



Python Programming

Comments & Markdown

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Outlines

- Comments
- Markdown
 - Web Mode
 - LaTeX



Why Do We Need Comments in Codes?

- In large-scale software projects, collaboration among multiple developers is often essential. However, each team member may have distinct coding styles, naming conventions, and architectural preferences. These differences can complicate code reviews, create friction during development, and even introduce critical bugs if the code base becomes inconsistent. Over time, misalignment in coding practices can lead to higher maintenance costs and make troubleshooting significantly more difficult.

Why Do We Need Comments in Codes?

- Conversely, when working on smaller projects, it's surprisingly easy to forget design details and implementation logic—especially if the code or algorithm isn't well documented. Without a clear record of why certain choices were made, developers may be forced to rewrite or re-implement existing components to make minor adjustments. This rework happens simply because the original reasoning, structure, or approach has been lost, leading to unnecessary duplication of effort.

Comments – Single Line

- In both the Python file (.py) and the Jupyter Notebook (.ipynb), we have two comment styles for single-line comments and multiline comments.

```
# single comment
A = [1.2, 3.14, 100] # this is a list
print(A)
# 1st line comment
# 2nd line comment
print(B)
```

Comments – Multiline

- Multiline comment style in both Jupyter Notebook and python file:

```
# single comment  
# 1st line comment  
# 2nd line comment  
print(123)
```

Comments – Multiline

- Multiline comment style in Python file:

```
"""
```

```
I am comment  
blablabla
```

```
"""
```

```
print(123)
```

```
'''
```

```
I am comment, too  
blablabla
```

```
'''
```

Markdown

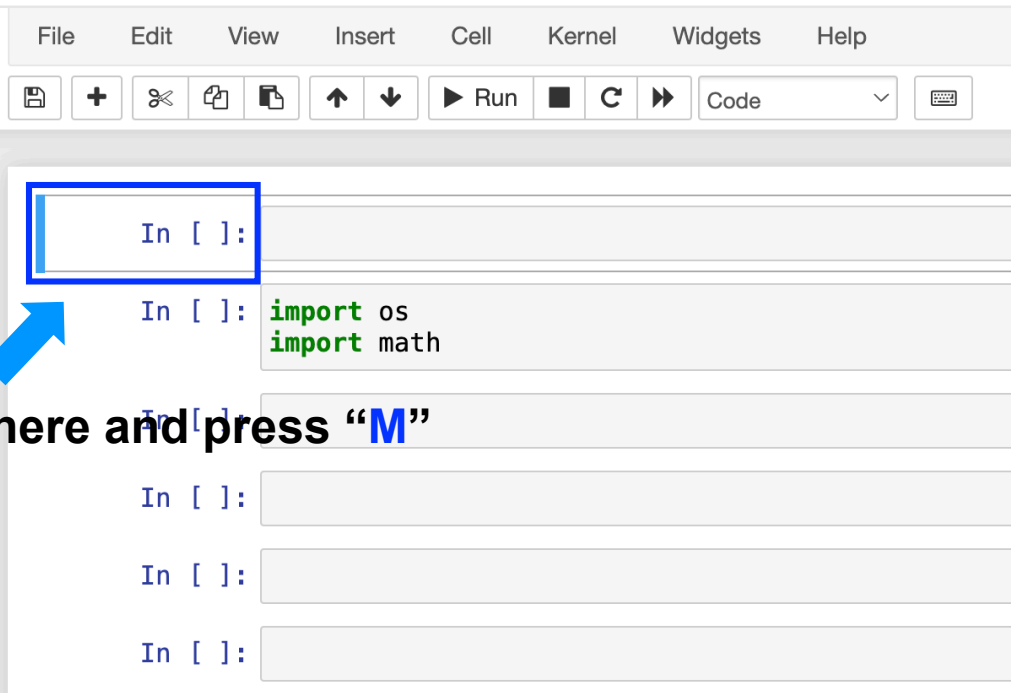
- In Jupyter Notebook, we have another powerful way to make comments in your file.

