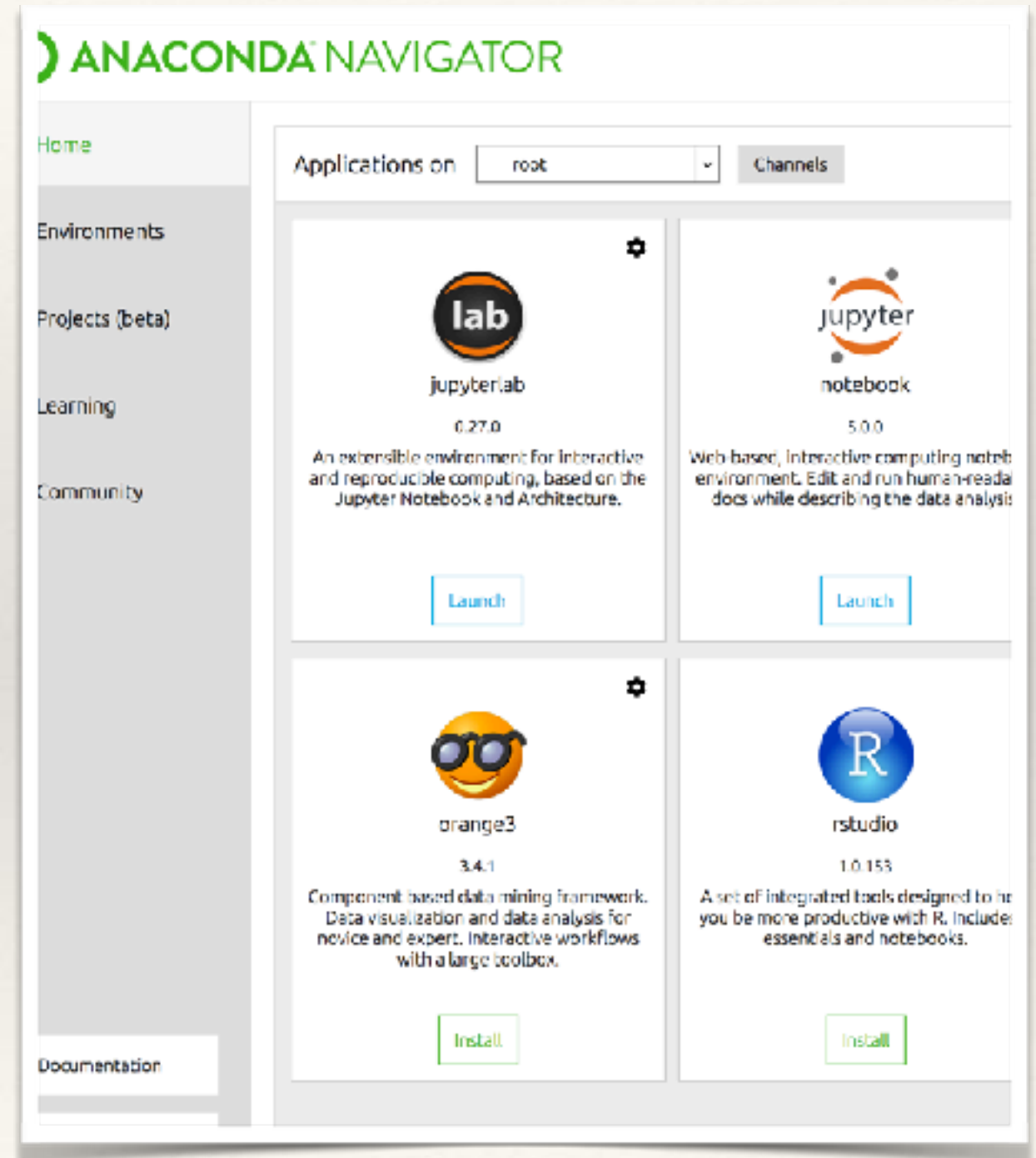
FONDEF
Fondo de Fomento al Desarrollo
Científico y Tecnológico



WIFI: ADASS
pass: adass2017

Installing Anaconda

- ❖ Jupyter runs over Python
- ❖ Anaconda is a Python Distribution
 - ❖ We will use Python 3.6
 - ❖ Environments can do the trick
 - ❖ pip at your own risk
- ❖ Over 500 MB
 - ❖ Please ask for a pendrive
 - ❖ Windows, Linux and MacOS



Setup an environment

- ❖ Fresh Installation:
 - ❖ `conda create --name adass --clone root`
- ❖ Previous Installation:
 - ❖ `conda create -n adass python=3.6 anaconda`
- ❖ Activate the environment
 - ❖ `source activate adass`
- ❖ Move to a working directory
 - ❖ `mkdir tutorial`
 - ❖ `cd tutorial`
- ❖ Run Jupyter!
 - ❖ `jupyter notebook`

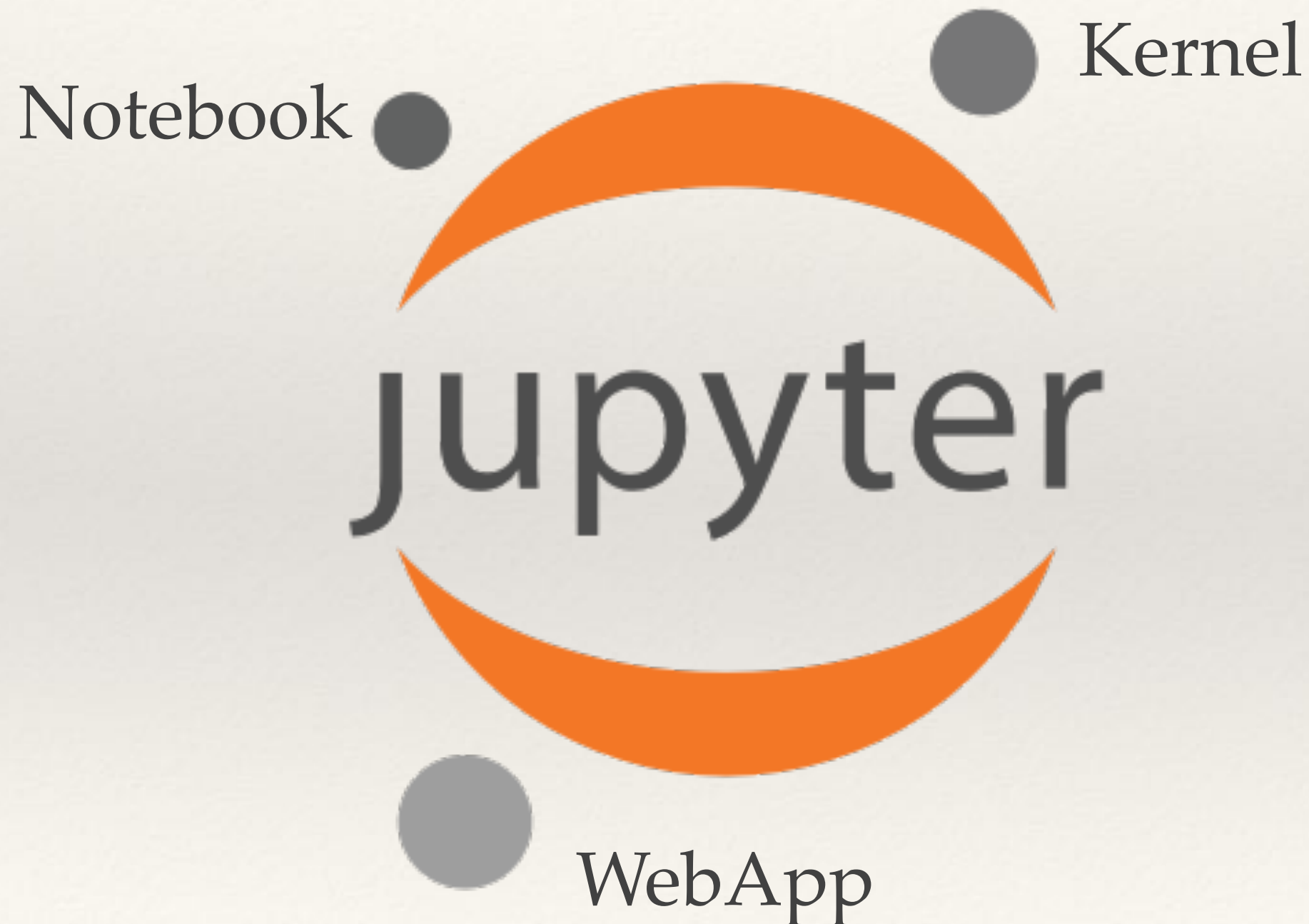


Resources

- ❖ Google docs for copy / paste information
 - ❖ <http://tinyurl.com/tutorial-docs>
- ❖ Data directory (Google Drive)
 - ❖ <http://tinyurl.com/tutorial-data>
- ❖ Just in case...
 - ❖ <http://csrg.cl/~maray/adass17/>

