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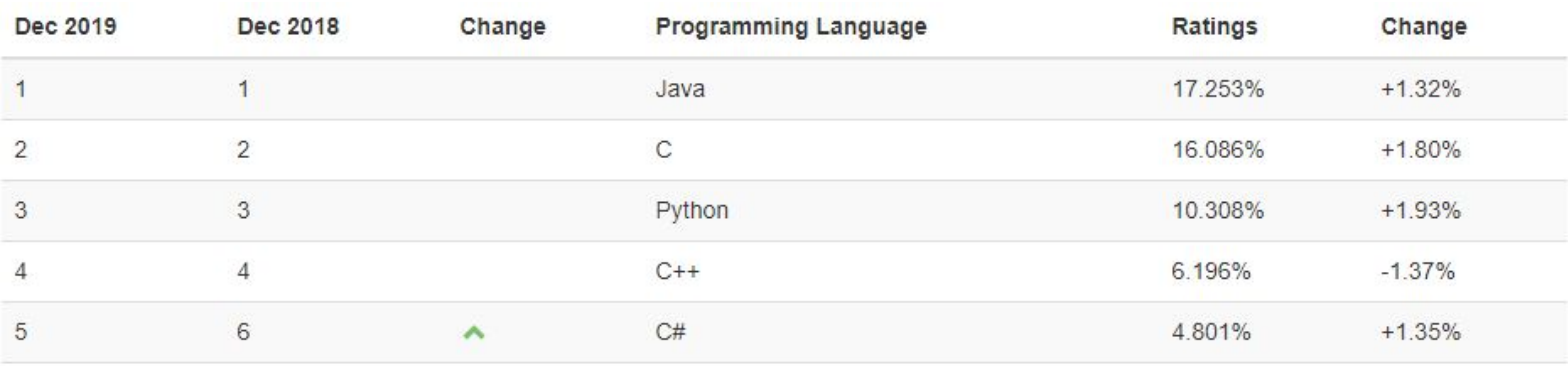
PYTHON INTRODUCTION

WHY PYTHON?

POPULARITY

- **3rd in TIOBE Programming Community Index**, measuring the popularity of programming languages
- Large community → More libraries to solve problems



Dec 2019	Dec 2018	Change	Programming Language	Ratings	Change
1	1		Java	17.253%	+1.32%
2	2		C	16.086%	+1.80%
3	3		Python	10.308%	+1.93%
4	4		C++	6.196%	-1.37%
5	6	▲	C#	4.801%	+1.35%

SIMPLE AND HIGH-LEVEL

- simple syntax
- high-level: close to the English language

high-level
"Computer, sort this list alphabetically"

VS

low-level
"Take the first name and compare it to second, if the first letter is lower then put the name first etc...."

INTERPRETED

- can run the program instantly

interpreted
runs instantly
get instant feedback

VS

compiled
have to build the code first to run
need imagination to visualize code, no instant feedback

