# Python IDEs & Jupyter Notebooks

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# **Outline**

- 1. Motivations for IDEs
- 2. Popular IDEs
  - Python
    - VS Code
    - PyCharm
  - Data Sciences
    - Jupyter Notebooks
- 3. Jupyter Ecosystem
- 4. Using Jupyter Notebooks in virtual environment



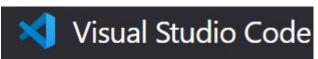
#### **Motivation for IDEs**

- Complex real life applications and computational problems
  - Lot of lines of code
  - Impossible to build/solve on Terminal or Console or Python shell
- Computational process
  - Develop
  - o Test
  - Document
  - Executing code
  - Communicate the results
- Integrated Development Environment (IDE) maximizes productivity to write code, and build applications quickly.

## **Popular IDEs**

#### **IDEs for Python:**

VSCode: <a href="https://code.visualstudio.com/">https://code.visualstudio.com/</a>



#### PvCharm:

https://www.ietbrains.com/pycharm/download



#### **IDE for Data Sciences**

Jupyter Notebooks: <a href="https://jupyter.org/">https://jupyter.org/</a>







Free software, open standards, and web services for interactive computing across all programming languages

#### 1. Jupyter Notebooks

- o Provides a web-based application suitable for capturing the whole computation process:
  - developing,
  - documenting,
  - executing code,
  - communicating the results.
- 2. Jupyter Lab
- 3. Jupyter Hub



## **Jupyter Notebooks**

#### Two Components

- 1. A web application
  - ✓ a browser-based tool
  - ✓ interactive authoring of documents
  - ✓ combine explanatory text, mathematics, computations and rich media output.
- 2. Notebook documents:
  - ✓ a representation of all content visible in the web application
  - ✓ Contains
    - inputs and outputs of the computations
    - explanatory text, mathematics,
    - images, and rich media representations of objects.



## Jupyter Notebooks: Web Application

- ✓ In-browser editing for code
  - automatic syntax highlighting,
  - indentation, and
  - □ tab completion/introspection.
- Execute code from the browser,
  - ☐ Shows the results of computations attached to the code
- ✓ Displaying the result of computation over HTML, LaTeX, PNG, SVG, etc.
- ✓ In-browser editing
  - ☐ for text using the Markdown markup language
    - ☐ Acts as a commentary for the code
  - includes mathematical notation within markdown cells using LaTeX



#### **Jupyter Notebook Documents**

- ✓ Contains the inputs and outputs of a interactive session as well as additional text that accompanies the code
- ✓ Internally JSON files and are saved with the .ipynb extension.
  - ☐ JSON is a plain text format,
  - version-controlled and
  - **a** can be shared with colleagues for collaboration.
- ✓ Exported to a range of static formats (using the nbconvert command)
  - ☐ HTML,
  - □ reStructuredText,
  - □ LaTeX,
  - □ PDF
  - □ slide shows



## **Working with Jupyter Notebook**

- 1. Create a virtual environment
- 2. Activate virtual environment
- 3. Install Jupyter notebook
  - 1. Run: pip install notebook
- 4. Open the Jupyter notebook
  - 1. Go to the folder on command prompt (Windows) or Terminal (Mac/Linux)
  - 2. Run: jupyter notebook
- 5. Jupyter notebook is opened on your default browser at this URL: <a href="http://127.o.o.1:8888">http://127.o.o.1:8888</a>
- 6. Open new notebook
  - 1. **For text**: use the text cell
  - 2. **For code**: use the code cell to type and run the code



#### **Markdown Basics**

- 1. Italic text
- 2. Bold text
- 3. Itemized or enumerated lists
- 4. Block quotes
- 5. Headings
- 6. Code blocks (non-executable) for text
- 7. Latex equations
- 8. Tables
- 9. Local files

#### **Practice:**

Jupyter Notebook 101.ipynb









### References

- https://jupyter-notebook.readthedocs.io/en/stable/notebook.html
- https://www.markdownguide.org/



