Data Mining I

Practical Class #1

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About us

David Silva

Academic background:

- Graduation in Information Management (2019 – NOVA IMS)
- MSc in Advanced Analytics (writing thesis – NOVA IMS)

Professional Experience:

- Consultancy project in Data Analysis
- Research in Natural Language Processing

About us

João Fonseca

Academic background:

- Graduation in Economics (2016 – NOVA SBE)
- MSc in Management (2019 – NOVA SBE)
- MSc in Information Management (2019 – NOVA IMS)
- PhD in Information Management (Since 2020 [Ongoing] – NOVA IMS)

Professional Experience:

- Research in Tourism Management
- Research in Remote Sensing, Natural Language Processing and Machine Learning methods (data augmentation, oversampling and active learning)

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Resources

- Bibliography
- Data Mining I Github repo:
    - https://github.com/joaopfonseca/Data-Mining-21-22
- Class slides and Jupyter Notebooks
- Google, Stack Overflow, documentations, Github and YouTube

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Our working environment

- We will be using Anaconda: Currently one of the most popular Python distributions.
- Sets up a data science oriented working environment in Python
- It installs a set of libraries (for now, think of libraries as programming tools – like a toolbox in a woodshop)
- But it can be used for many different purposes (all it takes is installing the necessary libraries)

Anaconda

www.anaconda.org

- Anaconda is one of the most popular Python distributions for Data Science
- Comes with most of the main libraries for data manipulation
  - Pandas
  - Numpy
  - Matplotlib
  - Scipy
  - …
- Easy to use and install

Virtual environments

https://docs.conda.io/projects/conda/en/latest/user-guide/concepts/environments.html
https://docs.conda.io/projects/conda/en/latest/user-guide/tasks/manage-environments.html

- Isolated spaces that contain per-project dependencies (specific collection of installed conda packages)
- Using conda to manage environments:
  - Create, export, list, remove, and update environments
  - Switching or moving between environments (conda activate)
  - You can also share an environment file
- You can also use pip to manage environment

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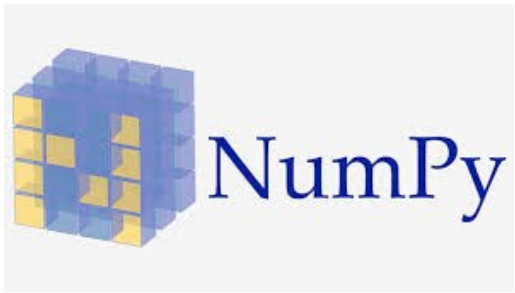
Python packages



NetworkX
Network Analysis in Python

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Git and GitHub

https://guides.github.com/activities/hello-world/
https://docs.github.com/en/github/getting-started-with-github

- What is GitHub?
  - Code hosting platform for version control and collaboration
- What is Git?
  - At the heart of GitHub is an open source **version control system** (VCS) called Git. Git is responsible for everything GitHub-related that happens locally on your computer.
- Why Git and GitHub?
  - You will need to use Git and GitHub for collaborating and version control in your projects. Also we have a GitHub repository with all the practical class contents:
  - https://github.com/joaopfonseca/Data-Mining-21-22