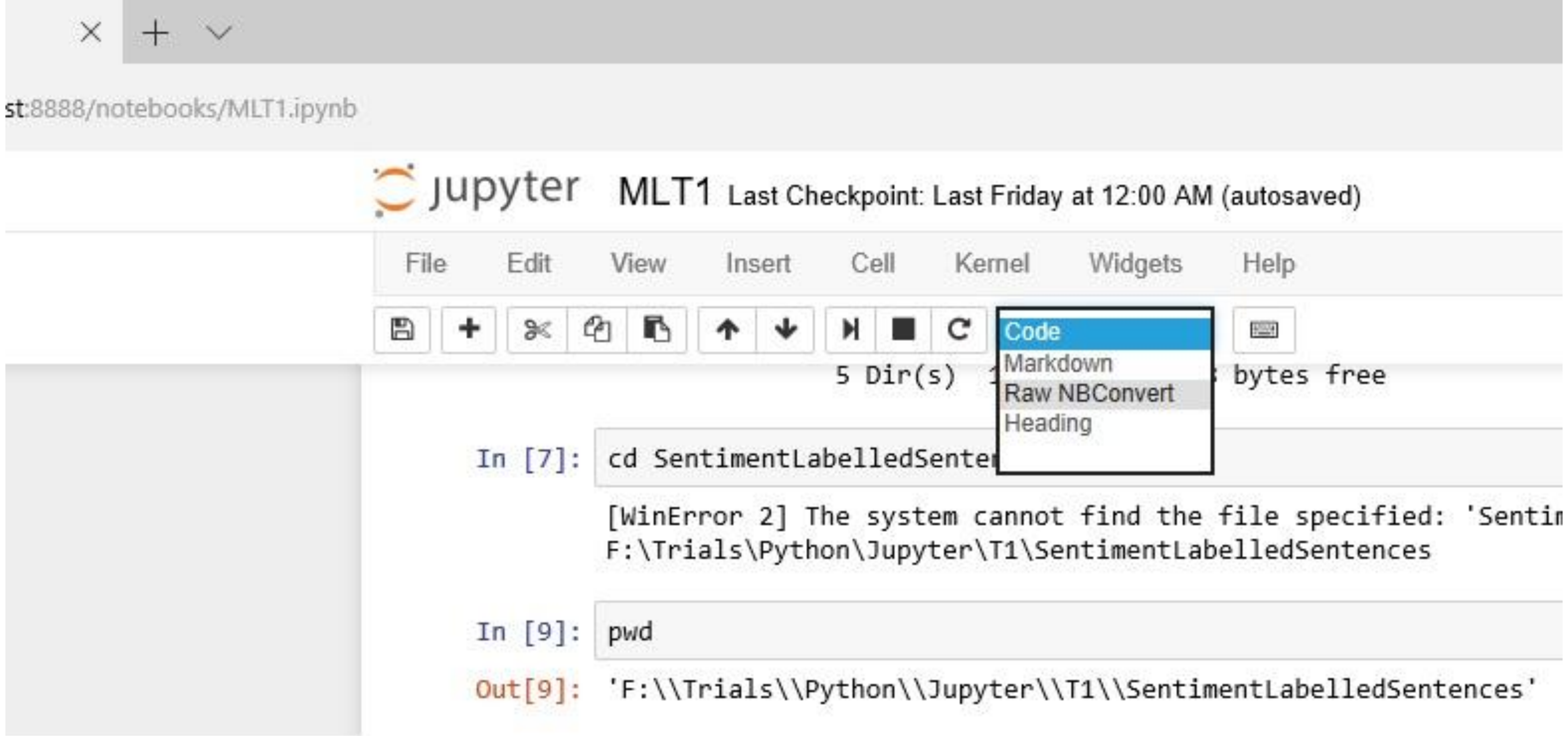
JUPYTER

JUPYTER

- interactive development environment (IDE) where we can run code and view results instantly
- notebook file format (.ipynb)
  - can mix HTML, markdown and code
- perfect for data analysis/science