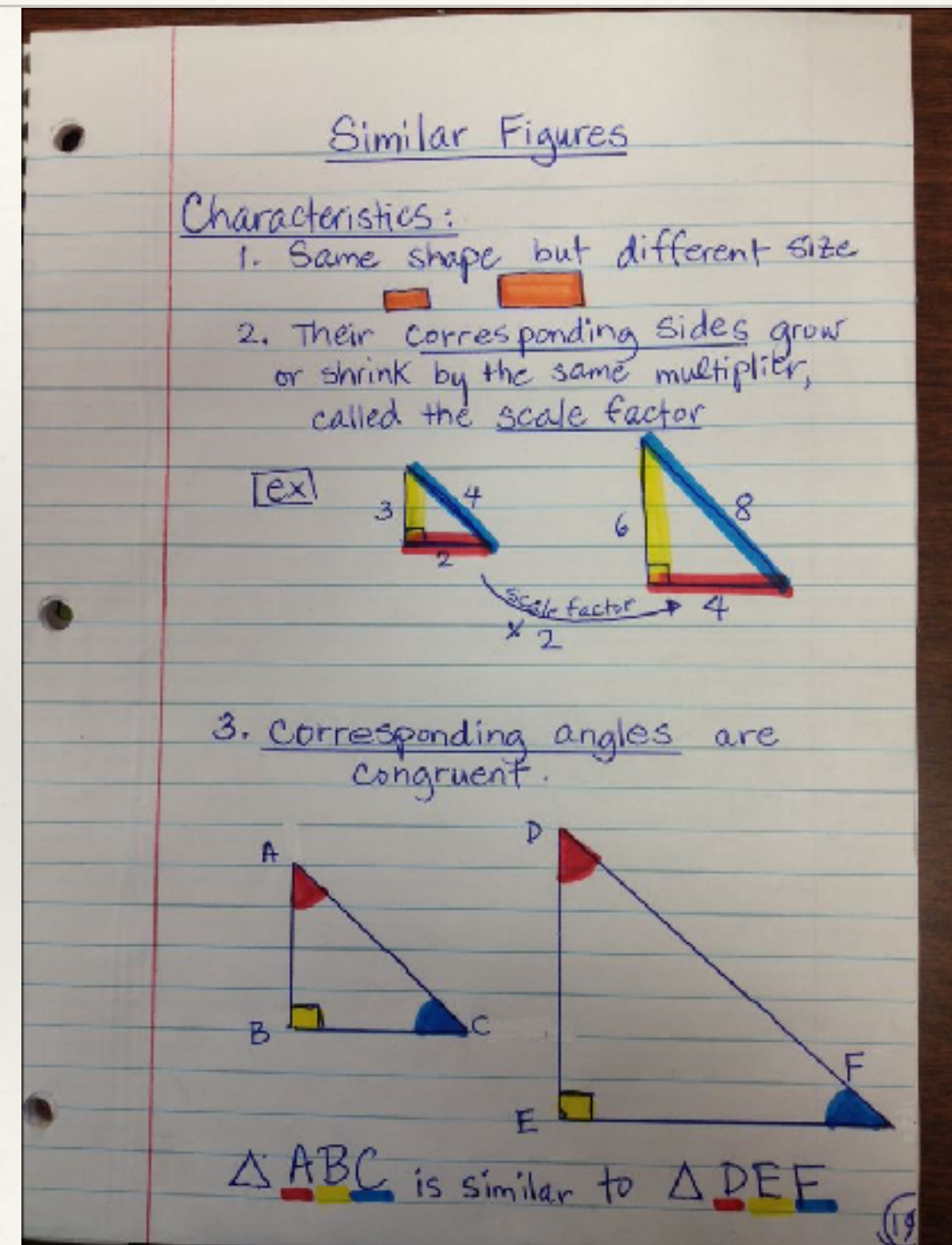


Basic Concepts of Jupyter



Basic Concepts of Jupyter

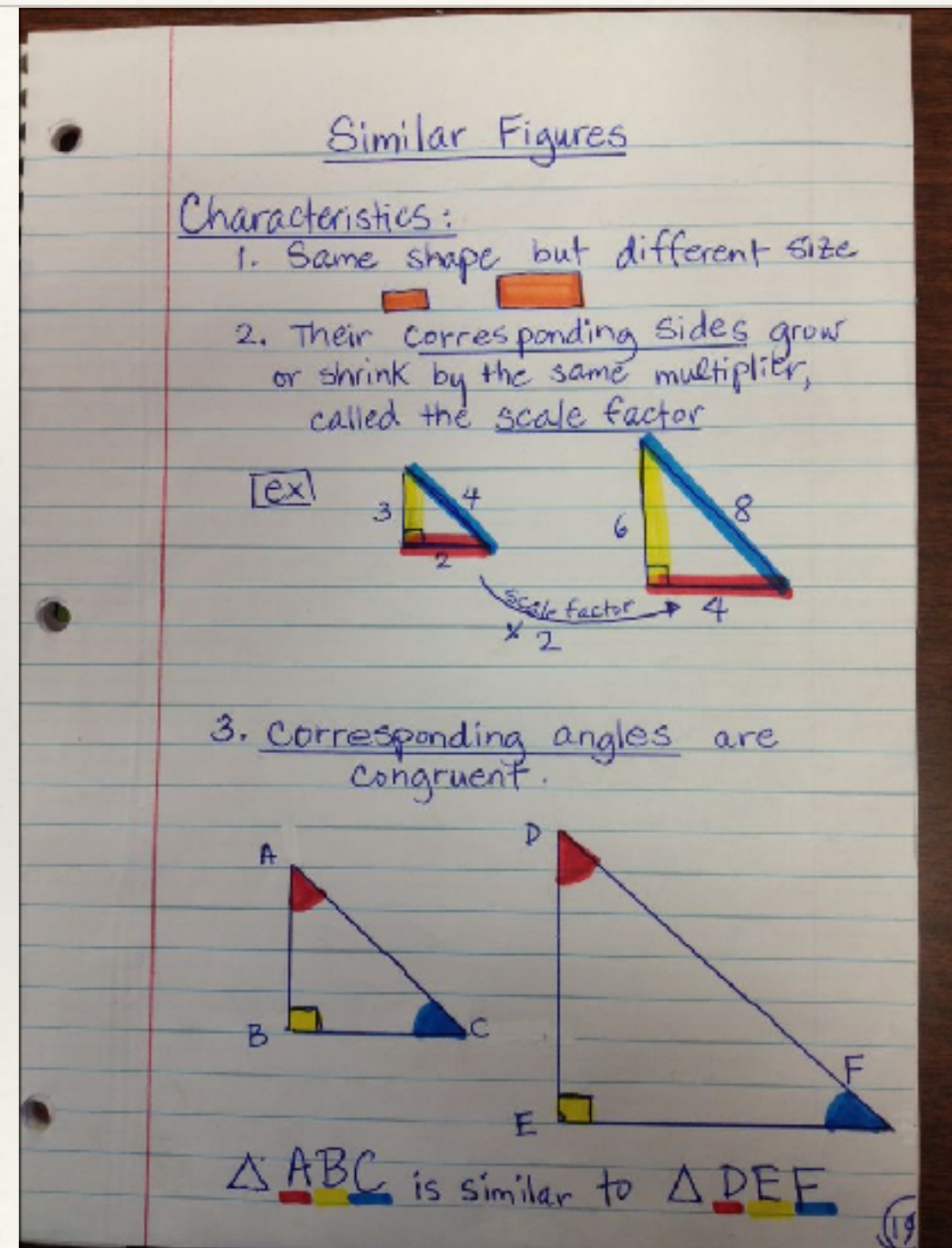
Notebook



Basic Concepts of Jupyter

Notebook

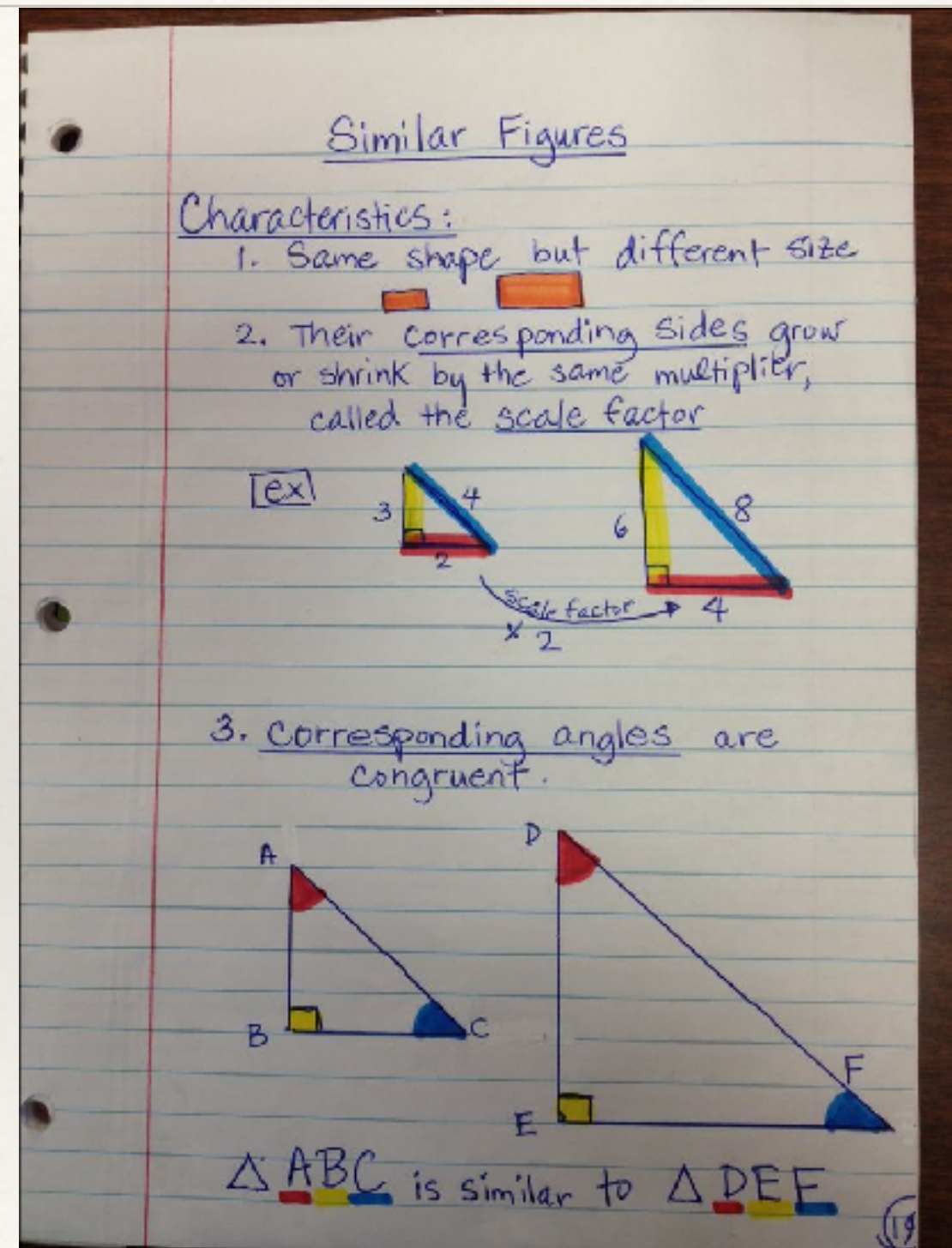
- ❖ Data, text, documentation, figures in the same place



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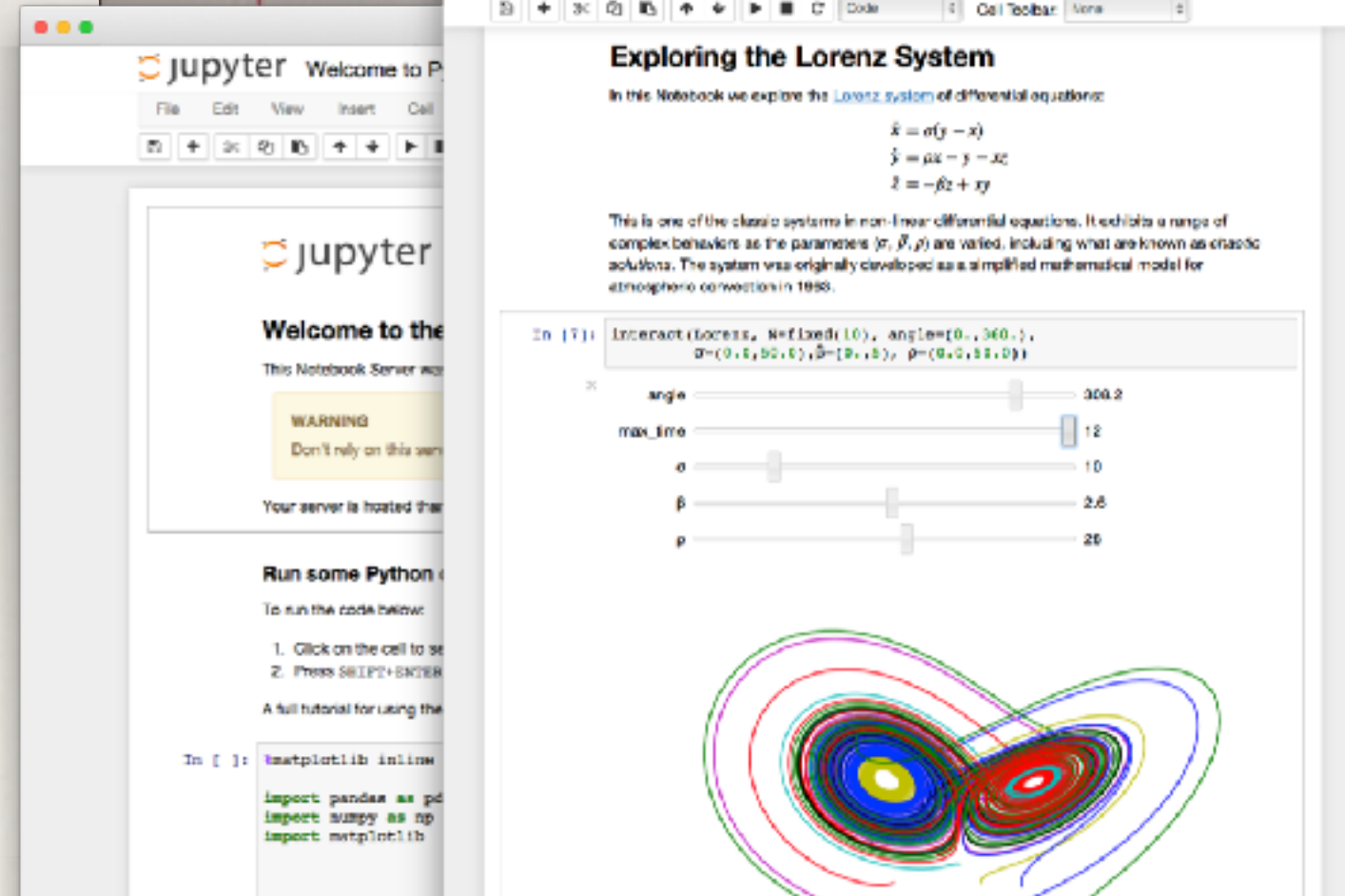
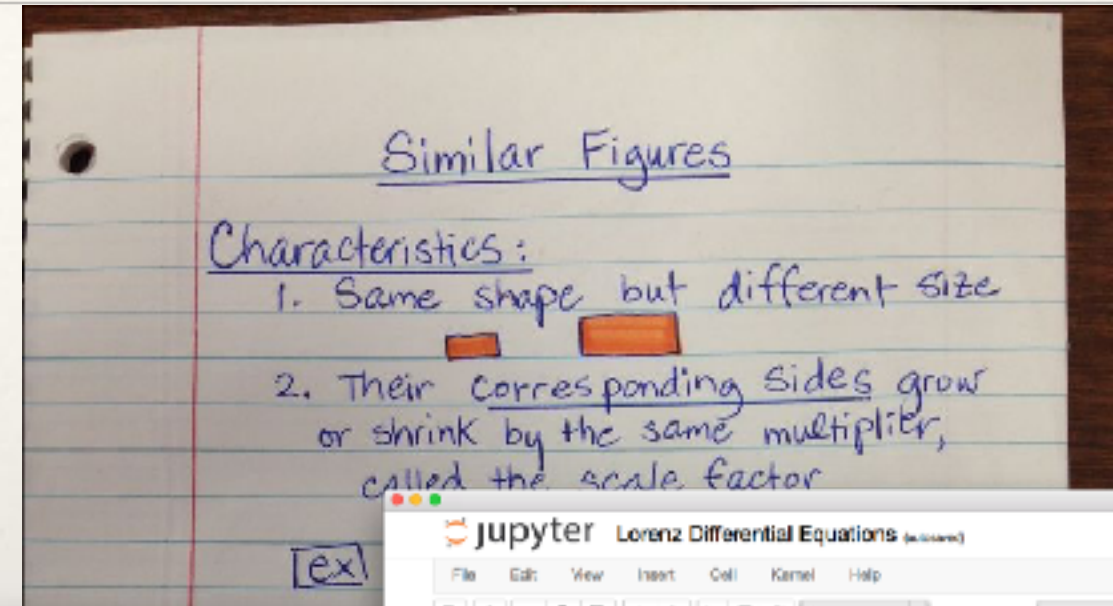
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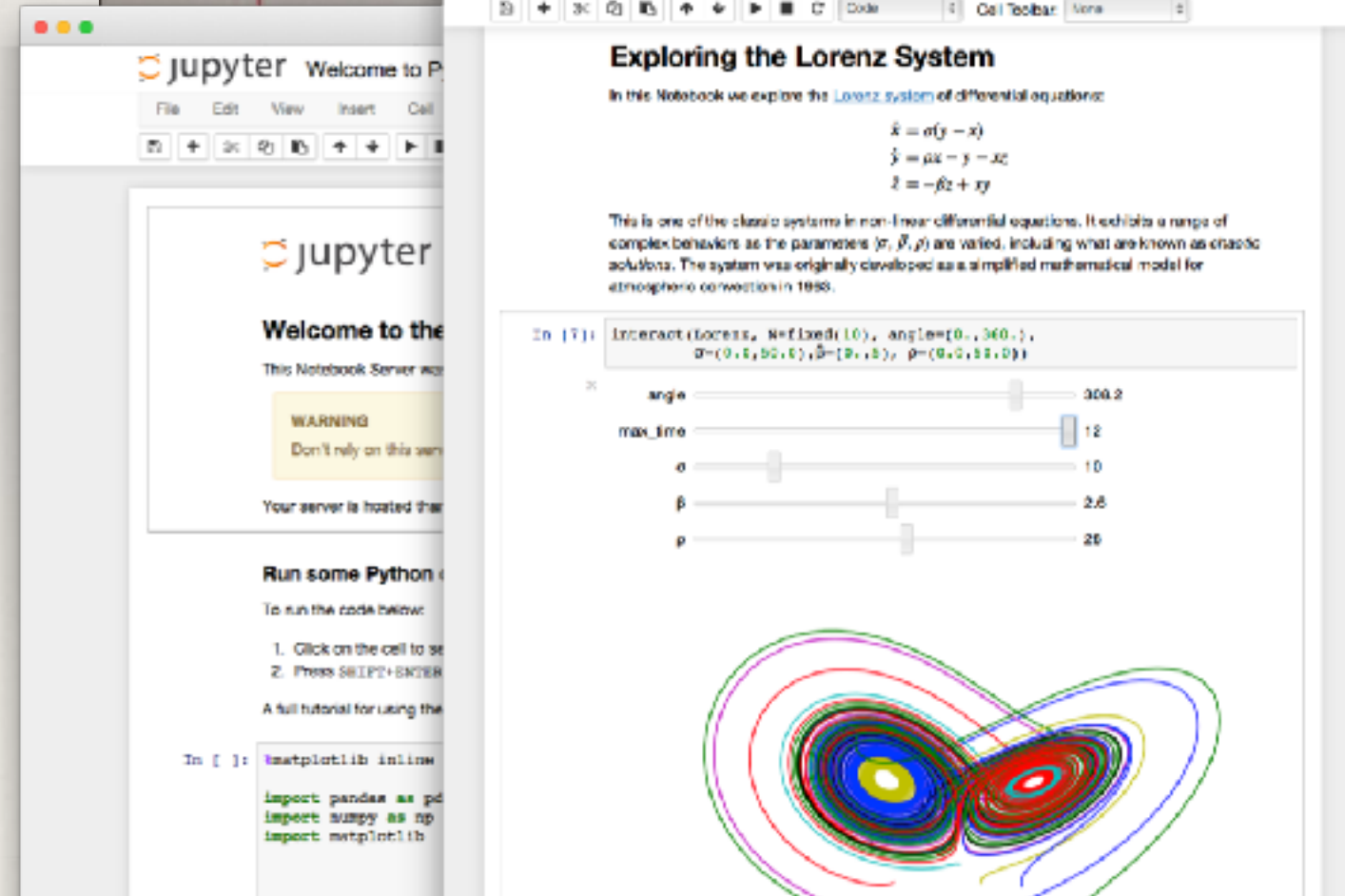
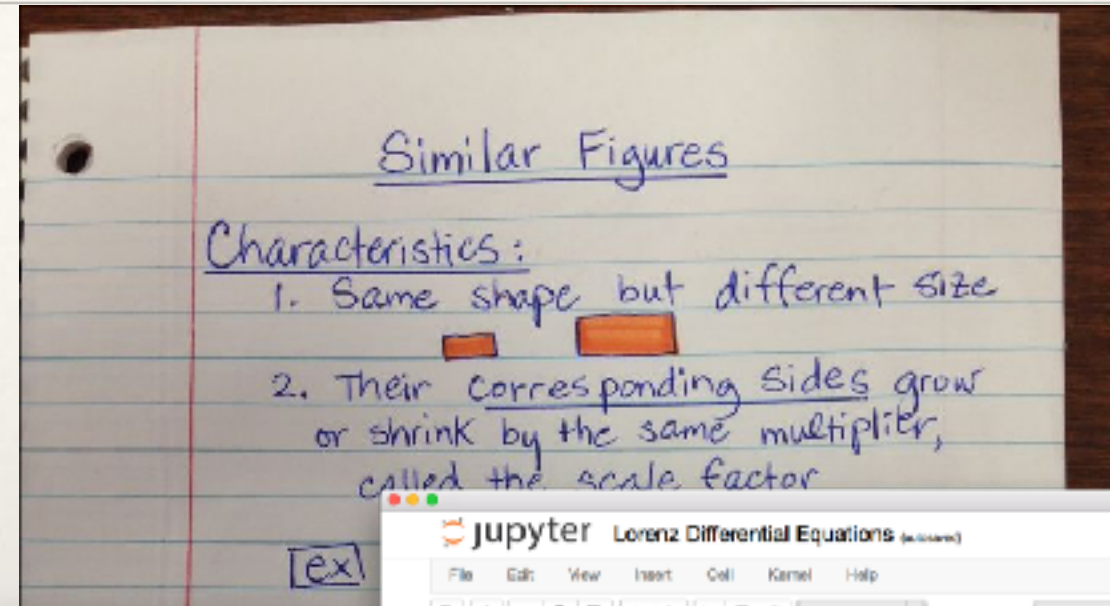
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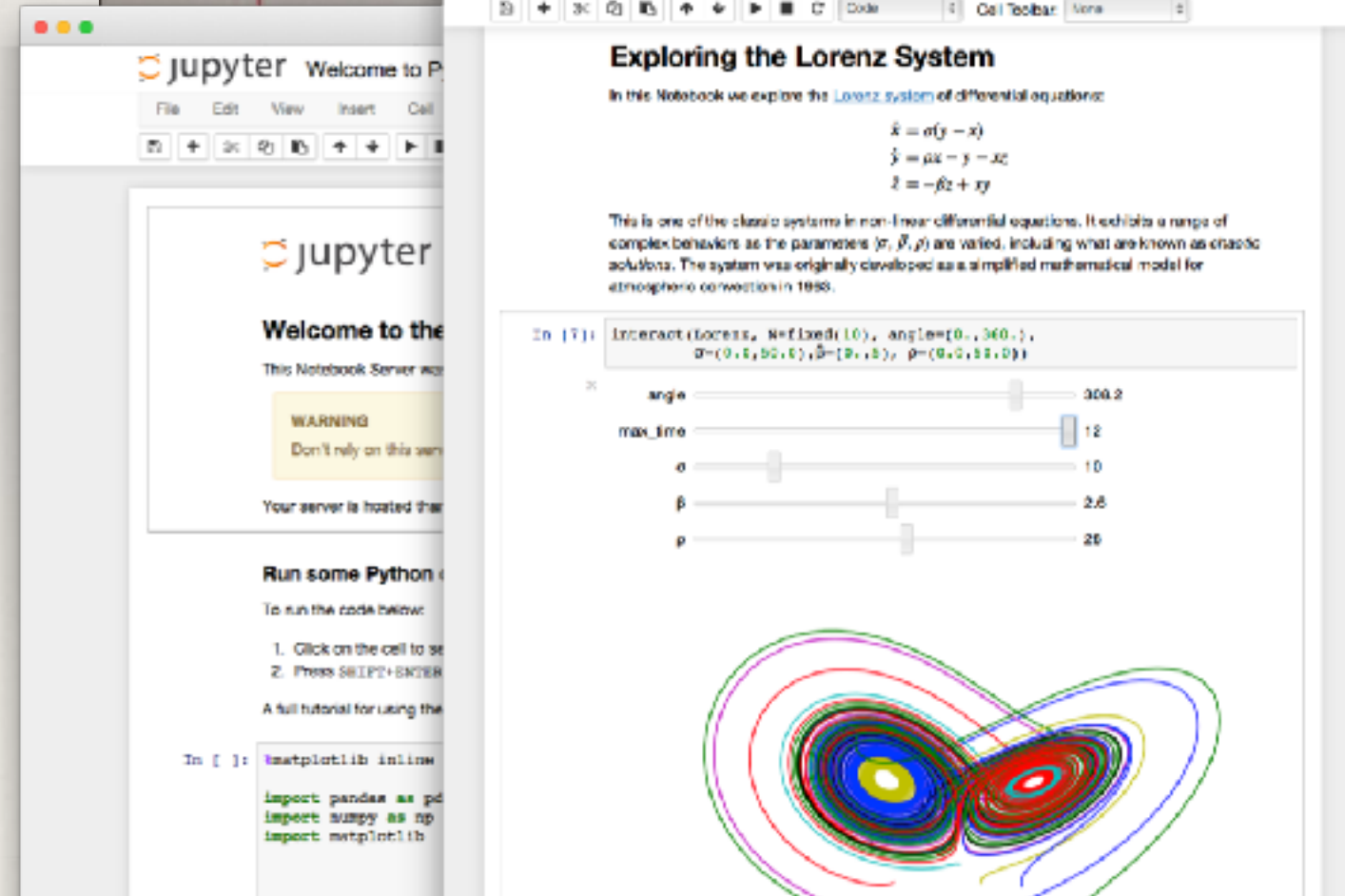
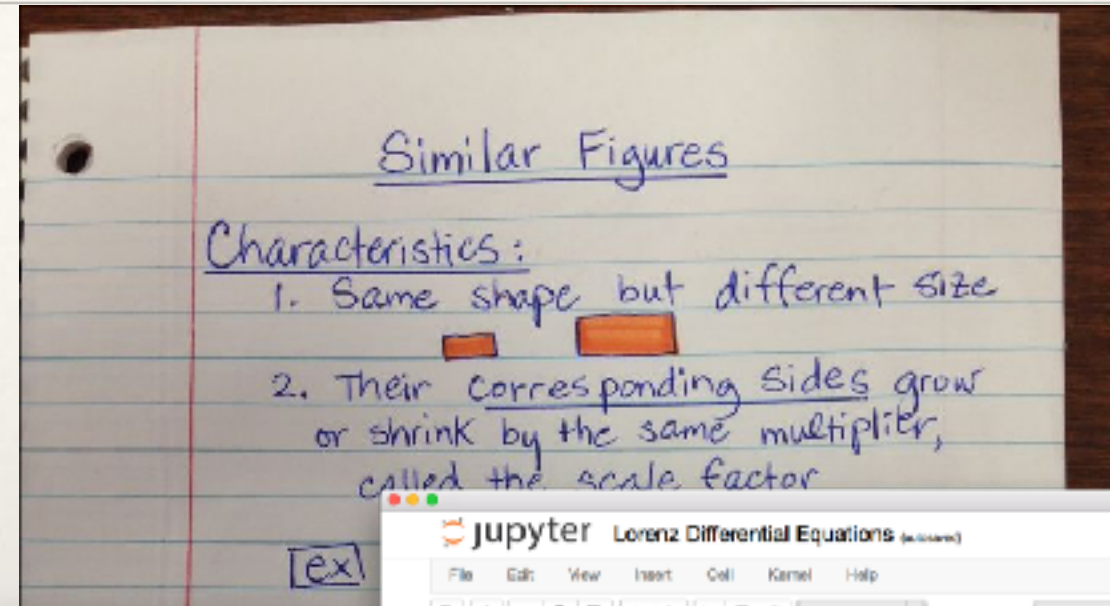
- ❖ Data, text, documentation, figures in the same place
- ❖ Adds code to the same space
- ❖ Popularized by Mathematica