The image displays two side-by-side screenshots of a Jupyter Notebook interface. The left screenshot shows the 'Cell' menu open, with the 'Markdown' option highlighted. A blue arrow points to an empty code cell, with the text 'Click here!' next to it. The right screenshot shows the same notebook with the selected cell containing the text 'Here is the markdown area!', also with a blue box around it and the text 'Click here!' next to it. The notebook title is 'jupyter Comment Last Checkpoint: 2024/09/20 (unsaved changes)'. The left screenshot also shows a code cell with `import os` and `import math`.

Markdown

- You may use a shortcut.
- Click the block and press “M”.

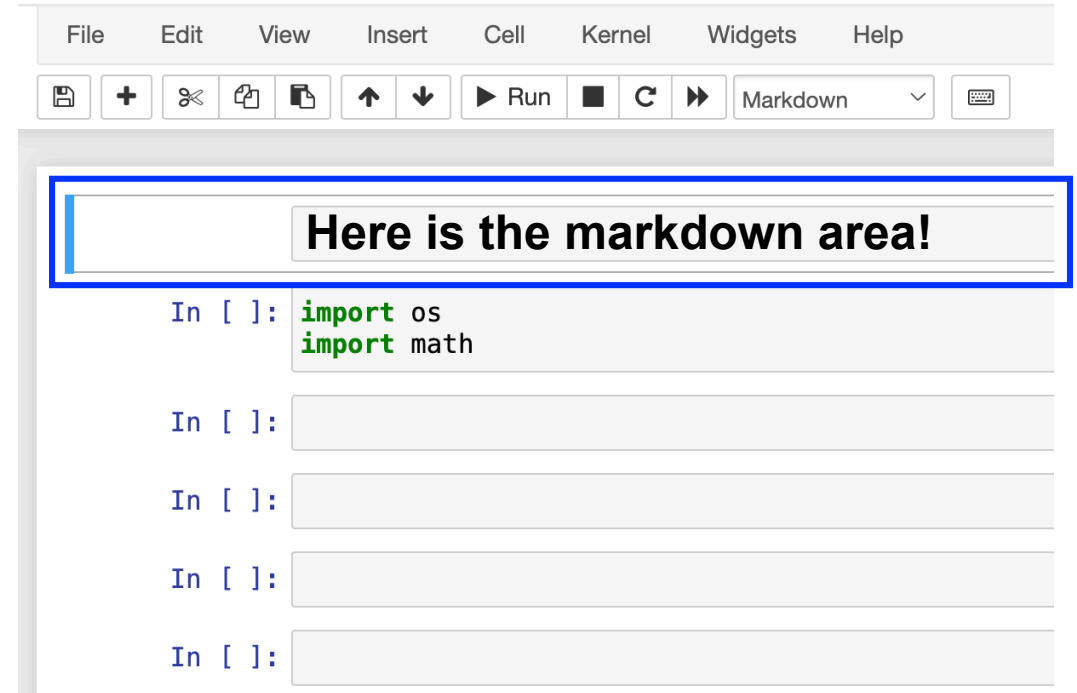
jupyter Comment Last Checkpoint: 2024/09/20 (unsaved changes)



The screenshot shows the JupyterLab interface with a menu bar (File, Edit, View, Insert, Cell, Kernel, Widgets, Help) and a toolbar with icons for save, add, copy, paste, undo, redo, run, and cell actions. The cell type dropdown is set to 'Code'. Below the toolbar, there are several code cells. The first cell, containing 'In []:', is highlighted with a blue box. A blue arrow points to this cell from the text 'Click here and press “M”' located to the left of the interface.

Click here and press “M”