CELL TYPES

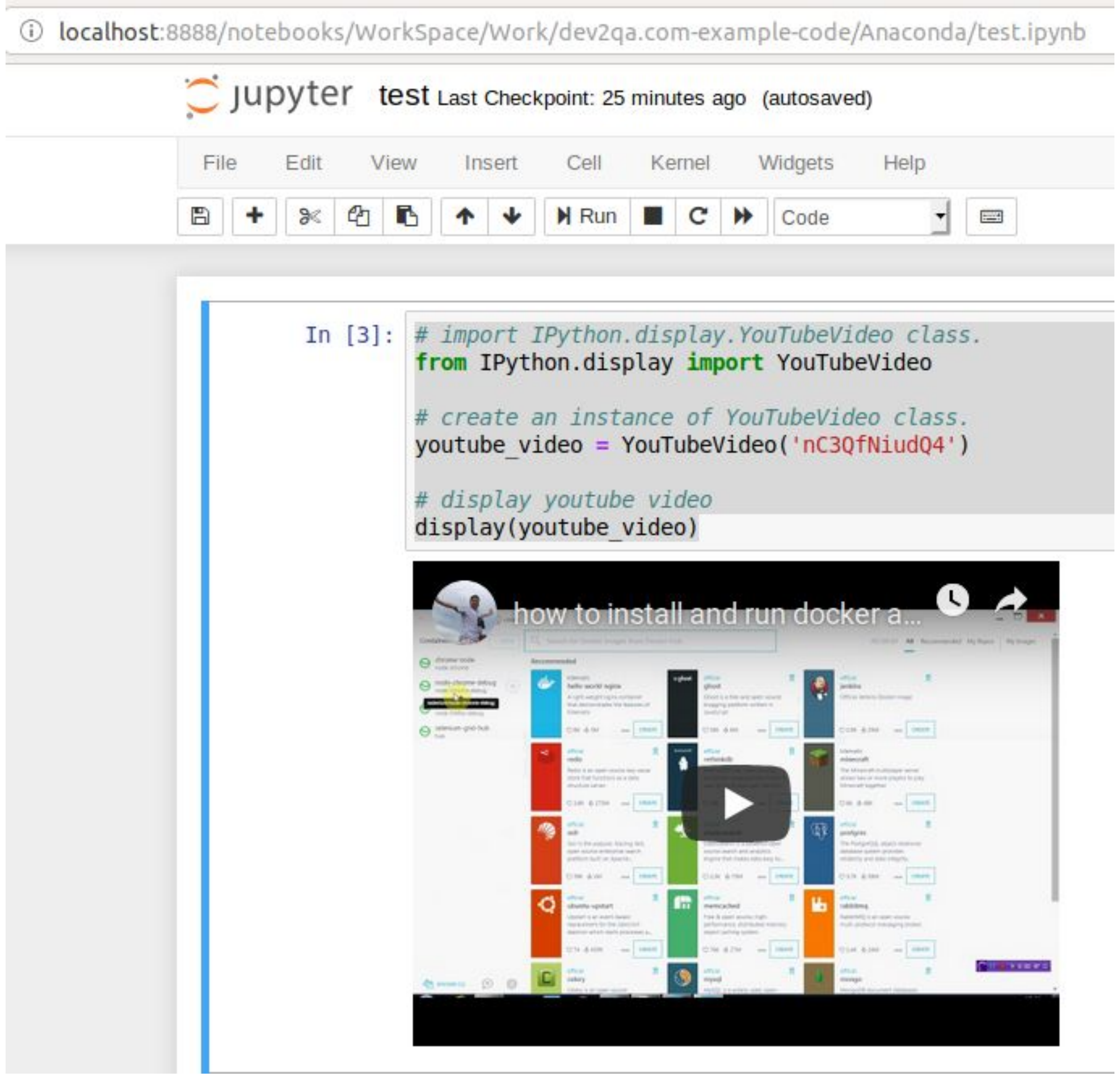
- Markdown
  - used to write text in notebooks
- Code
  - used to store code
- Raw
  - rarely used



```
              5 Dir(s)  1              bytes free

In [7]: cd SentimentLabelledSente

        [WinError 2] The system cannot find the file specified: 'Sentin
        F:\Trials\Python\Jupyter\T1\SentimentLabelledSentences

In [9]: pwd

Out[9]: 'F:\\Trials\\Python\\Jupyter\\T1\\SentimentLabelledSentences'
```