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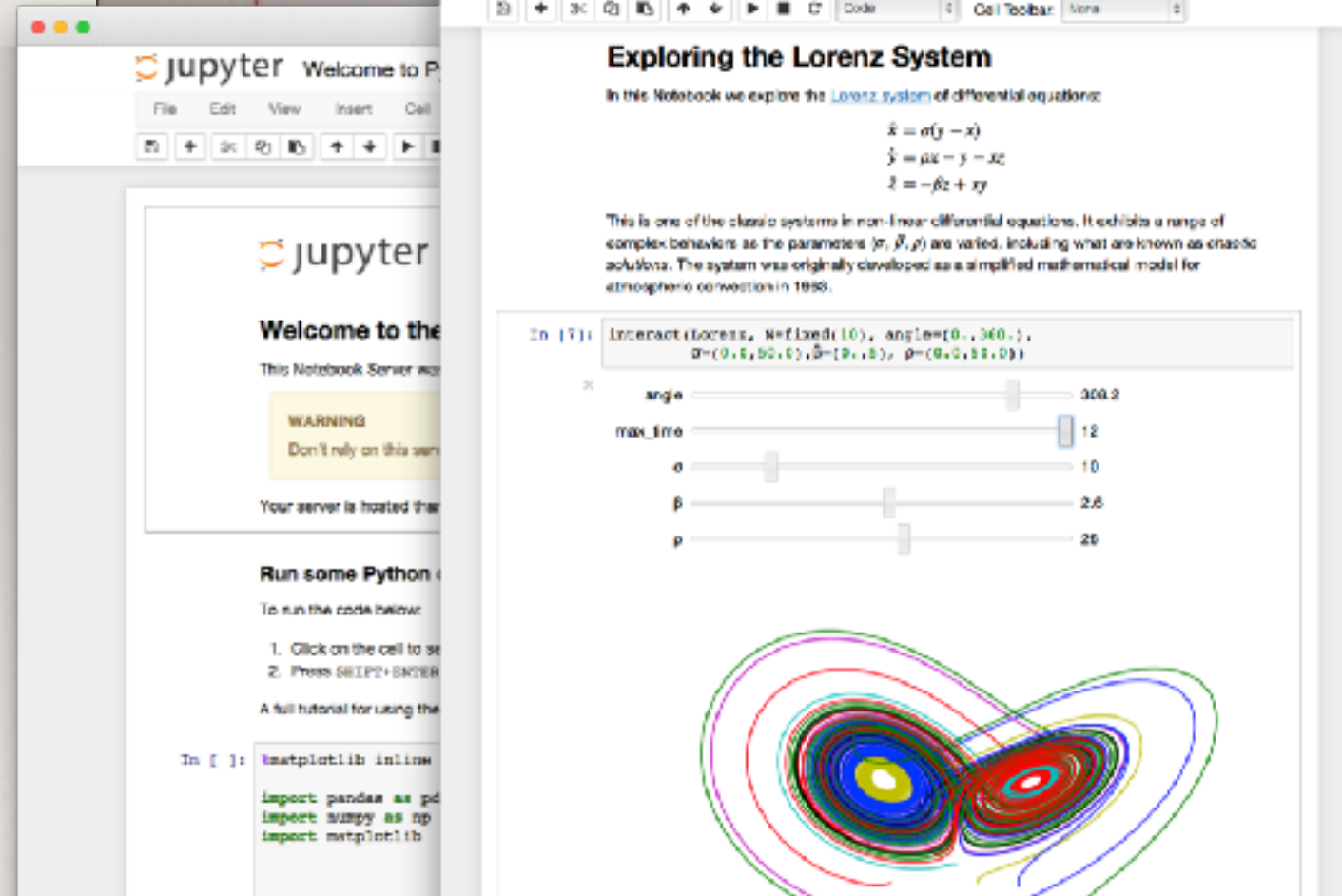
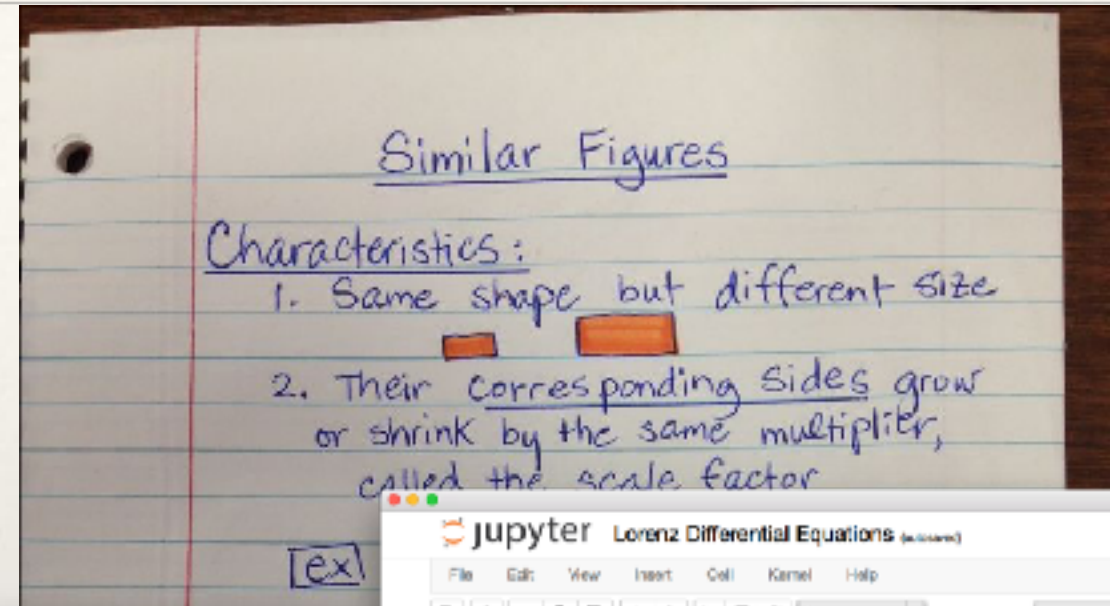
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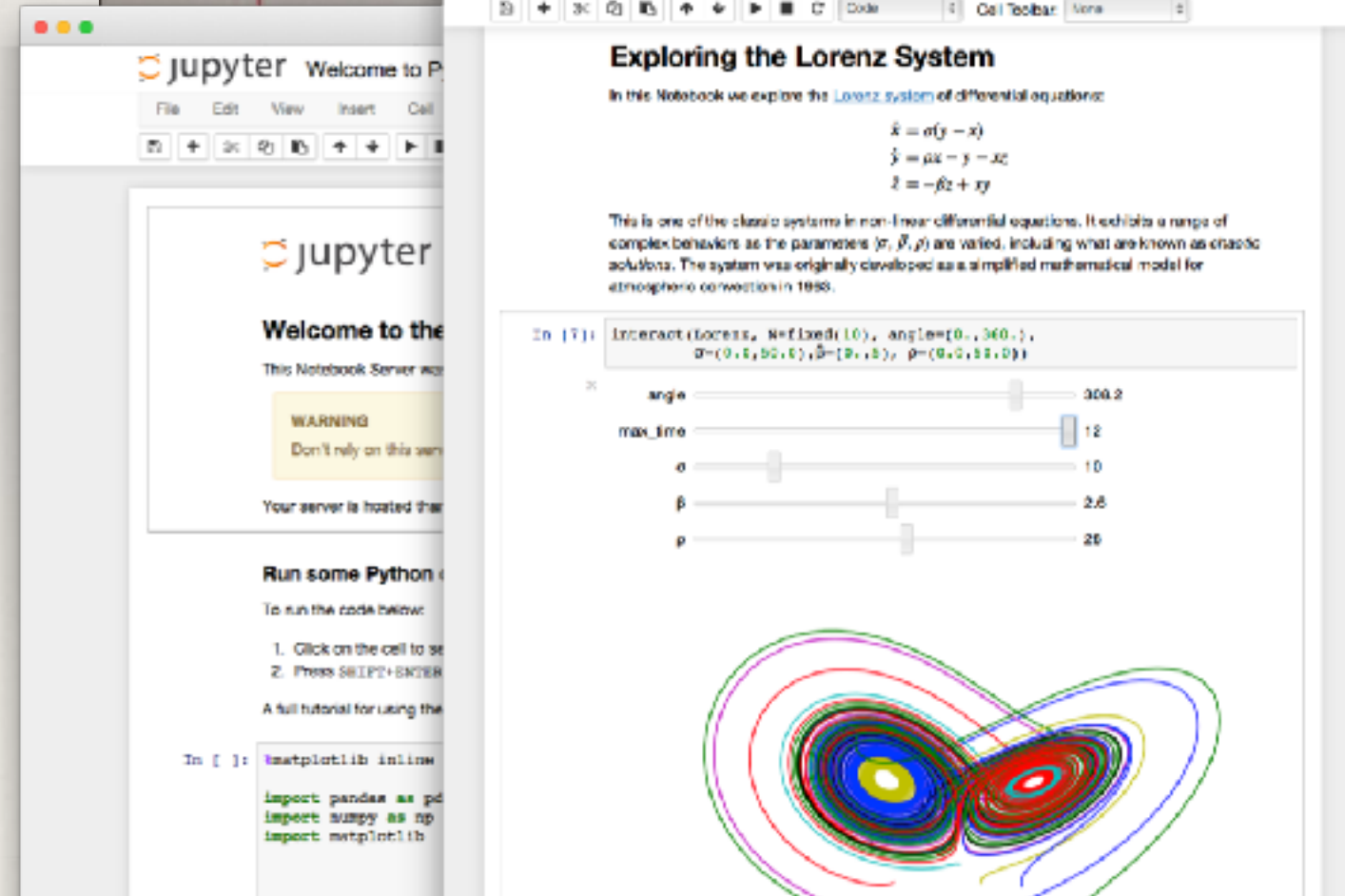
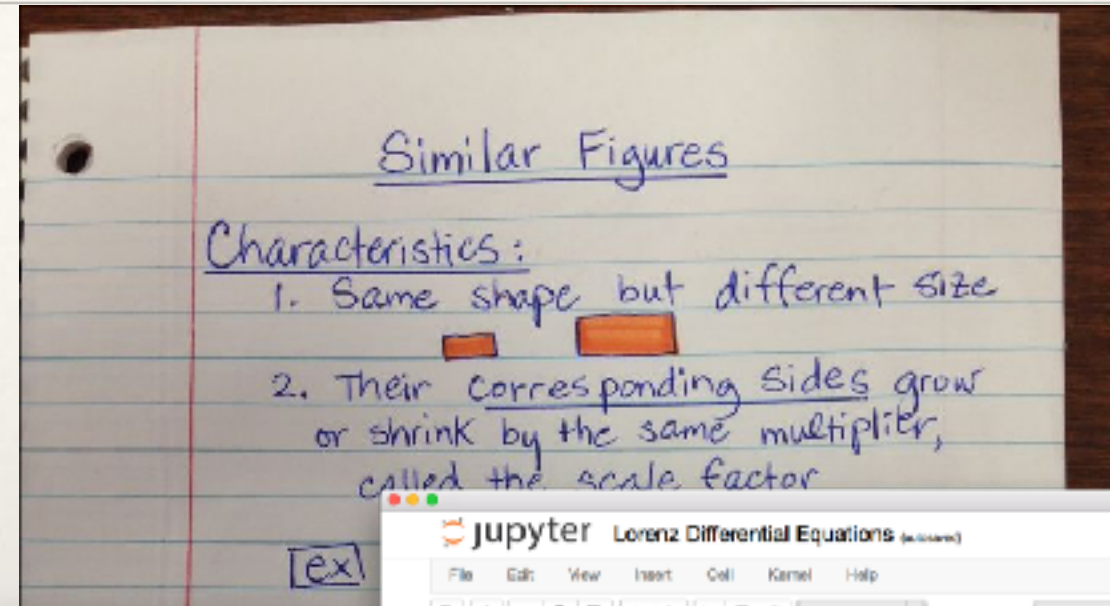
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- ❖ Popularized by Mathematica
- ❖ Popular in data science
- ❖ Astronomy: self-documented pipelines



