Filling your notebook with code and text

Create your first Jupyter Notebook: Steps

1. Create a new Jupyter Notebook

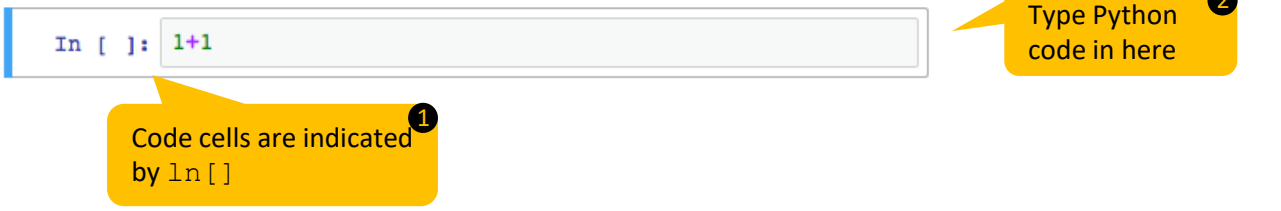
2. **Create Content**

   - Add text elements as Markdown syntax
   - Add code elements in any supported program language
   - Use LaTeX in your Jupyter Notebook

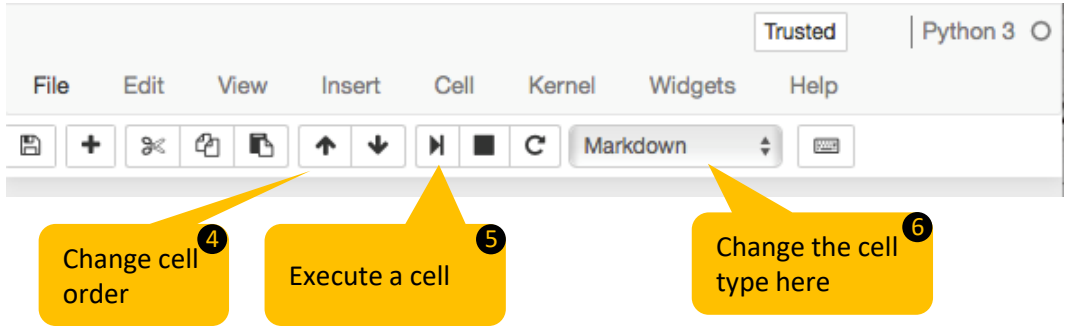
Elements of a Jupyter Notebook (which you can e.g. use through the service “Google Colab”)

Jupyter Notebooks have two major types of "cells" for content:

- **Code Cell**



- **Markdown Cells**



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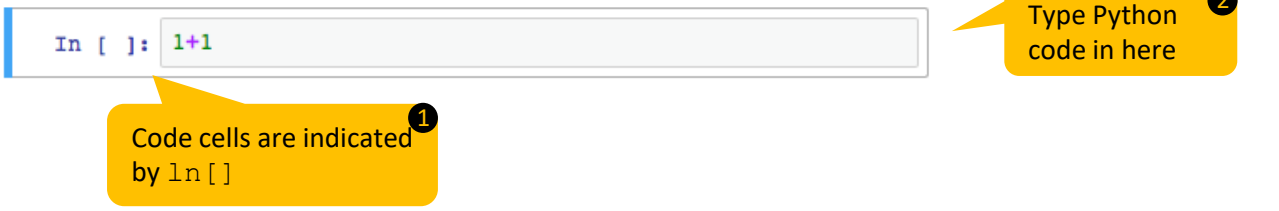

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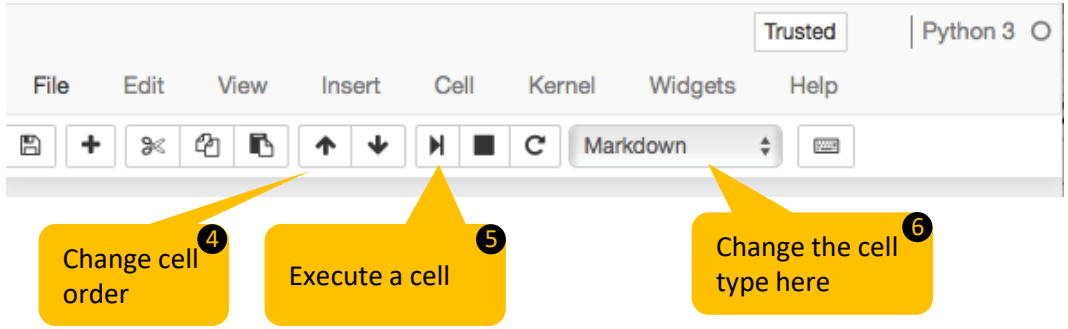

Use Markdown syntax to format the report: Basics (1/2)

Basic Font Styles

```
**bold** and __bold__

*italics* and _italics_

~~scratched text~~

suberscript^2^

[link](www.google.com)

>This is a quote.
>
>[Author]
```

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Use > to create quotes (1)