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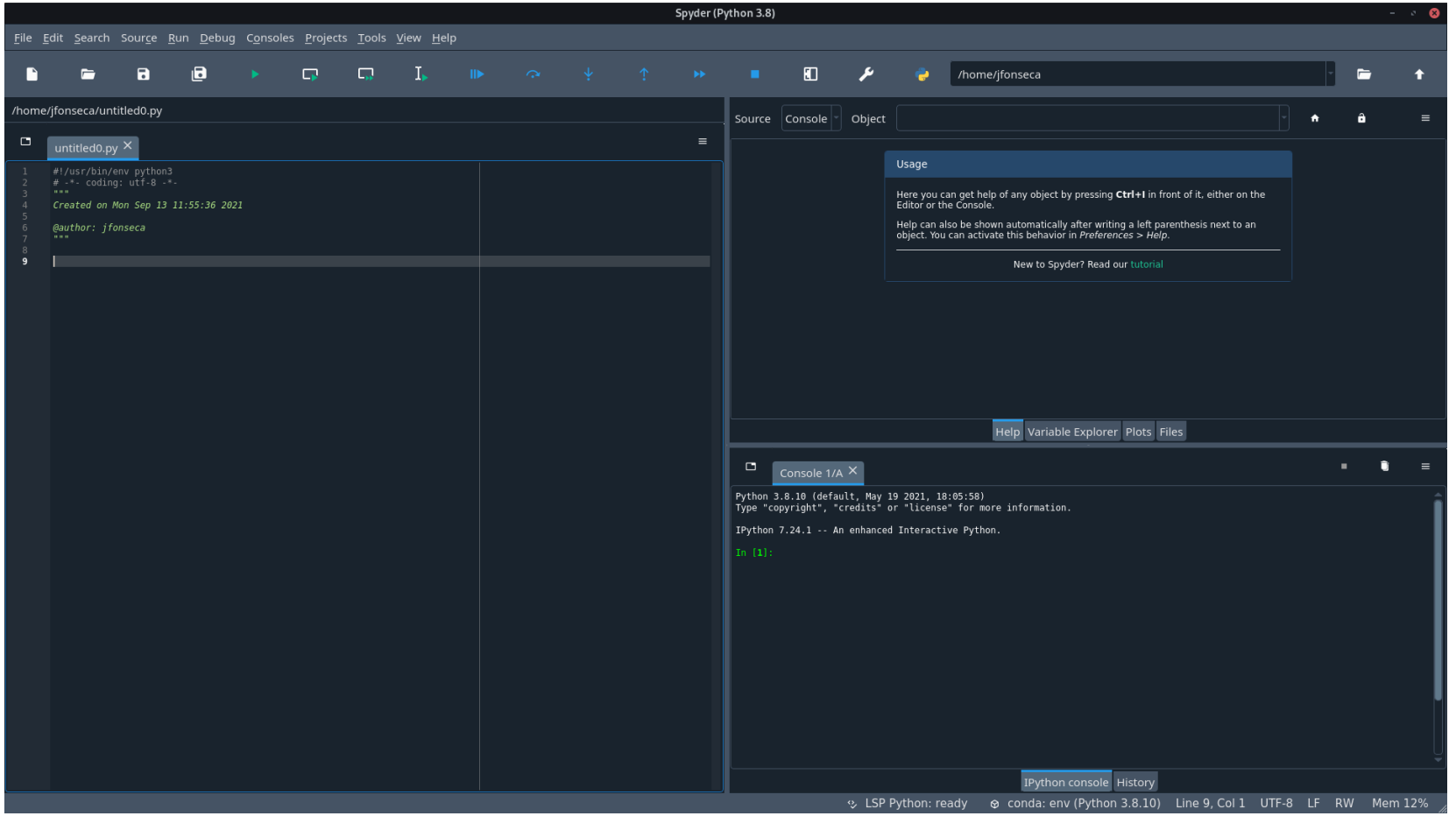
Main ways to access Python

- Python Shell and IPython
  - An interactive environment for writing and running code
- Jupyter Notebooks
  - A notebook that weaves code, data, prose, equations, analysis, and visualization
  - A tool for prototyping new code and analysis
  - A method for creating a reproducible workflow for scientific research
- IDE (Integrated Development Environment):
  - A software that helps you build code

Integrated Development Environment (IDE)

- Popular IDE's:
  - Spyder
  - PyCharm
  - VSCode
  - Rodeo
- Anaconda comes with Spyder and VSCode