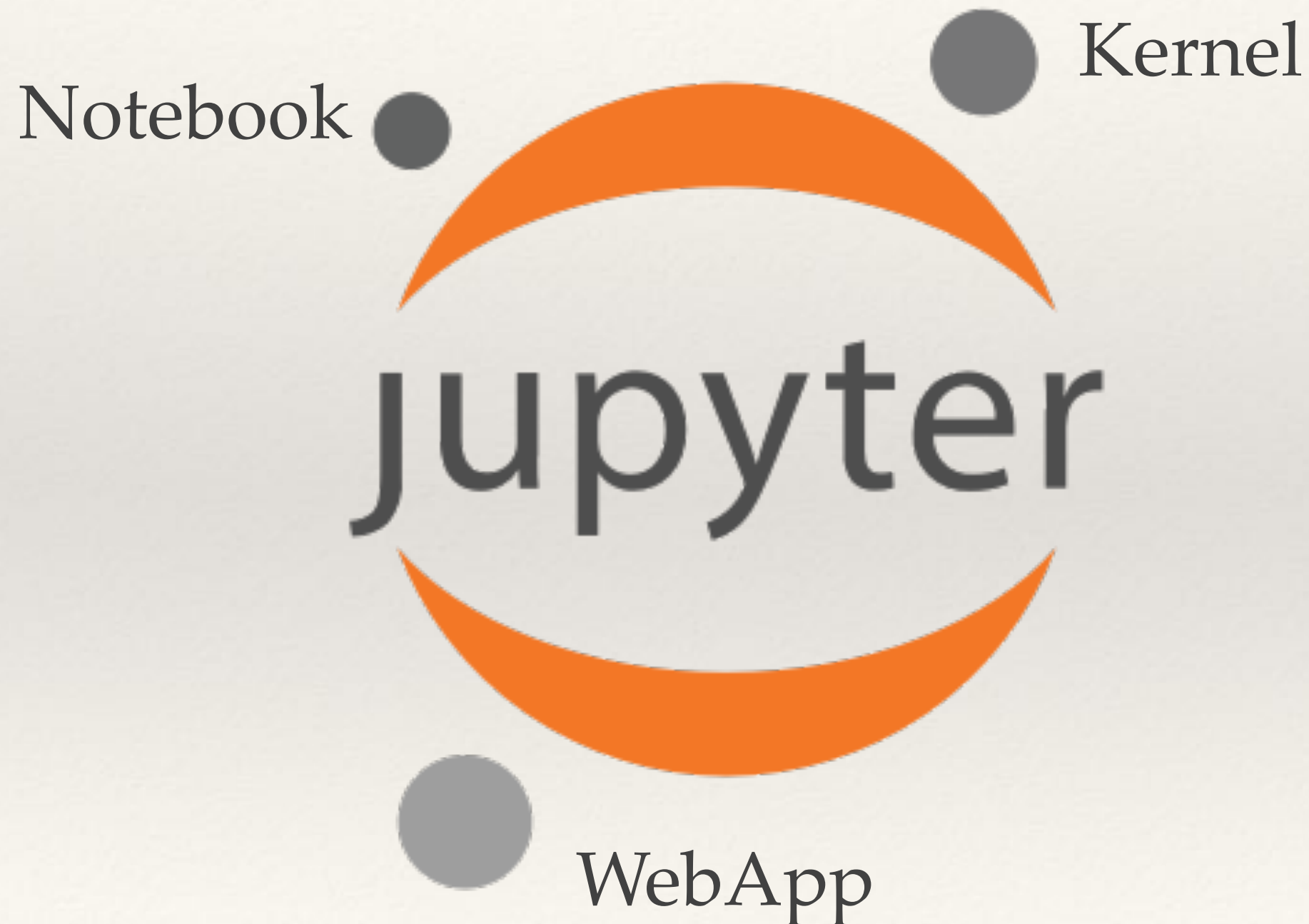
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- ❖ Popular in data science
- ❖ Astronomy: self-documented pipelines
- ❖ Reproducible research

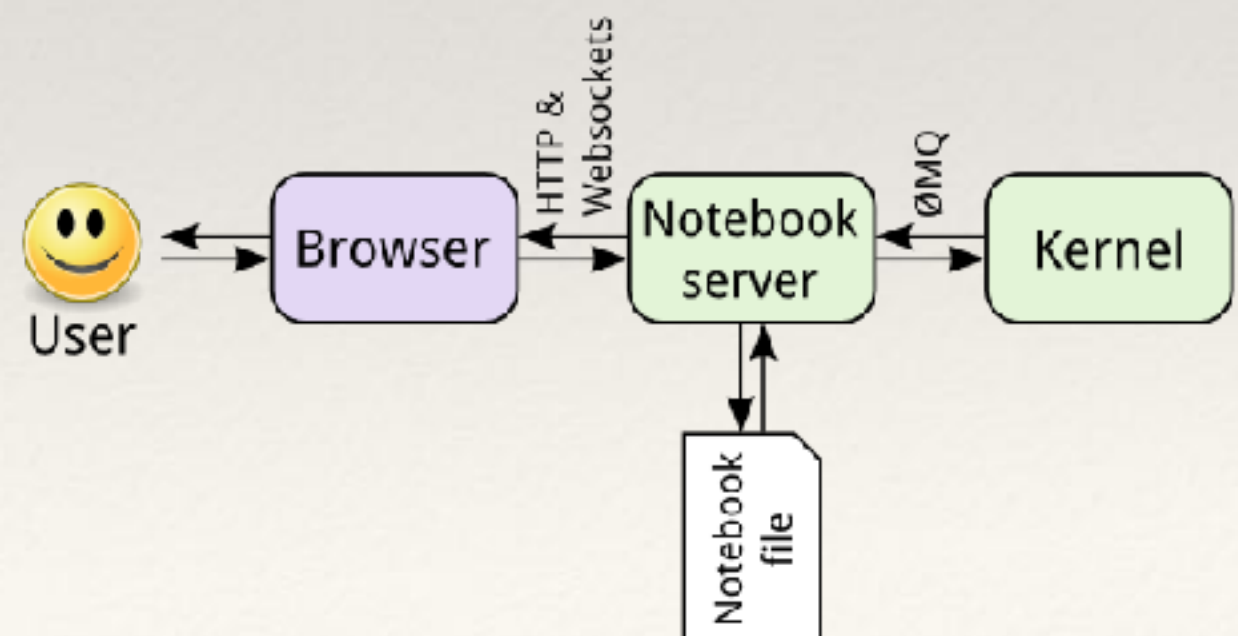
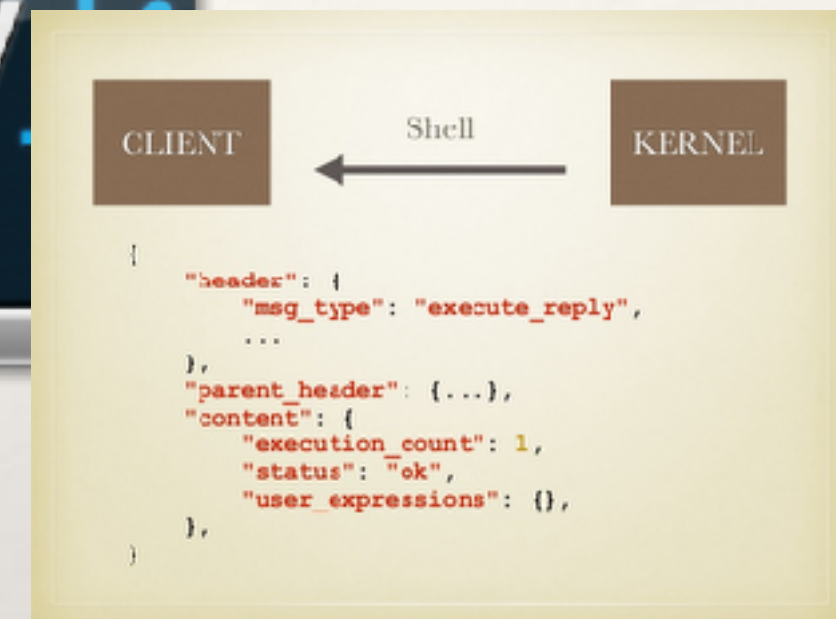
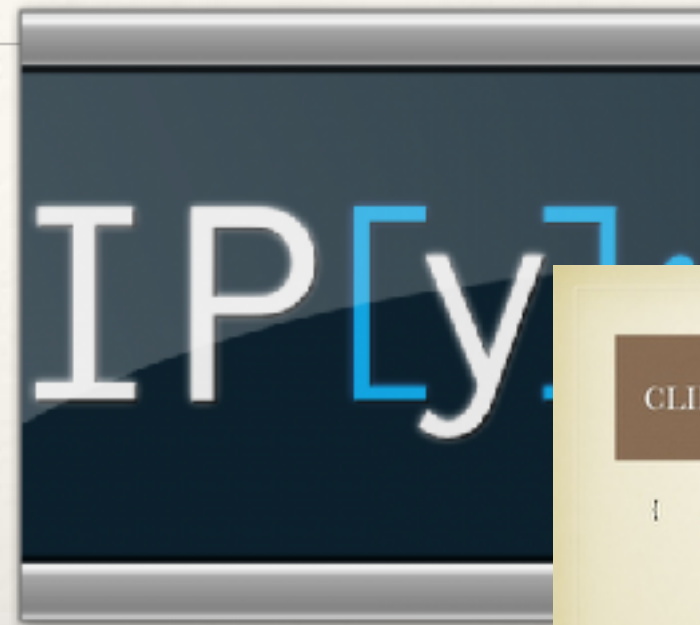


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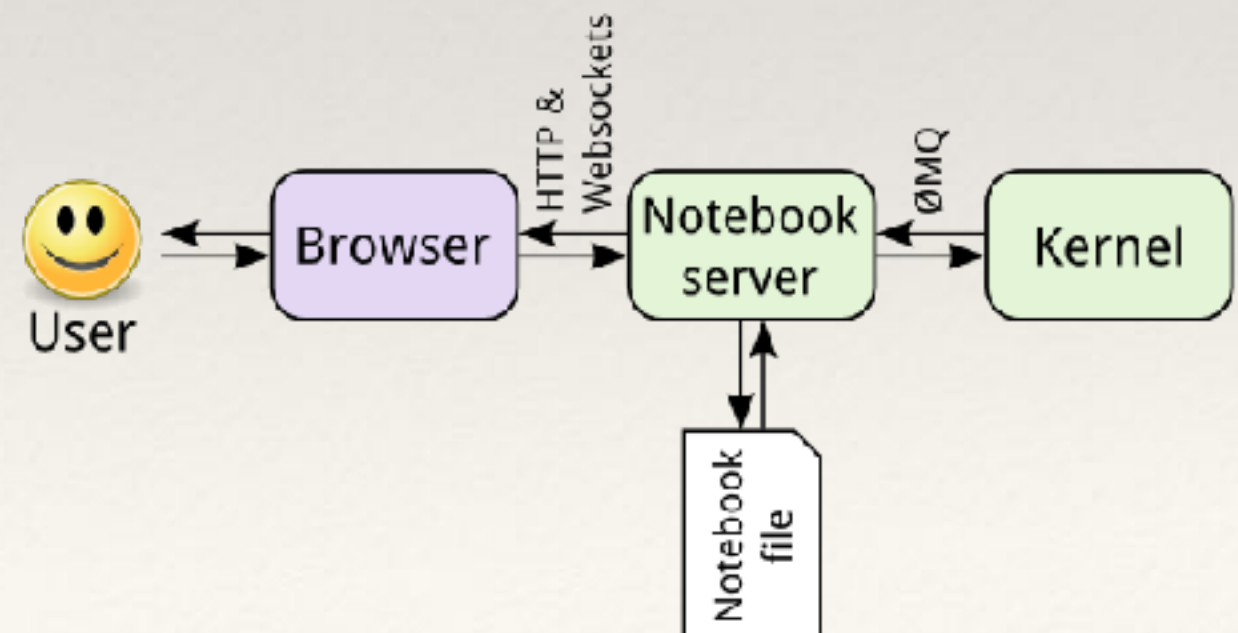
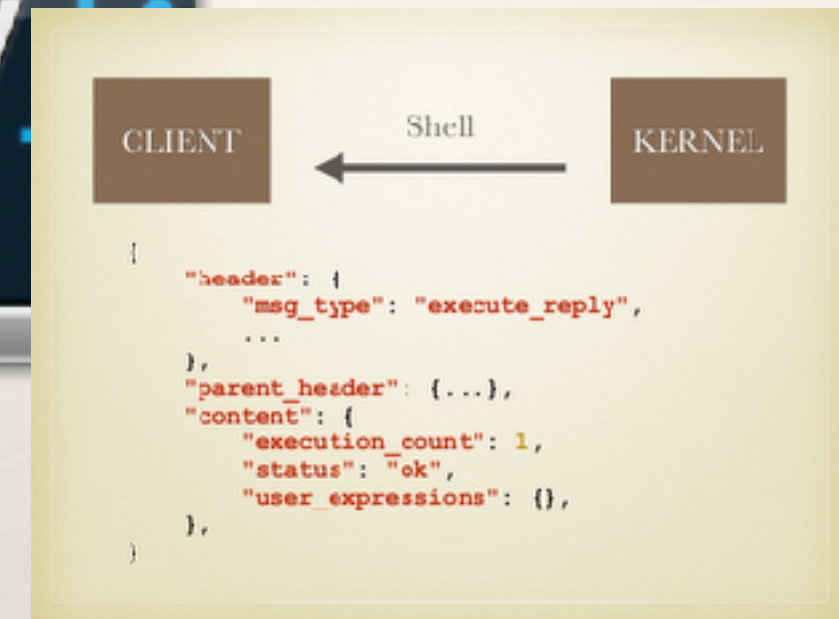
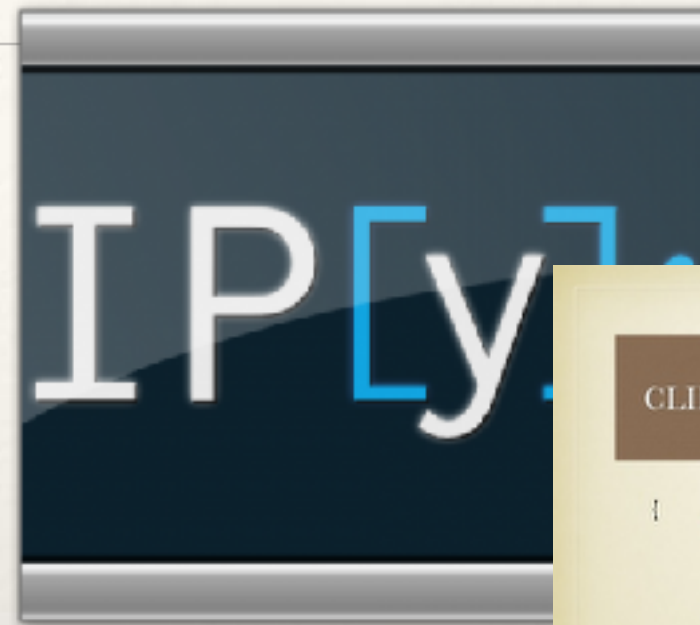
Kernel