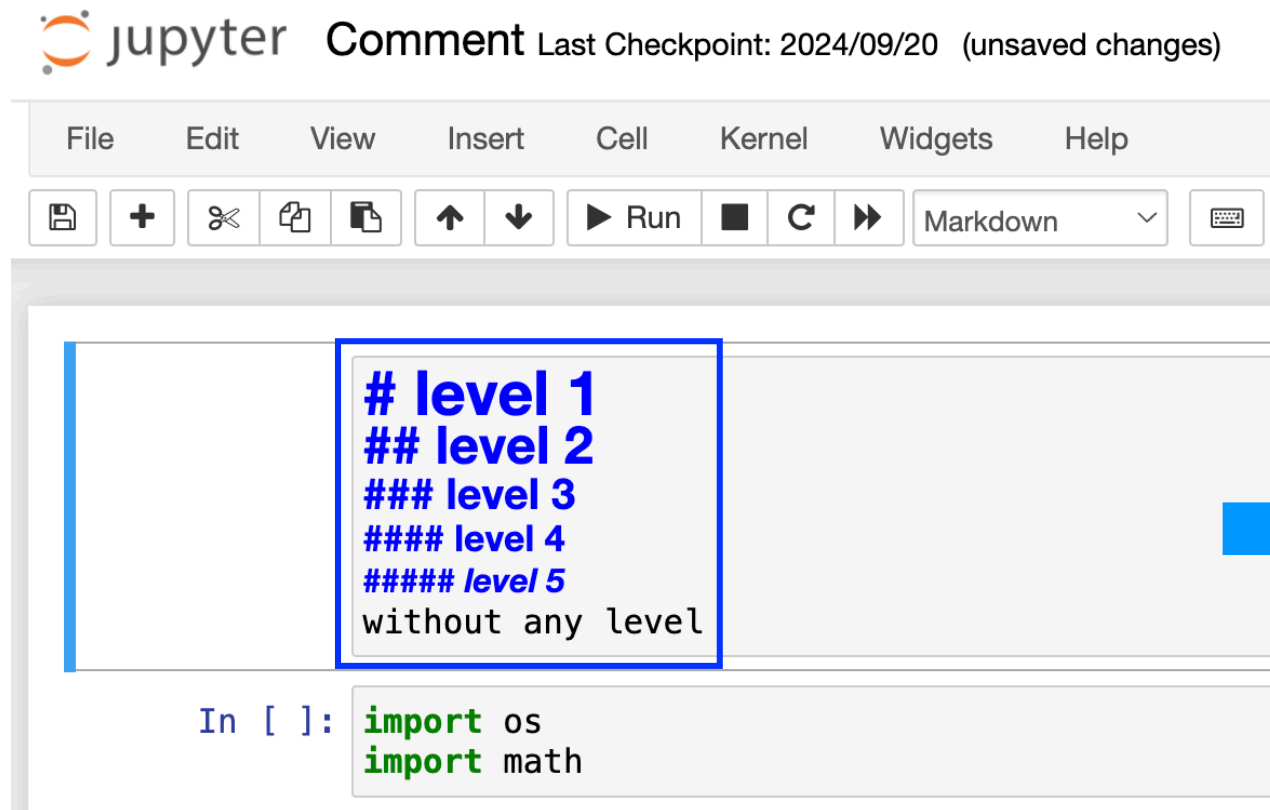
jupyter Comment Last Checkpoint: 2024/09/20 (unsaved changes)



The screenshot shows the JupyterLab interface after the conversion. The cell type dropdown is now set to 'Markdown'. The first cell, which was previously 'In []:', now contains the text 'Here is the markdown area!' and is highlighted with a blue box. Below it, the code cell containing 'import os' and 'import math' is visible, followed by several empty 'In []:' cells.

Markdown

- The coding style of Markdown is similar to HTML.