MARKDOWN

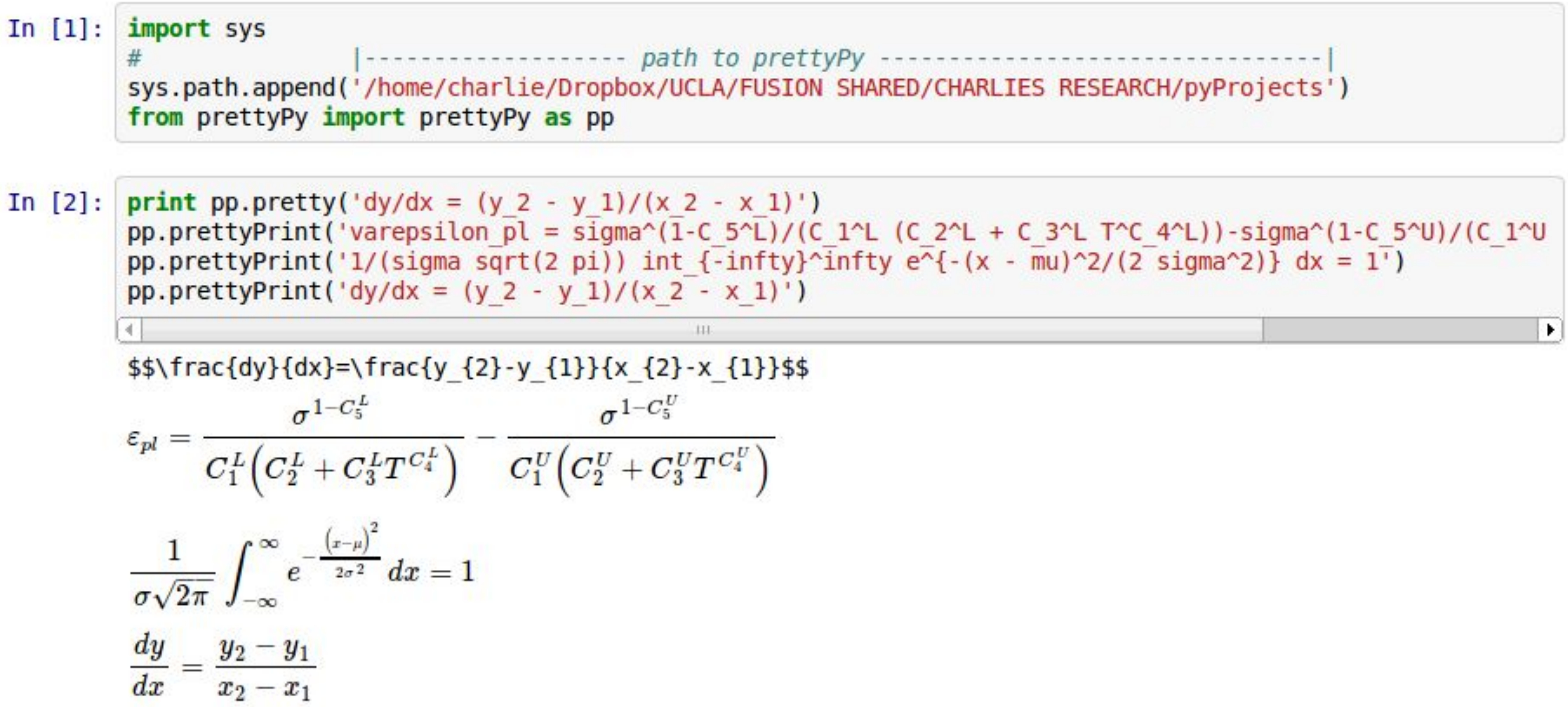
- lightweight language for writing text documents
- markdown cells also capable of executing HTML


localhost:8888/notebooks/WorkSpace/Work/dev2qa.com-example-code/Anaconda/test.ipynb
jupyter
test Last Checkpoint: 25 minutes ago (autosaved)
File
Edit
View
Insert
Cell
Kernel
Widgets
Help
Run
Code
how to install and run docker a...

```
In [3]: # import IPython.display.YouTubeVideo class.
        from IPython.display import YouTubeVideo

        # create an instance of YouTubeVideo class.
        youtube_video = YouTubeVideo('nC3QfNiudQ4')

        # display youtube video
        display(youtube_video)
```

LATEX

- language for writing mathematical equations



```
In [1]: import sys
        #                |------------------- path to prettyPy --------------------------------|
        sys.path.append('/home/charlie/Dropbox/UCLA/FUSION SHARED/CHARLIES RESEARCH/pyProjects')
        from prettyPy import prettyPy as pp
```

```
In [2]: print pp.pretty('dy/dx = (y_2 - y_1)/(x_2 - x_1)')
        pp.prettyPrint('varepsilon_pl = sigma^(1-C_5^L)/(C_1^L (C_2^L + C_3^L T^C_4^L))-sigma^(1-C_5^U)/(C_1^U
        pp.prettyPrint('1/(sigma sqrt(2 pi)) int_{-infty}^infty e^{-(x - mu)^2/(2 sigma^2)} dx = 1')
        pp.prettyPrint('dy/dx = (y_2 - y_1)/(x_2 - x_1)')
```

```
$$\frac{dy}{dx}=\frac{y_{2}-y_{1}}{x_{2}-x_{1}}$$
```