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Kernel

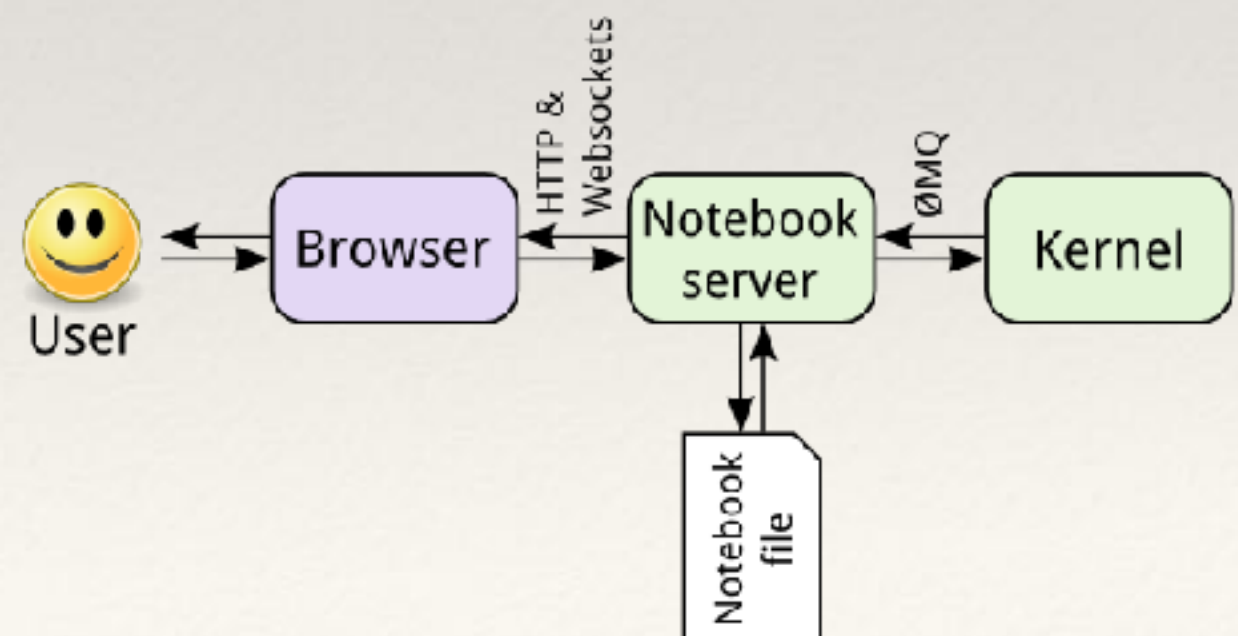
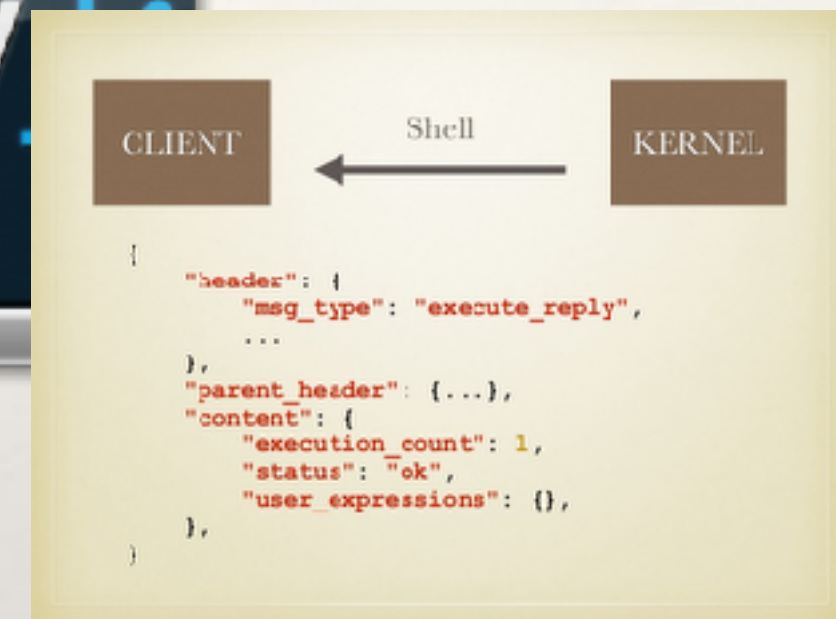
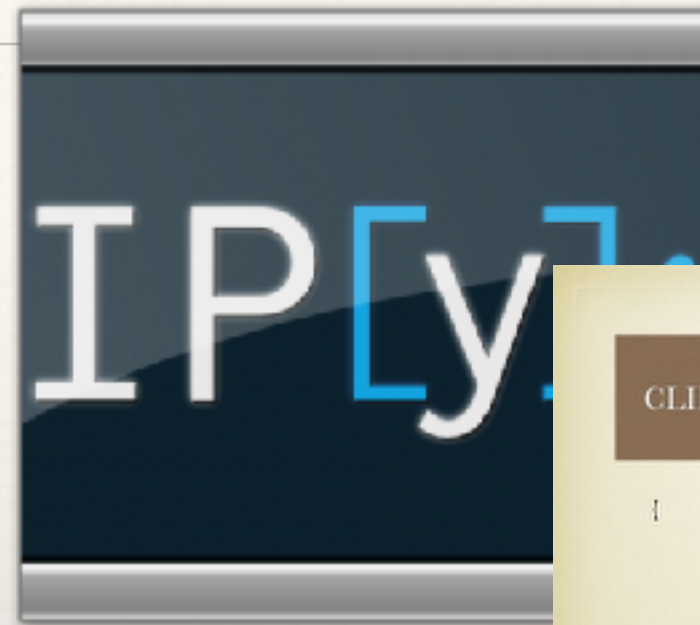
- ❖ Interactive code executor



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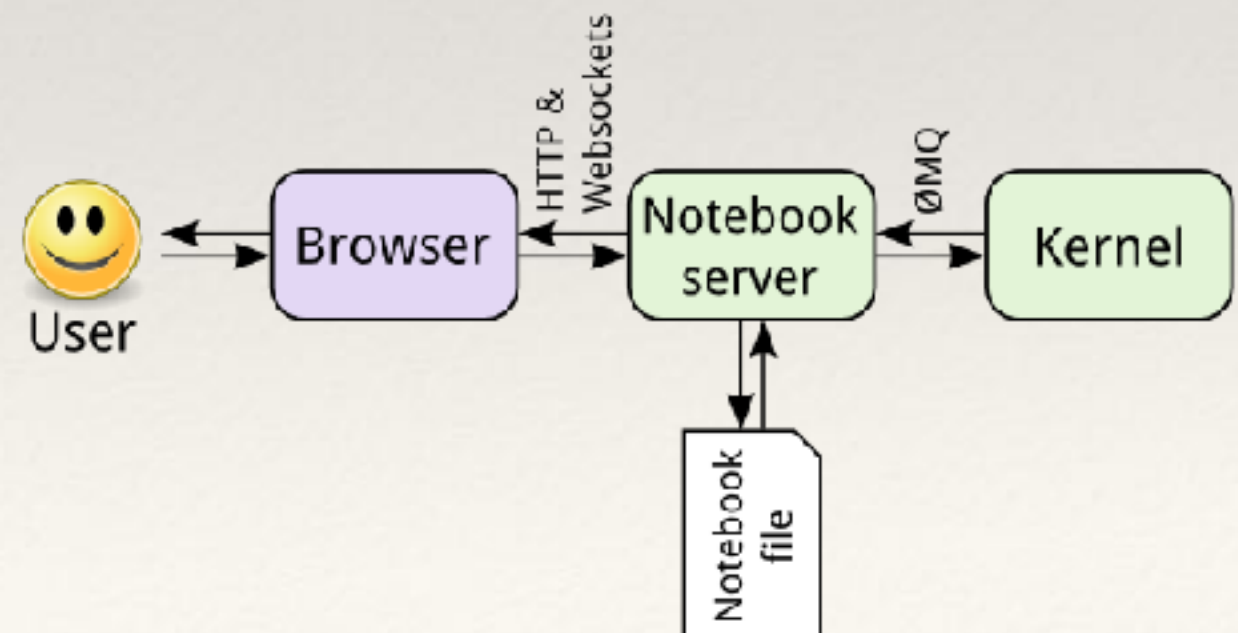
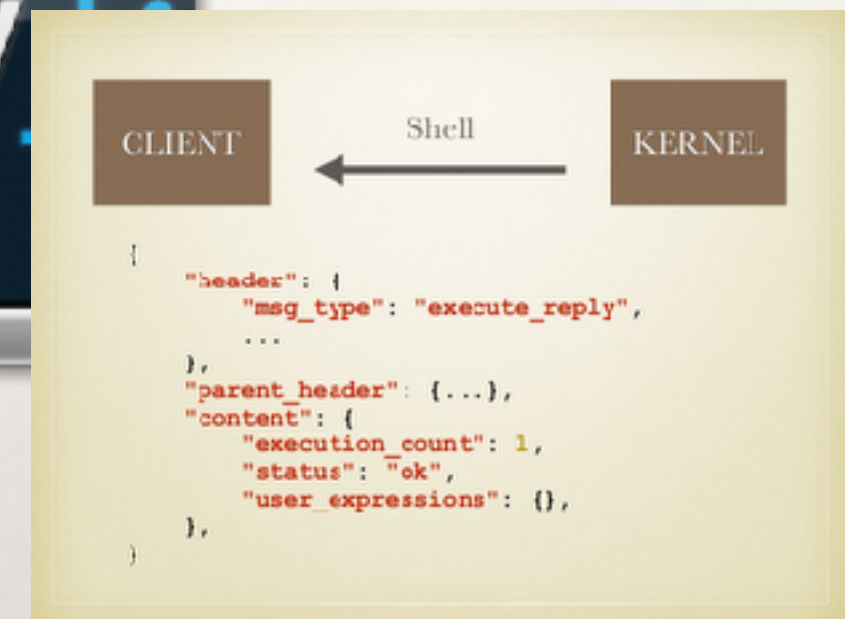
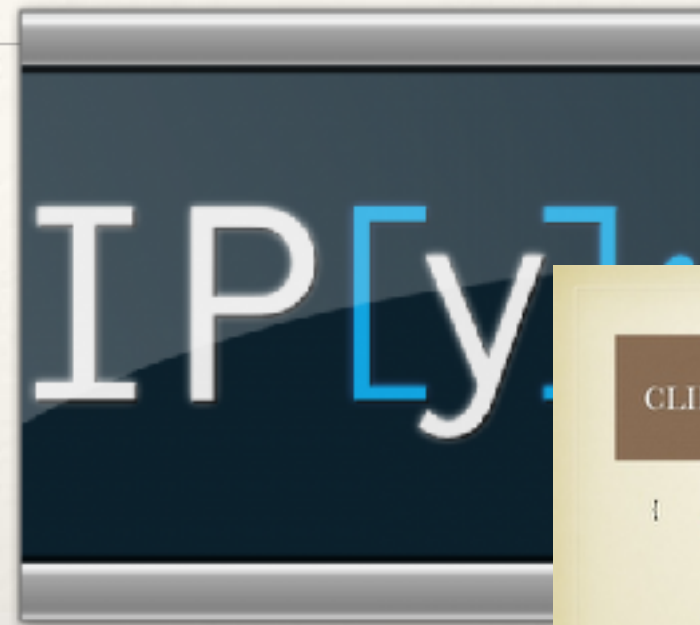
- ❖ Interactive code executor
- ❖ Running in the “background” of the notebook



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Kernel

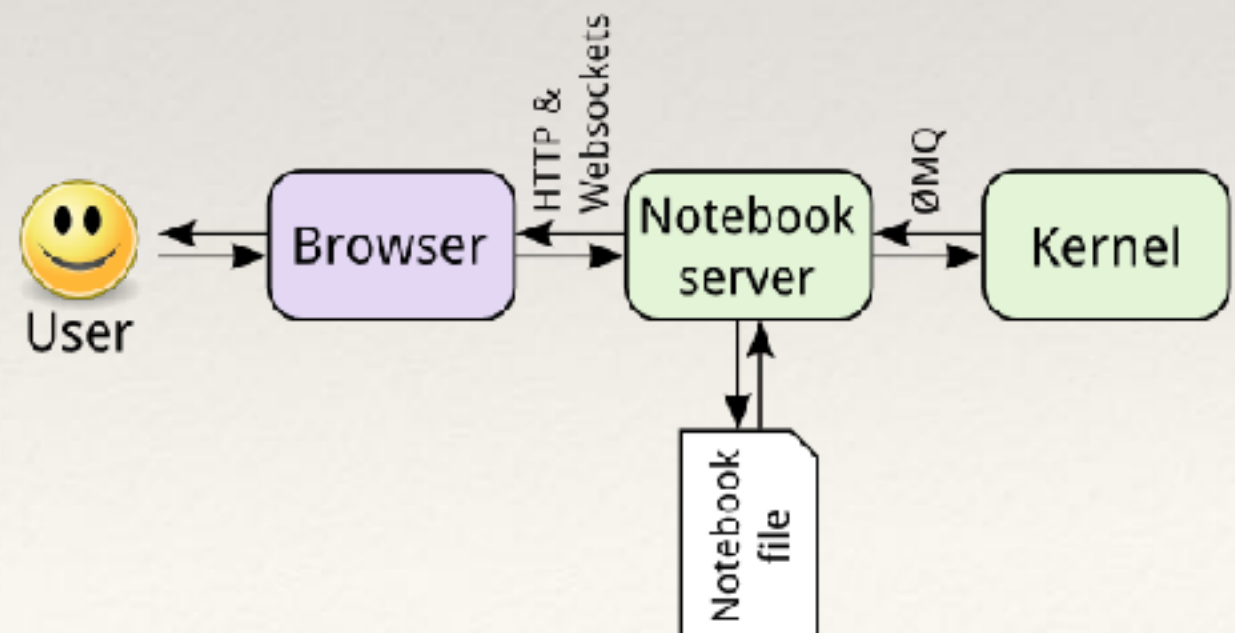
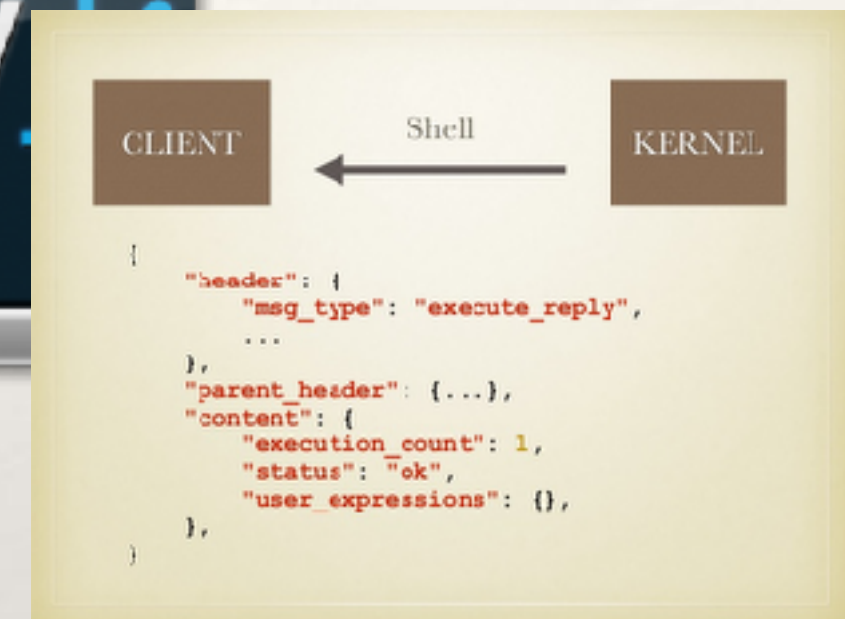
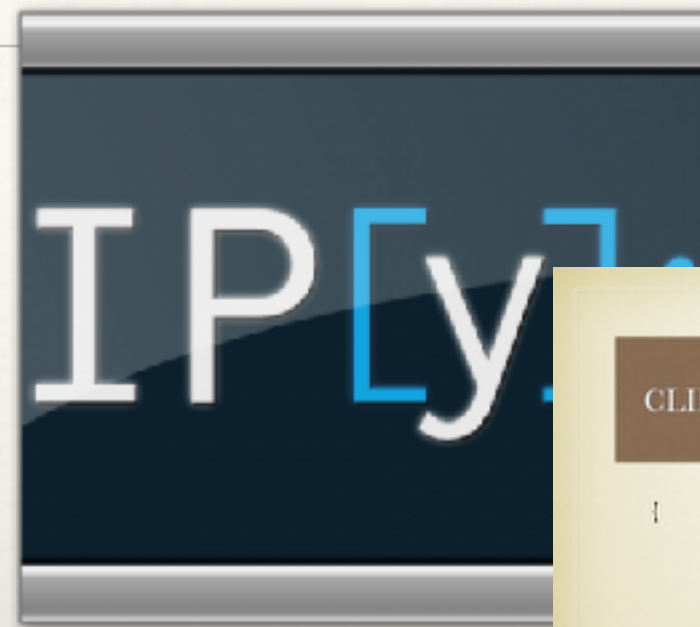
- ❖ Interactive code executor
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- ❖ Maintains the state (variables)