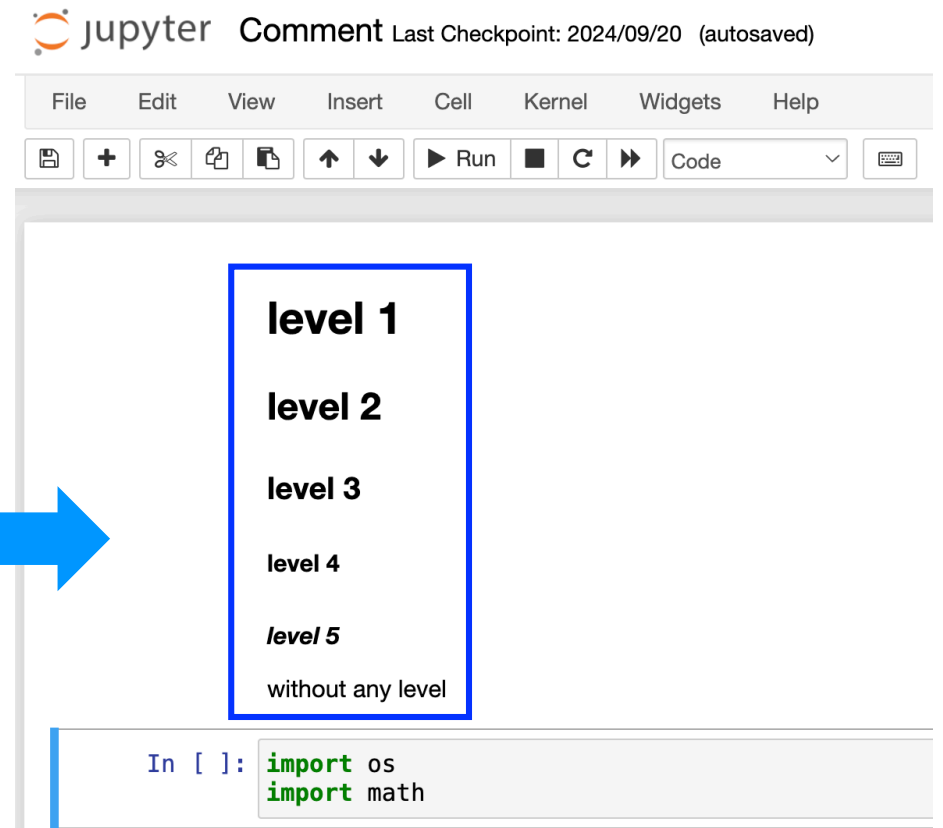


The screenshot shows a Jupyter Notebook interface with a menu bar (File, Edit, View, Insert, Cell, Kernel, Widgets, Help) and a toolbar with icons for file operations and execution. The selected cell is in 'Markdown' mode and contains the following text:

```
# level 1  
## level 2  
### level 3  
#### level 4  
##### level 5  
without any level
```

Below the cell, the code editor shows the following Python code:

```
In [ ]: import os  
import math
```



The screenshot shows the same Jupyter Notebook interface, but the cell is now rendered. The text from the previous screenshot is displayed as formatted HTML:

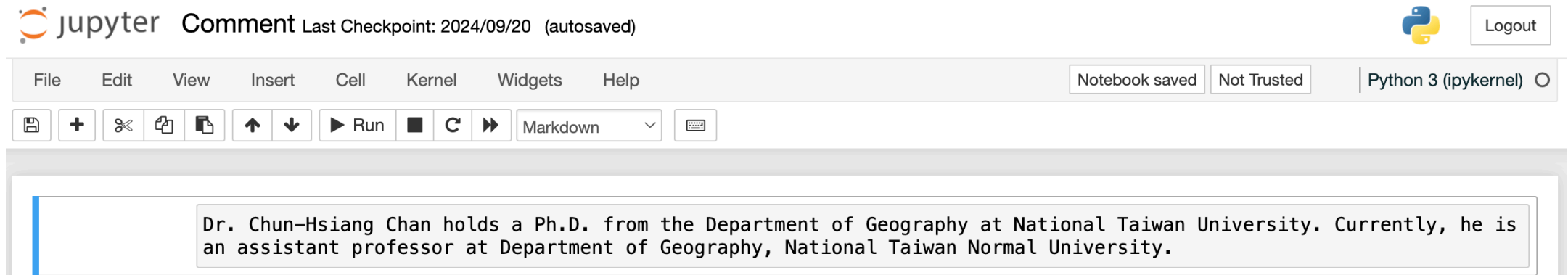
```
level 1  
level 2  
level 3  
level 4  
level 5  
without any level
```

The code editor below the cell remains the same:

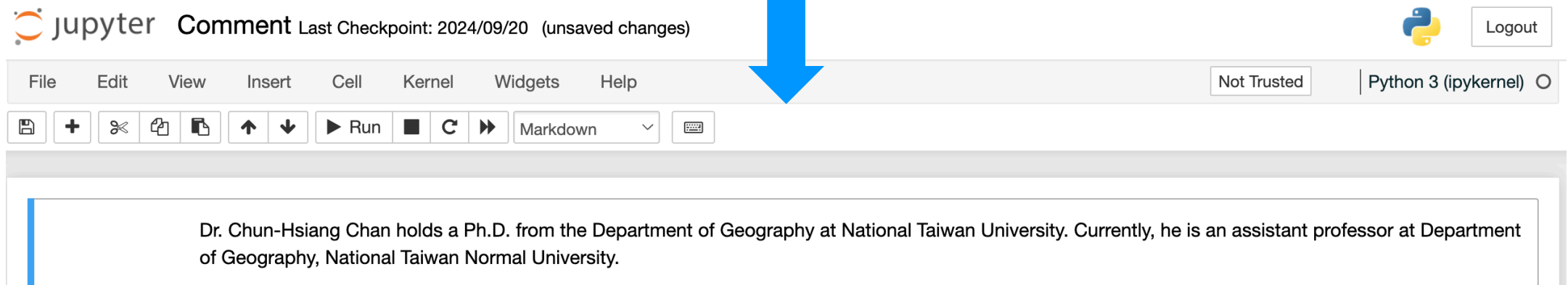
```
In [ ]: import os  
import math
```

Markdown

- The coding style of Markdown is similar to HTML.



The screenshot shows the Jupyter Notebook interface. At the top left, the Jupyter logo is followed by the text "jupyter Comment Last Checkpoint: 2024/09/20 (autosaved)". On the top right, there is a Python logo and a "Logout" button. Below this is a menu bar with "File", "Edit", "View", "Insert", "Cell", "Kernel", "Widgets", and "Help". To the right of the menu bar are three status boxes: "Notebook saved", "Not Trusted", and "Python 3 (ipykernel)". Below the menu bar is a toolbar with icons for saving, adding, undo, redo, up/down arrows, a "Run" button, a stop button, a refresh button, and a dropdown menu currently set to "Markdown". The main content area contains a single code cell with the following text: "Dr. Chun-Hsiang Chan holds a Ph.D. from the Department of Geography at National Taiwan University. Currently, he is an assistant professor at Department of Geography, National Taiwan Normal University."



The screenshot shows the Jupyter Notebook interface after rendering the Markdown cell. The top bar and menu are identical to the previous screenshot, but the status boxes now show "Not Trusted" and "Python 3 (ipykernel)". The main content area shows the same text as the previous screenshot, but it is now rendered in a larger, more readable font, indicating that the Markdown has been processed into HTML.

Markdown

- Therefore, we need to use “`
`” to make a newline.

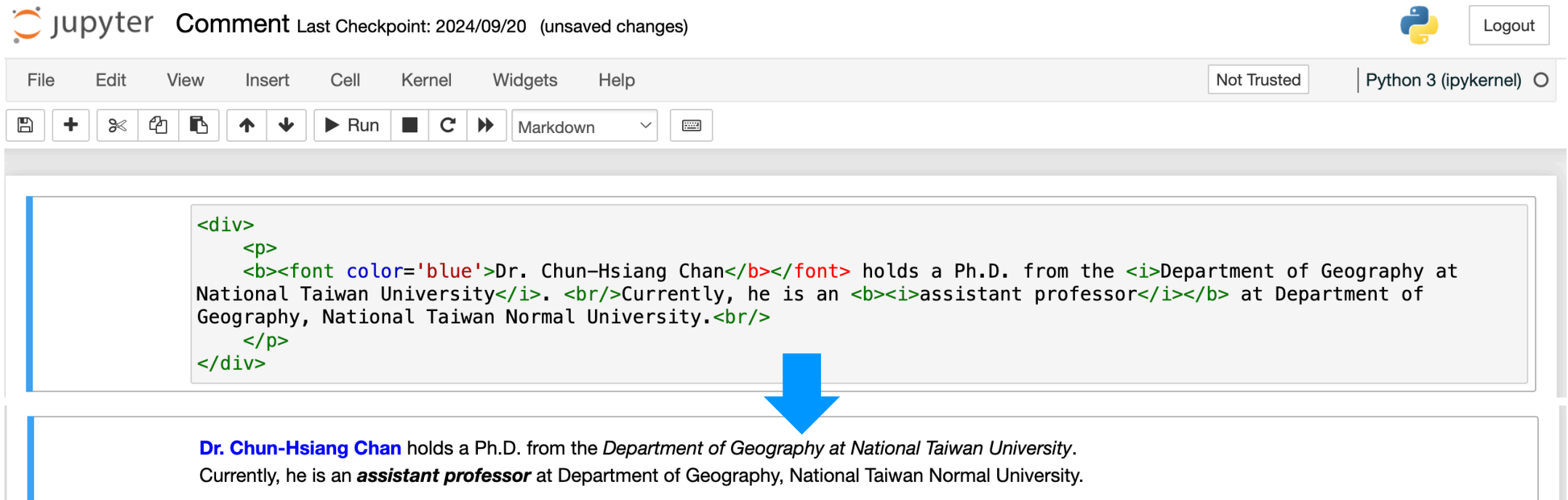
The image displays two screenshots of a Jupyter Notebook interface, illustrating the use of the `
` tag for line breaks in Markdown text.