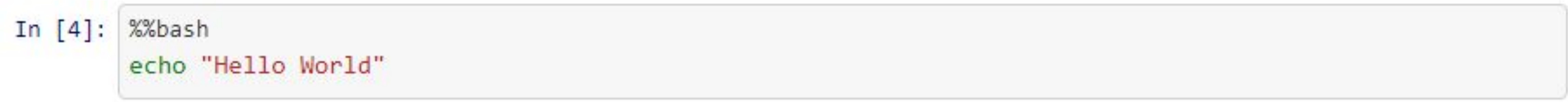
$$\varepsilon_{pl} = \frac{\sigma^{1-C_5^L}}{C_1^L\left(C_2^L + C_3^L T^{C_4^L}\right)} - \frac{\sigma^{1-C_5^U}}{C_1^U\left(C_2^U + C_3^U T^{C_4^U}\right)}$$

$$\frac{1}{\sigma\sqrt{2\pi}} \int_{-\infty}^{\infty} e^{-\frac{\left(x-\mu\right)^2}{2\sigma^2}} dx = 1$$

$$\frac{dy}{dx} = \frac{y_2 - y_1}{x_2 - x_1}$$

MAGICS

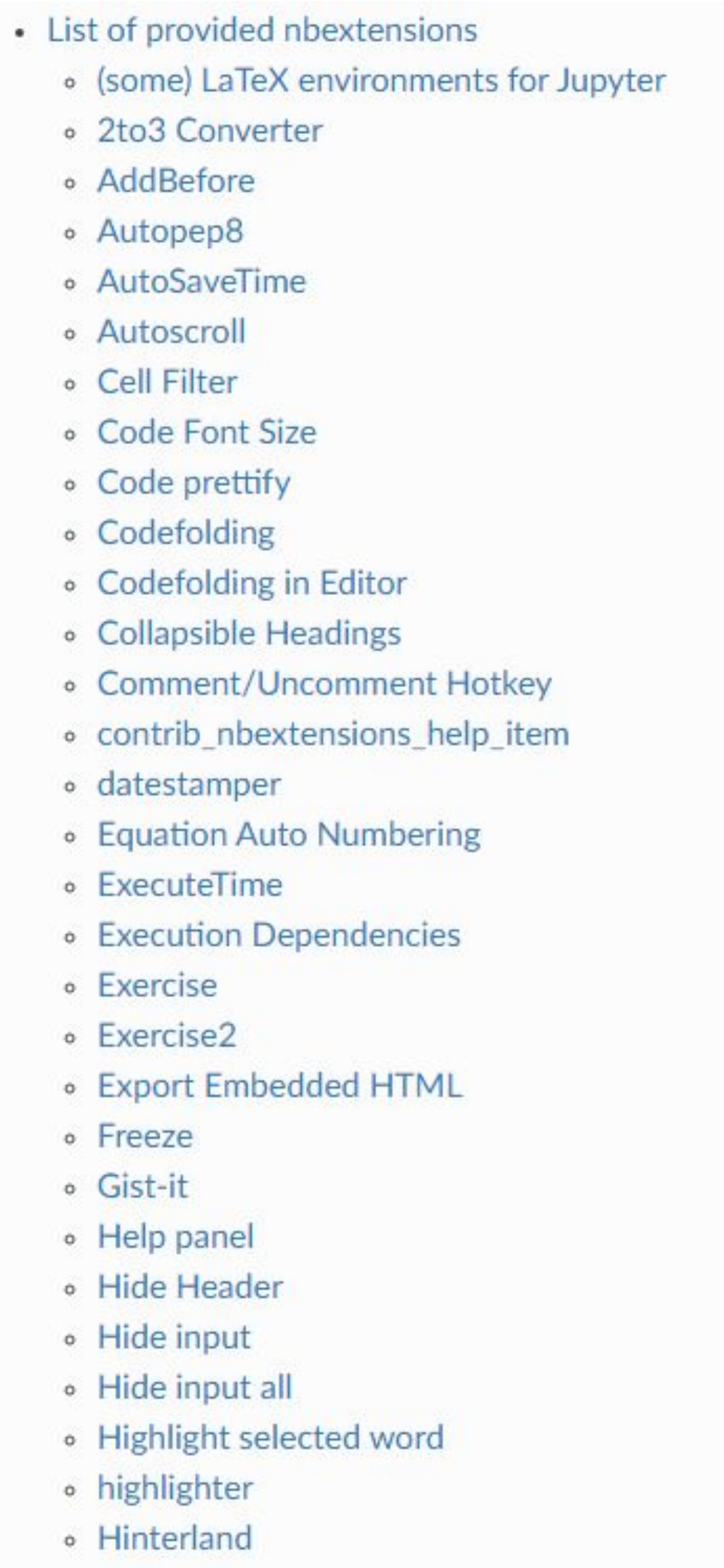
- specific to Python notebooks only
- add additional functionality to code cells
- For example in the below code, we can execute bash code in the notebook using bash magic



```
%%bash
echo "Hello World"
```