Basic Concepts of Jupyter

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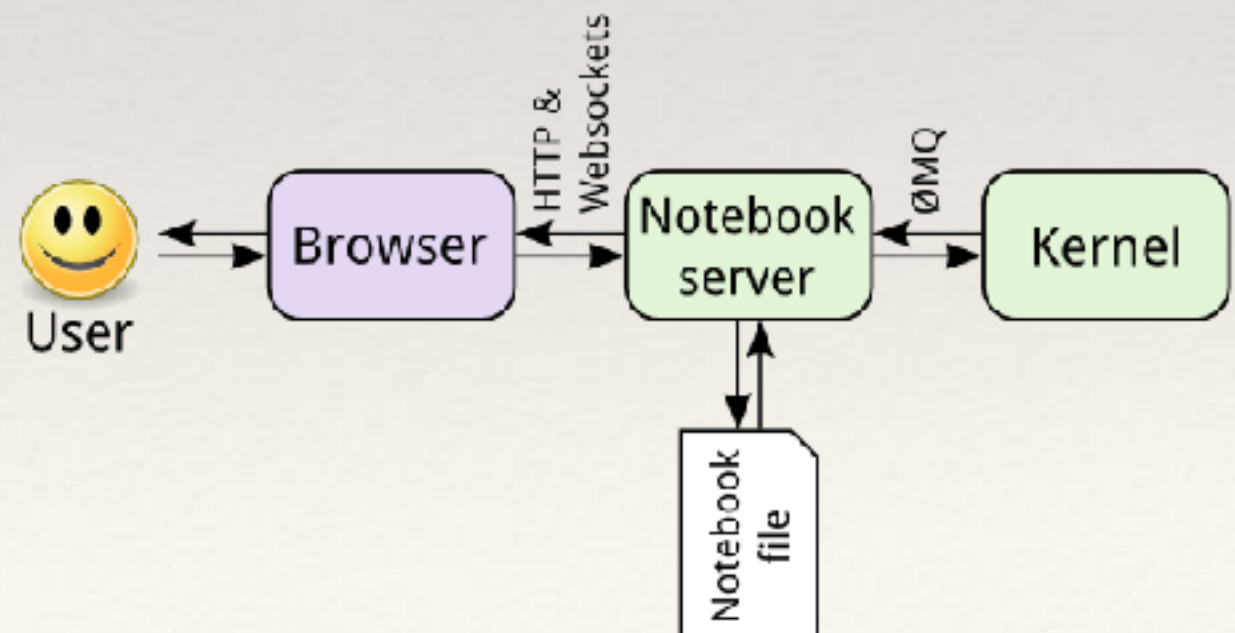
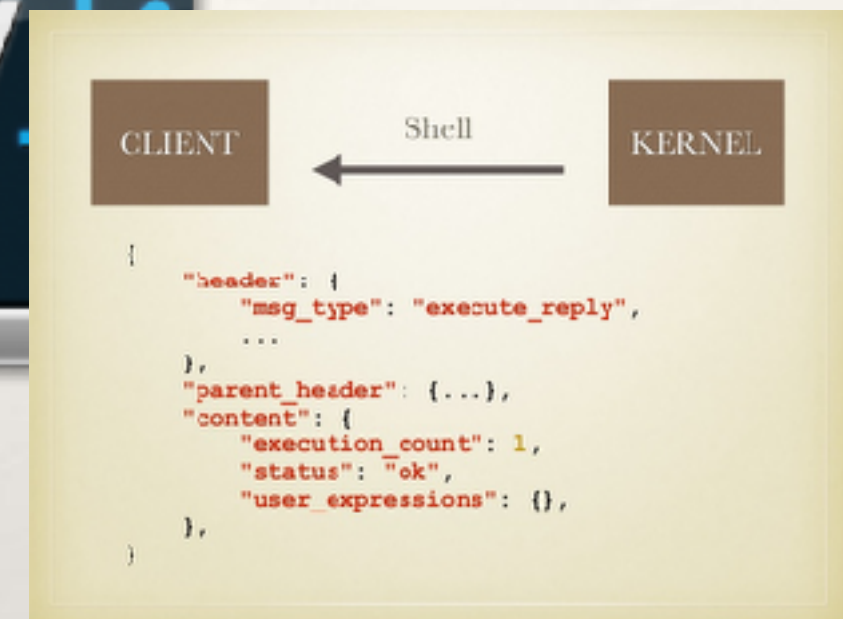
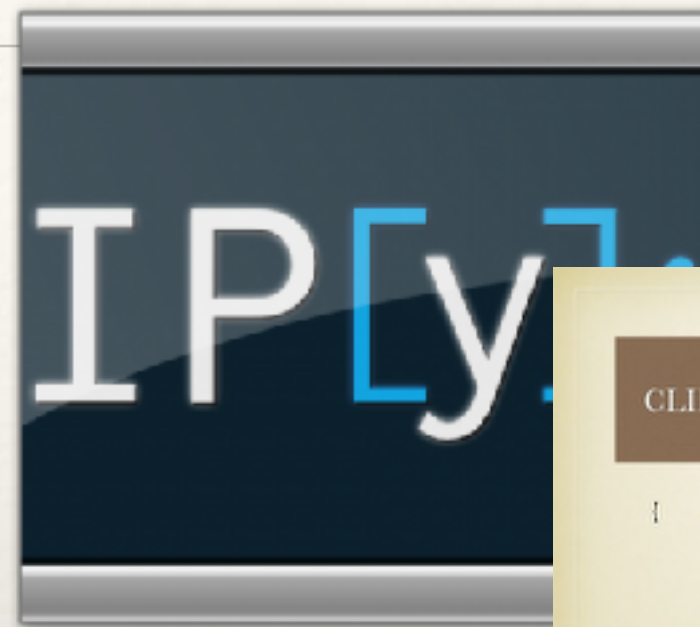
- ❖ Interactive code executor
- ❖ Running in the “background” of the notebook
- ❖ Maintains the state (variables)
- ❖ Jupyter supports several



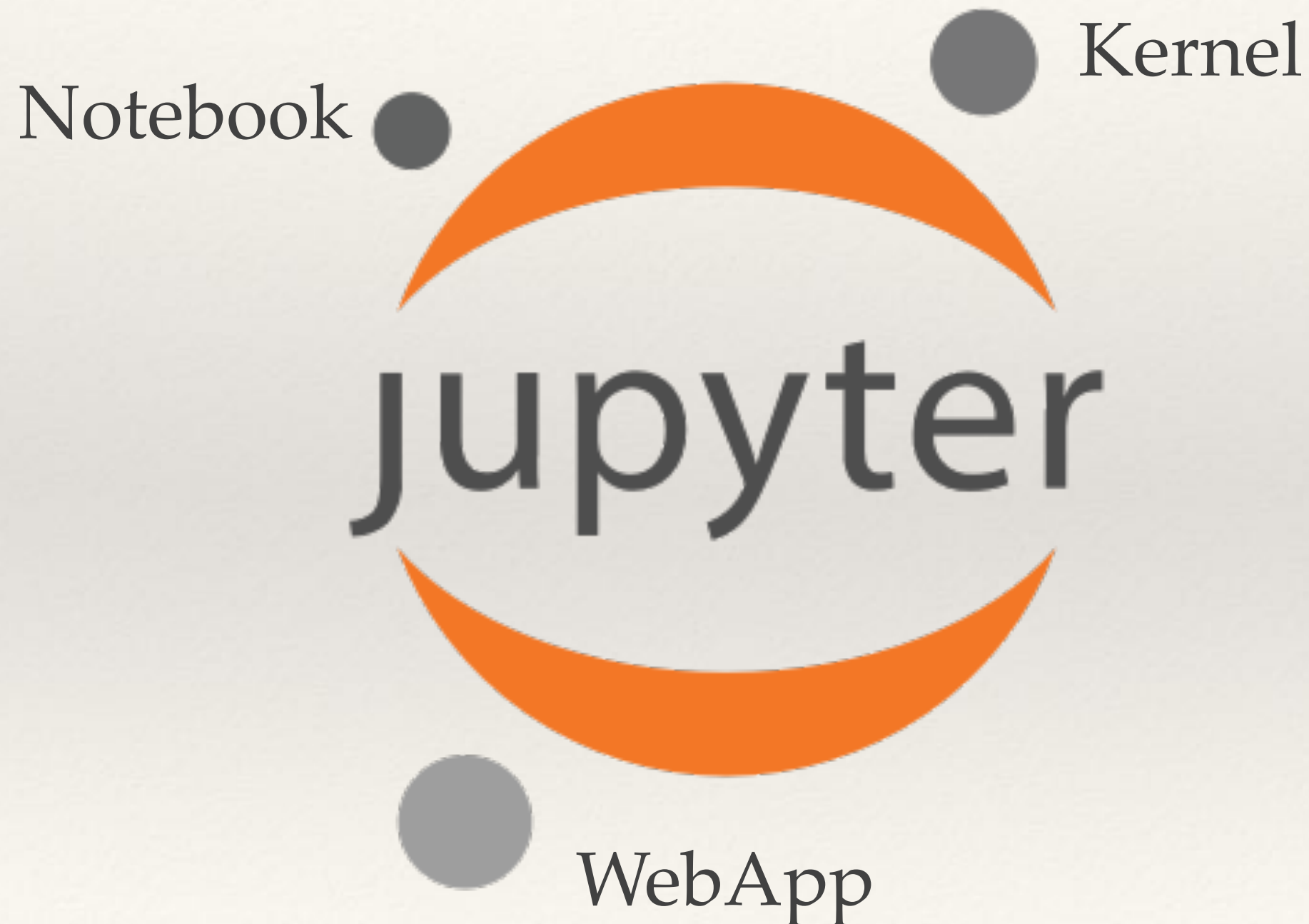
Basic Concepts of Jupyter

Kernel

- ❖ Interactive code executor
- ❖ Running in the “background” of the notebook
- ❖ Maintains the state (variables)
- ❖ Jupyter supports several
- ❖ We will use only **iPython** kernel

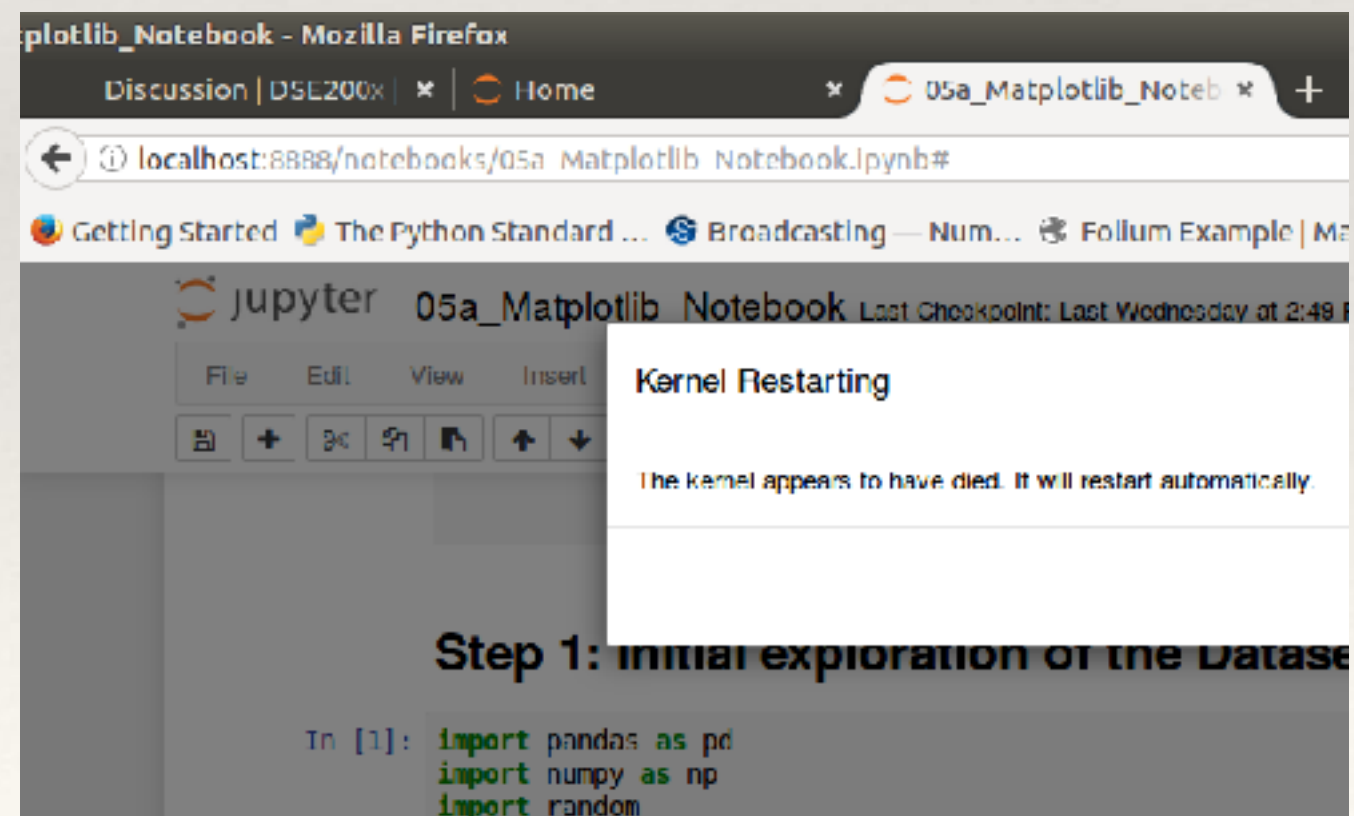
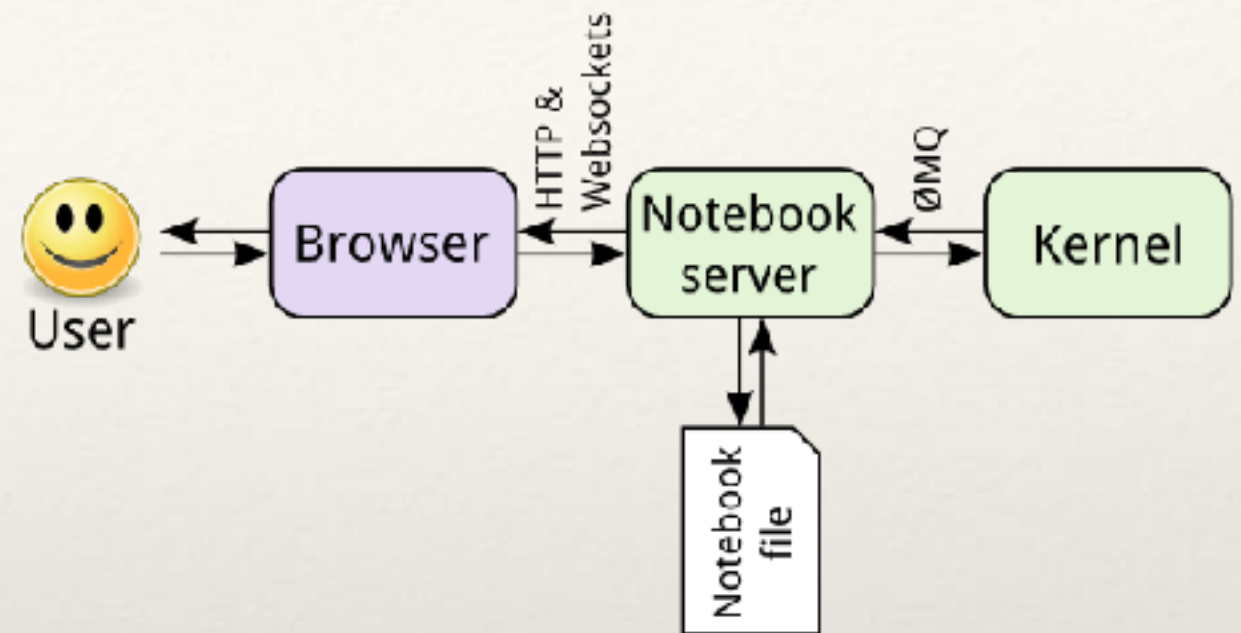