Spyder

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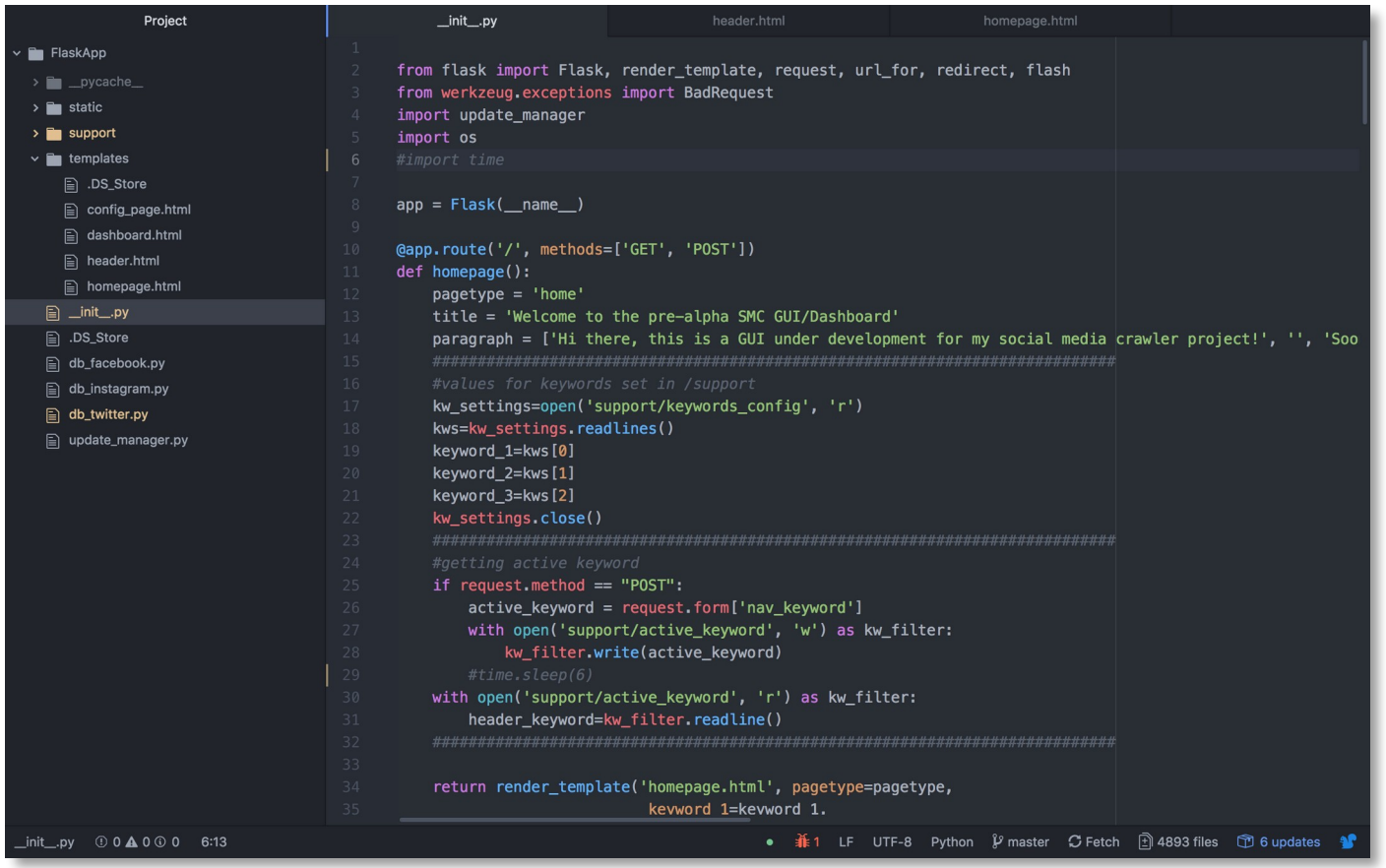
Text Editors

- Another method to write python scripts is using text editors
- Some popular text editors:
  - Vim (Linux terminal text editor)
  - Atom (popular open source editor)
  - Sublime Text (popular proprietary text editor)
  - Notepad ++ (Windows only)
- Usually highly customizable
- Usage of IDE and/or Text editor (and which ones to use) comes down to personal preference