EXTENSIONS

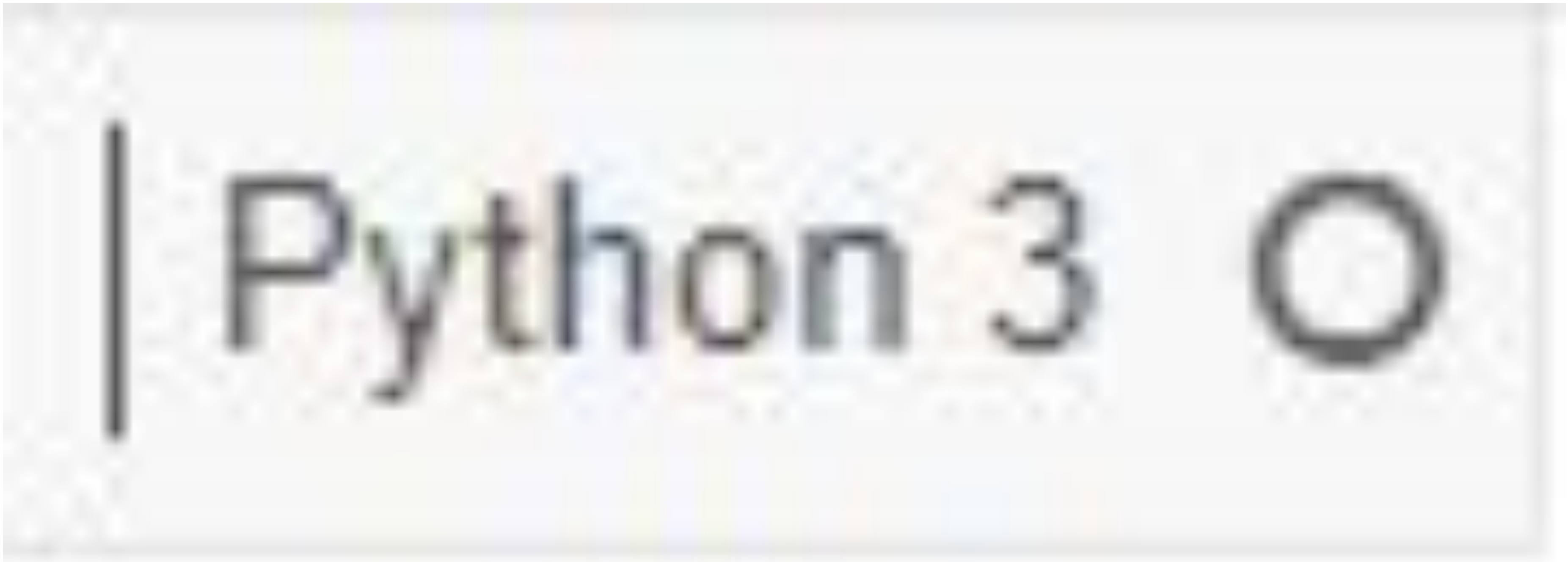
- give more functionality to Jupyter notebooks
- little helper functions



- List of provided nbextensions
  - (some) LaTeX environments for Jupyter
  - 2to3 Converter
  - AddBefore
  - Autopep8
  - AutoSaveTime
  - Autoscroll
  - Cell Filter
  - Code Font Size
  - Code prettify
  - Codefolding
  - Codefolding in Editor
  - Collapsible Headings
  - Comment/Uncomment Hotkey
  - contrib_nbextensions_help_item
  - datestamper
  - Equation Auto Numbering
  - ExecuteTime
  - Execution Dependencies
  - Exercise
  - Exercise2
  - Export Embedded HTML
  - Freeze
  - Gist-it
  - Help panel
  - Hide Header
  - Hide input
  - Hide input all
  - Highlight selected word
  - highlighter
  - Hinterland

KERNEL

- computational engine responsible for executing the code in a notebook
- can install kernels of other languages
- can have program notebooks of different languages



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