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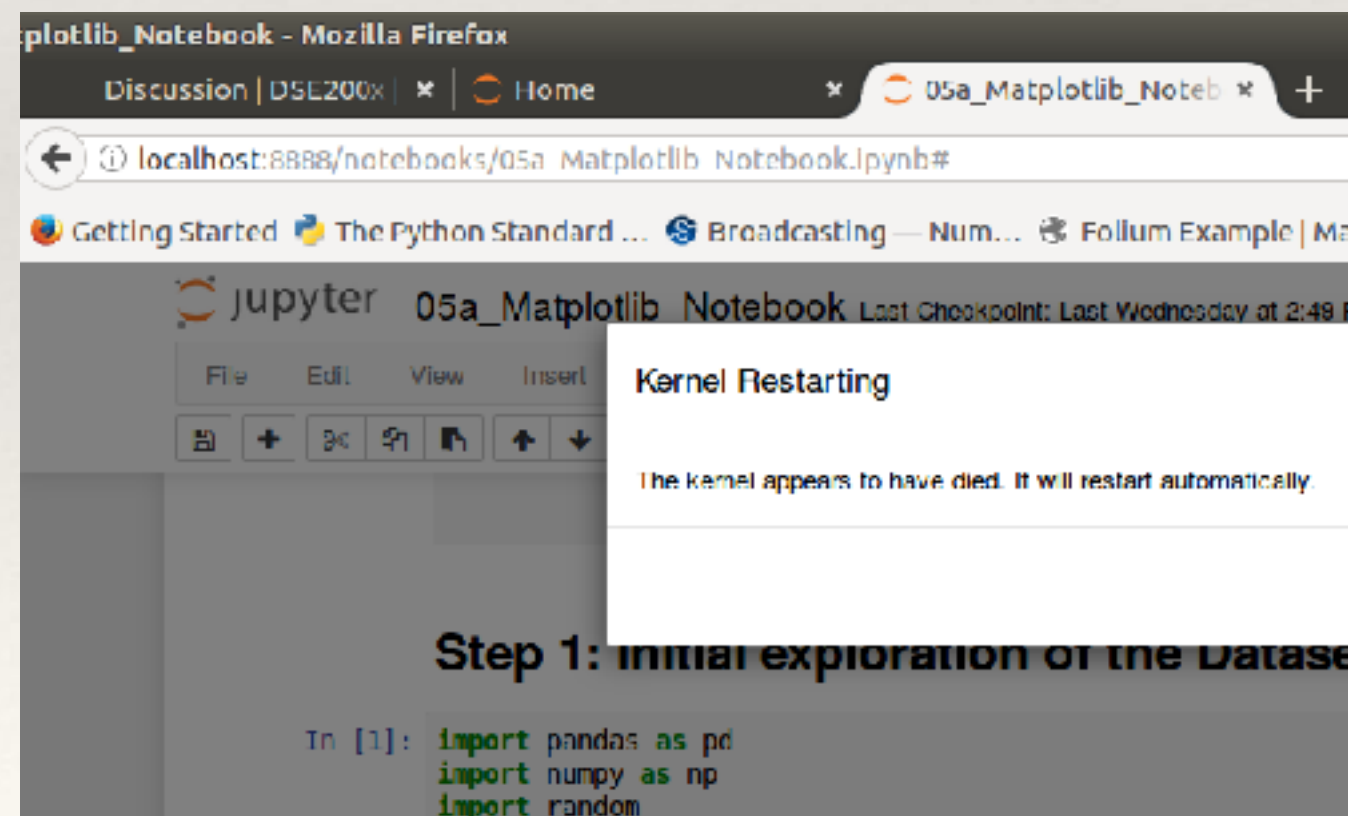
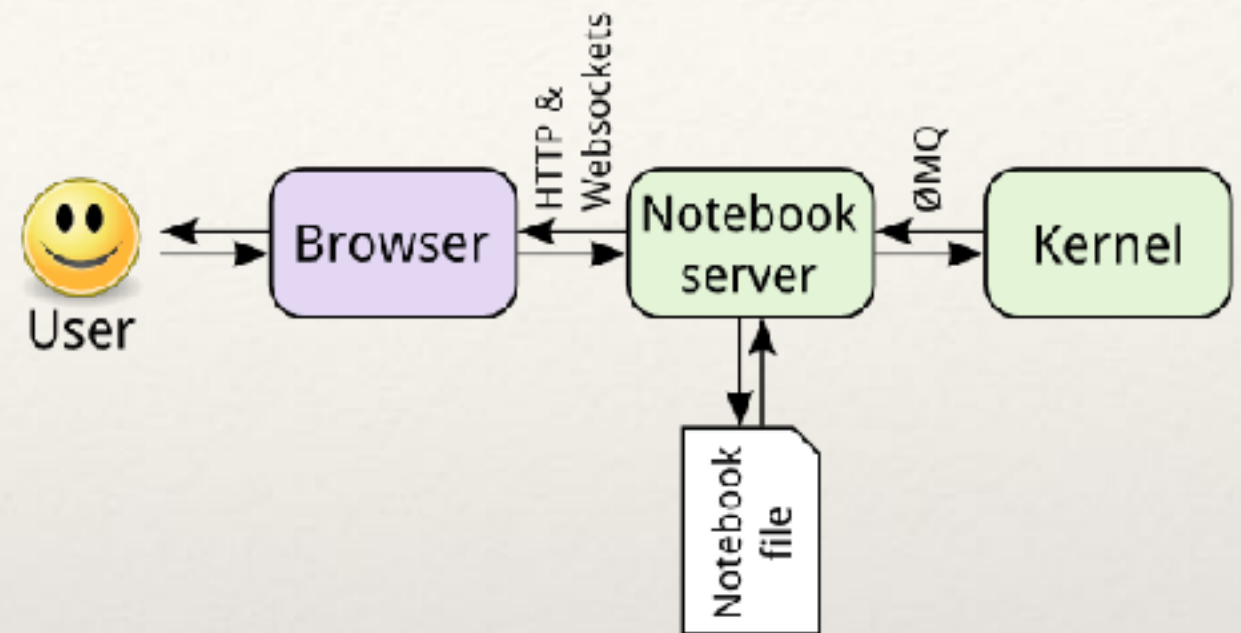
WebApp



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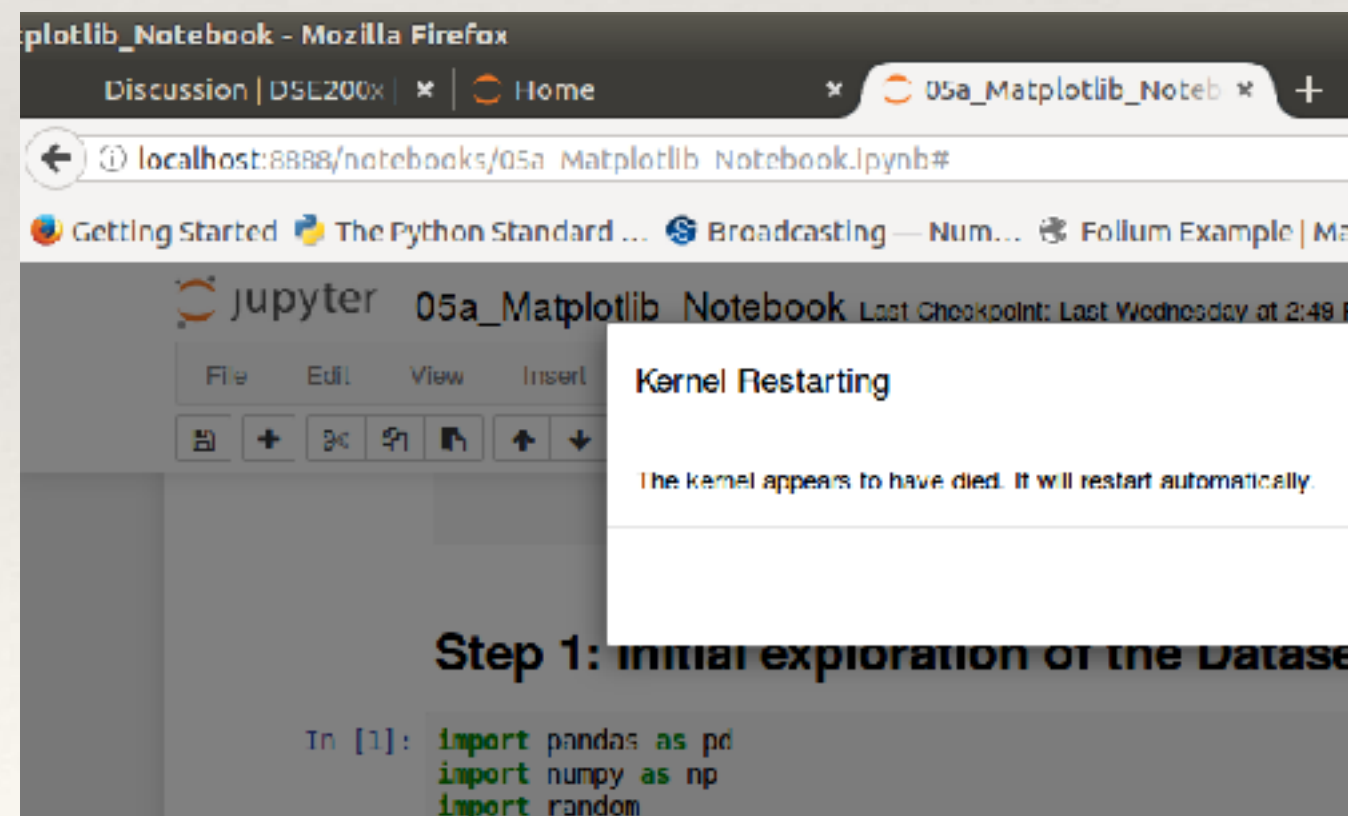
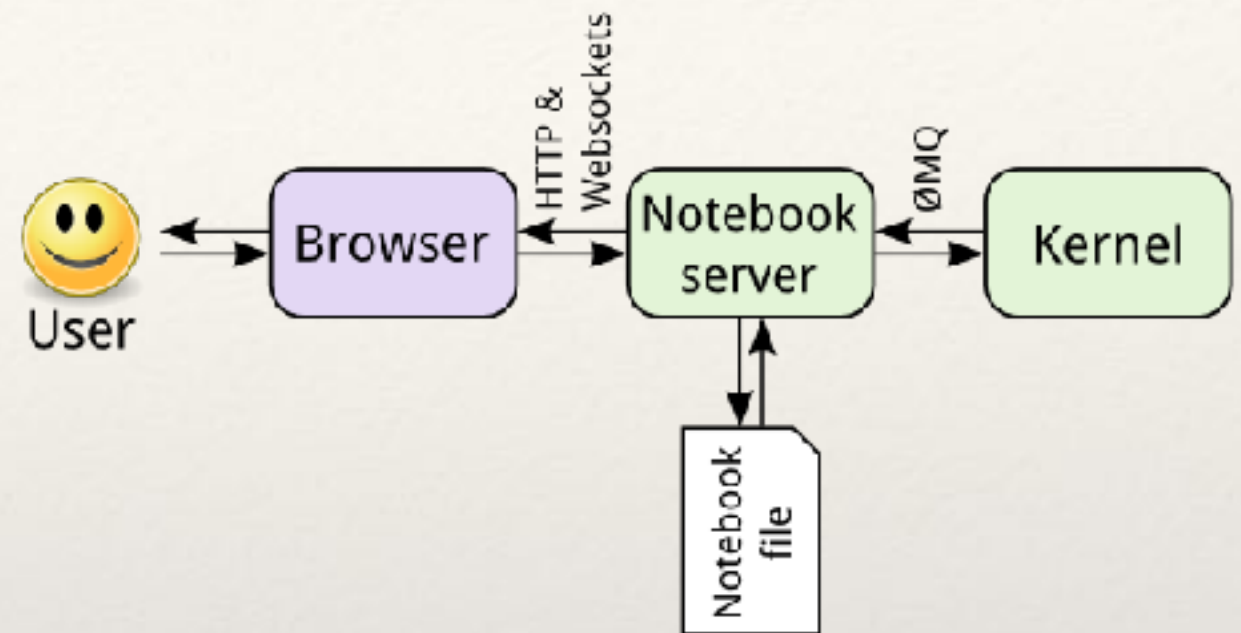
- ❖ Jupyter is a notebook server