Lines

```
--

---

...
```

–

…

Escape

```
\*

\\

\_
```

*

\

_

Use \ to escape special signs (2)

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Use Markdown syntax to format the report: Basics (2/2)

Headers

```
# Header 1

## Header 2

### Header 3

#### Header 4

##### Header 5
```

Header 1

Header 2

Header 3

Header 4

Header 5

Lists

Space required 1

```
* list item
* list item
    + list sub item
    + list sub item
```

Use **two** tabs 2

```
1. num list item
2. num list item
3. num list item
```

Images

```
![Caption](Rlogo.png)
```

Caption

Use Markdown syntax to format the report: Basics (2/2)

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Images

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![Caption](Rlogo.png)
```

Caption

Embed code into your code notebook: Inline Python Code

To print Python code Inline you need the Python Markdown extension. It allows to display output produced by the current kernel in markdown cells.

Set variable:

```
a = 1.23
```

```
a is {{a}}
```

Run Cell

```
a is 1.23
```

https://github.com/ipython-contrib/jupyter_contrib_nbextensions/tree/master/src/jupyter_contrib_nbextensions/nbextensions/python-markdown

Embed code into your code notebook: Python code chunks (1/2)

Insert Python code as chunks:

Press `Shift-Enter` to execute the code in a cell (1)

```
In [4]: n=10
        n2=list(range(n+1))
        print(n2)

[0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10]
```

```
In [5]: print(n2)

[0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10]
```

Cells do not have an isolated environment. Variables are "passed along" (2)

Large outputs will be collapsed automatically to ensure better readability:

```
In [2]: for i in range(500):
            print(2**i - 1)
```

```
63
127
255
511
1023
2047
4095
8191
16383
32767
65535
131071
262143
524287
1048575
2097151
4194303
8388607
16777215
```

Click **once** here to expand the out put (3)

Click **twice** here to minimize the output completely (4)

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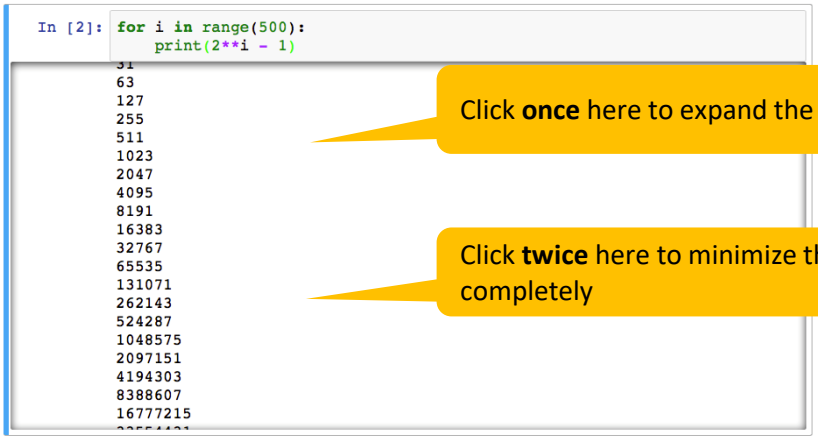

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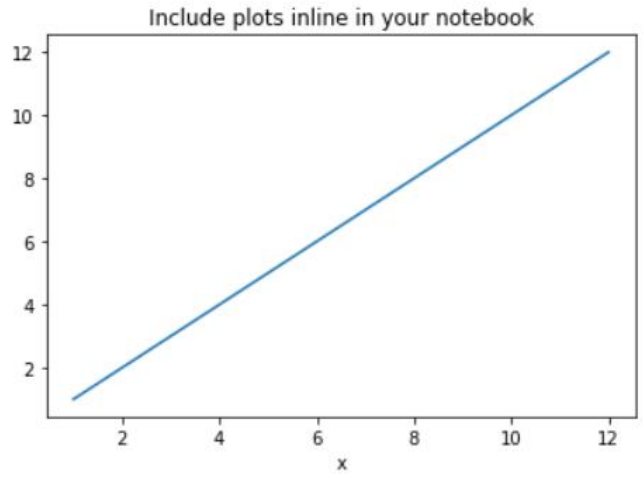
Embed code into your code notebook: Python code chunks (2/2)

Code chunks may also include **plots**. However you need to **import the required package** previously.

Load required packages first using the `import` command

```
In [4]: import matplotlib.pyplot as plt
        %matplotlib inline
        x=[1,3,4,5,7,10,12]
        plt.plot(x,x)
        plt.title("Include plots inline in your notebook")
        plt.xlabel("x")
        plt.show()
```



Use LaTeX syntax to format the report

- LaTeX is a typeset system for scientific documentation. LaTeX enables the simple construction of mathematical and statistical formulas.
- With Jupyter Notebooks, it is easy to include LaTeX documentation in your report:

```
Inline Latex: $A= \pi*r^{2}$
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```
Block equation:
$$\sqrt{100}=10$$
```

Block equation:

$$\sqrt{100} = 10$$

centered

- See i.e. http://reu.dimacs.rutgers.edu/Symbols.pdf for a LaTeX math cheat sheet.

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