Atom Text Editor

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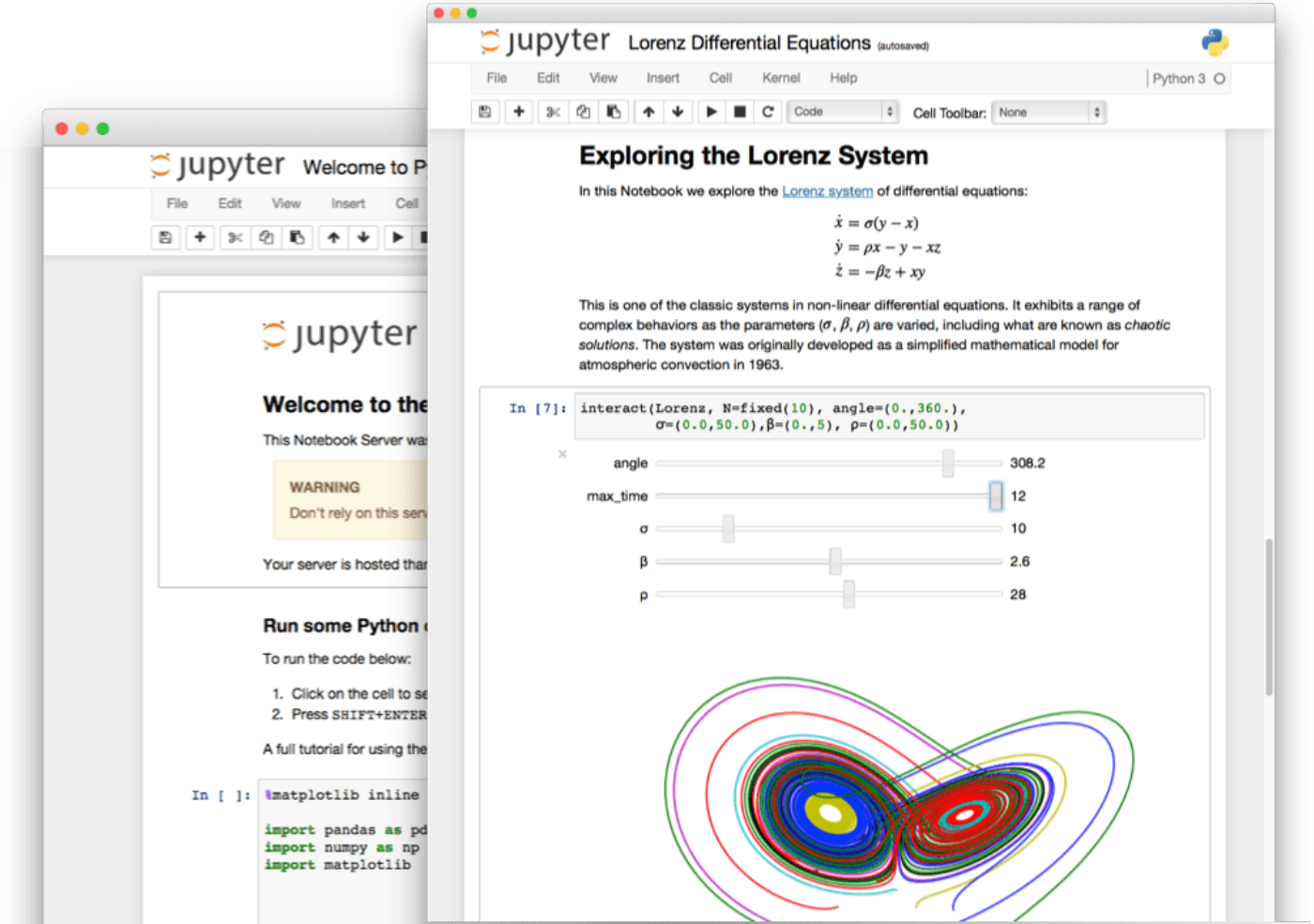
The Jupyter Notebook

http://jupyter.org/

- Let's try it out!
  - Open your Anaconda Navigator
  - Start Jupyter Notebook



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Data Mining Project

- Groups on Moodle **(up to 3 students)**
- Project guidelines on Moodle
- Anonymized data from a real-world **insurance company** (henceforth called "A2Z Insurance")
- Your goal is to develop a **Customer Segmentation** in such a way that it will be possible for the Marketing Department to better understand all the different Customers' Profiles.