Basic Concepts of Jupyter

WebApp

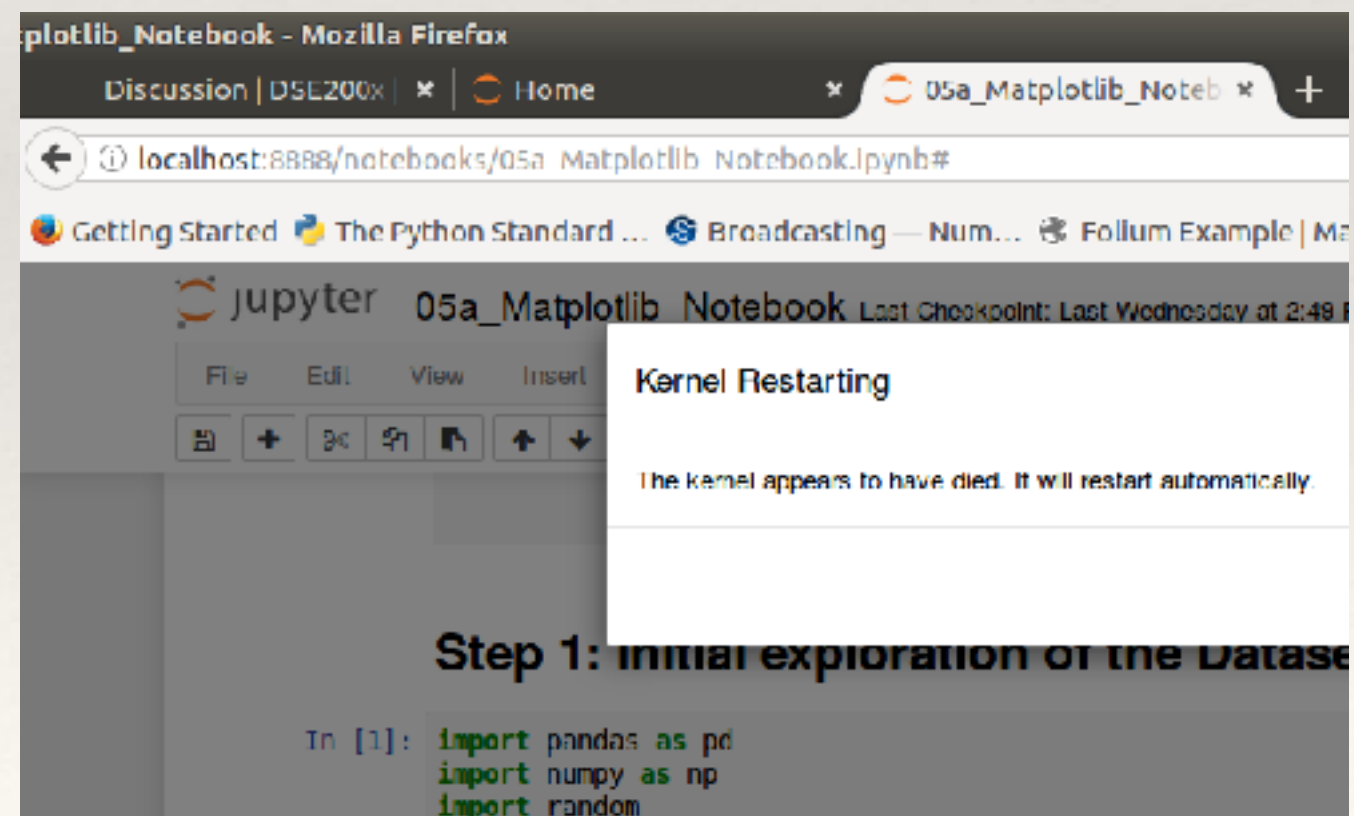
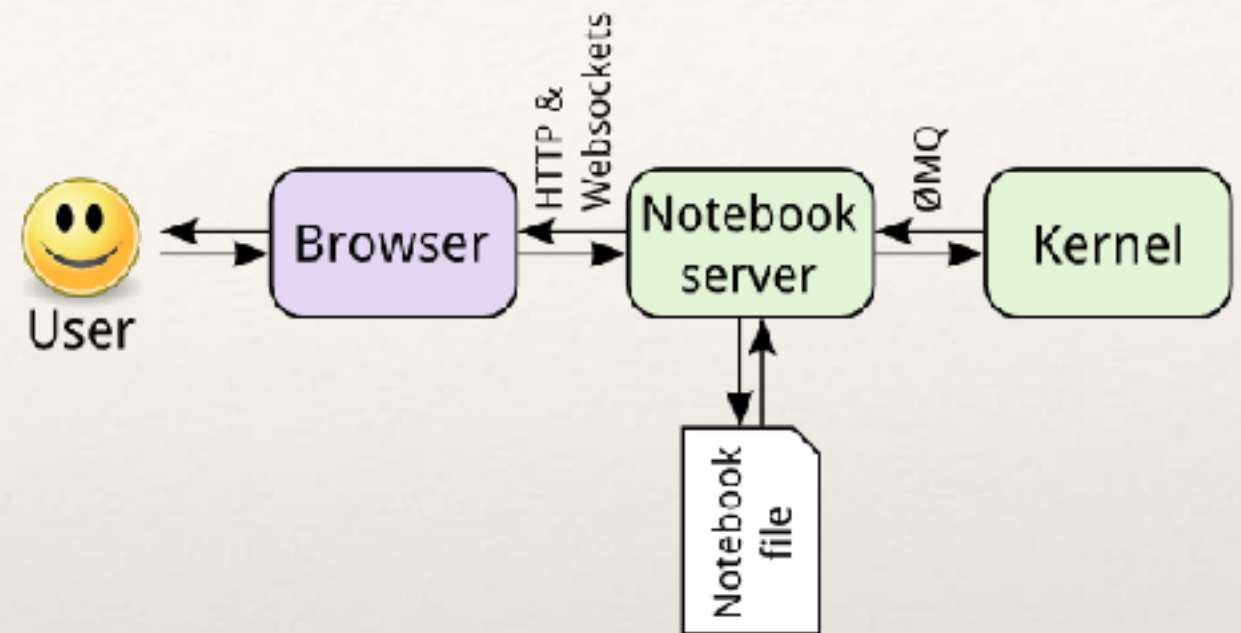
- ❖ Jupyter is a notebook server
- ❖ Your browser is the client



Basic Concepts of Jupyter

WebApp

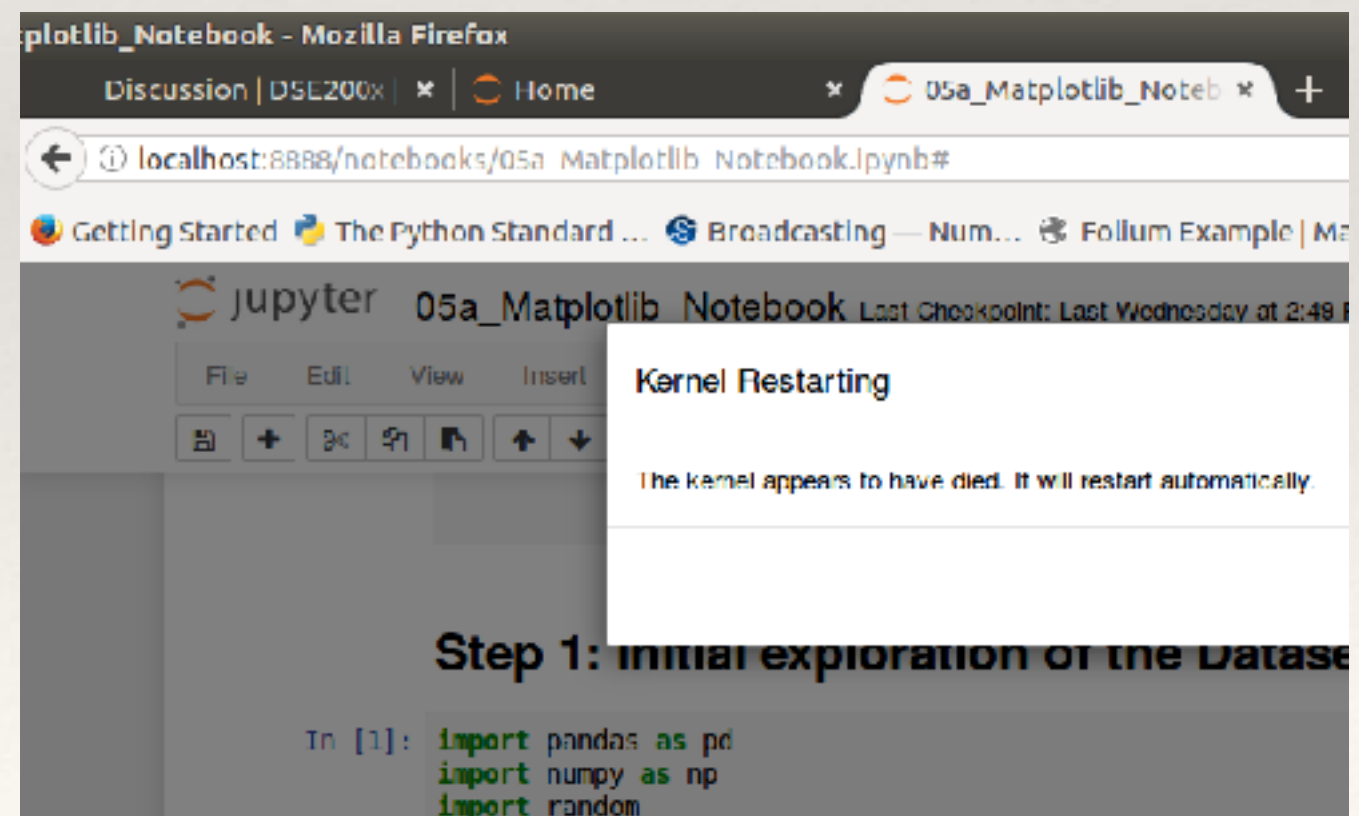
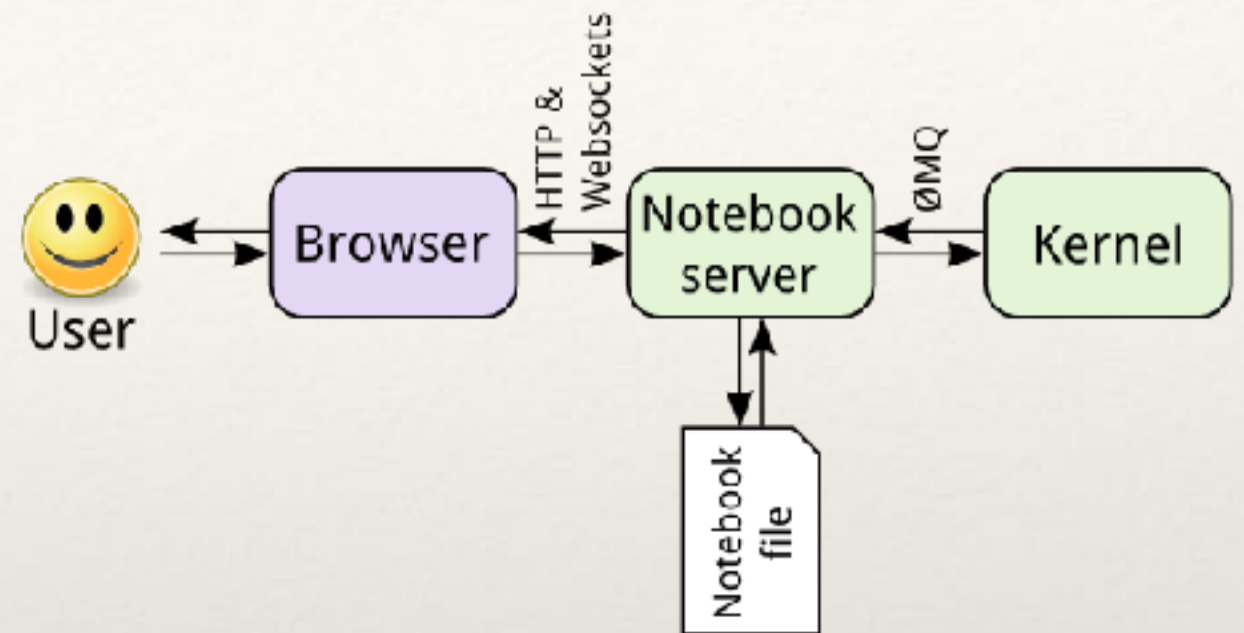
- ❖ Jupyter is a **notebook server**
- ❖ Your browser is the **client**
- ❖ The state is in the server, not in the browser



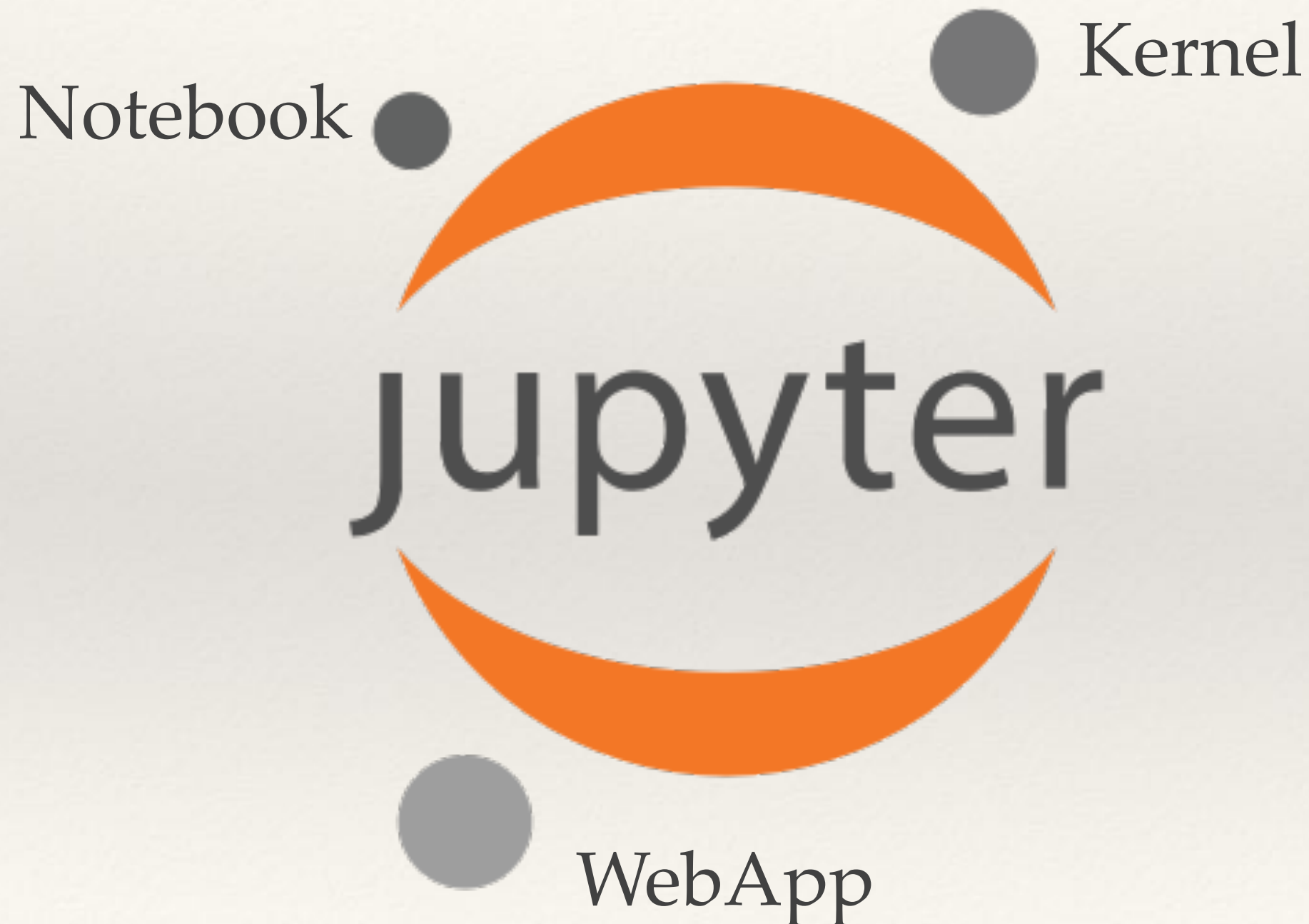
Basic Concepts of Jupyter

WebApp

- ❖ Jupyter is a **notebook server**
- ❖ Your browser is the **client**
- ❖ The state is in the server, not in the browser
- ❖ Is a Web Application, despite if you use it locally



Basic Concepts of Jupyter





Python



- ❖ I assume you know python (sorry if not)
- ❖ We will start with a few reminders though
- ❖ Then we will go to scientific python
- ❖ Then to astronomical python
- ❖ And end up with a short demo of our python packages

jupyter notebook

Our Posters & Presentations

- ❖ **Poster 067:** Docker-based Implementation for an Astronomical Data Analysis Cloud Service (Jovial)
- ❖ **Poster 072:** Towards Large-Scale RoI Indexing for Content-Aware Data Discovery (HPC)
- ❖ **Oral 9.2 (Wed 16:30) :** Wrapping and Deploying Legacy Astronomical Code Into Python Environments: An applied Case Study (pyCupid)