Top Screenshot: The notebook shows a text cell with the following content: "Dr. Chun-Hsiang Chan holds a Ph.D. from the Department of Geography at National Taiwan University. `
`Currently, he is an assistant professor at Department of Geography, National Taiwan Normal University." The `
` tag is highlighted with a blue box. The text is displayed on a single line, with the tag visible at the end of the first line.

Bottom Screenshot: The notebook shows the same text cell after the `
` tag has been rendered. The text is now displayed on two lines: "Dr. Chun-Hsiang Chan holds a Ph.D. from the Department of Geography at National Taiwan University." followed by "Currently, he is an assistant professor at Department of Geography, National Taiwan Normal University." A blue box highlights the end of the first line, and a blue arrow points from the `
` tag in the top screenshot to this box. Another blue arrow points from the `
` tag in the top screenshot to the start of the second line in the bottom screenshot.

Markdown – Web Mode

- If you want to add some styles for your markdown, then you may read HTML and CSS references.



The screenshot shows a Jupyter Notebook interface. At the top, there is a header with the Jupyter logo, the text "jupyter Comment", and "Last Checkpoint: 2024/09/20 (unsaved changes)". On the right, there is a Python logo and a "Logout" button. Below the header is a menu bar with "File", "Edit", "View", "Insert", "Cell", "Kernel", "Widgets", and "Help". To the right of the menu bar, there is a "Not Trusted" warning and "Python 3 (ipykernel)". Below the menu bar is a toolbar with icons for saving, adding, deleting, copying, pasting, undo, redo, and running. A dropdown menu is set to "Markdown". The main content area shows a code cell with the following HTML code:

```
<div>
  <p>
    <b><font color='blue'>Dr. Chun-Hsiang Chan</font></b> holds a Ph.D. from the <i>Department of Geography at
    National Taiwan University</i>. <br/>Currently, he is an <b><i>assistant professor</i></b> at Department of
    Geography, National Taiwan Normal University.<br/>
  </p>
</div>
```

A large blue arrow points from the code cell to the rendered output below. The rendered output shows the text: "Dr. Chun-Hsiang Chan" in blue bold font, followed by "holds a Ph.D. from the Department of Geography at National Taiwan University." in italic font. The next line starts with "Currently, he is an assistant professor" in bold italic font, followed by "at Department of Geography, National Taiwan Normal University." in regular font.

Please see my *HTML* and *CSS* slides in [Web Crawler Practice](#).

Markdown – LaTeX

- **LaTeX** is a powerful tool for typing mathematical equations.

Evaluation Metrics

R Squared (R^2):

R squared, also called the coefficient of determination, describes the percentage of explanation of dependent variables by parameters (independent variables). In general, the model fitting results could be divided into two parts: residual sum of squares and regression sum of squares.

(1) Residual Sum of Squares:

\$\$

$$SSR = SS_{\text{res}} = \sum_{i=1}^n (y_i - \hat{y}_i)^2$$

\$\$

where y_i is the ground truth values (dependent variable) and \hat{y}_i is the predicted values.

(2) Total Sum of Squares:

\$\$

$$SST = SS_{\text{total}} = \sum_{i=1}^n (y_i - \bar{y})^2$$

\$\$

where y_i is the ground truth values (dependent variable) and \bar{y} is the average value of observation.

Hence, the **R squared** could be calculated by

\$\$

$$R^2 = 1 - \frac{SSR}{SST} = 1 - \frac{SS_{\text{res}}}{SS_{\text{total}}} = 1 - \frac{\sum_{i=1}^n (y_i - \hat{y}_i)^2}{\sum_{i=1}^n (y_i - \bar{y})^2}$$

\$\$

Markdown – LaTeX

- Here is the result!

Evaluation Metrics

R Squared (R^2):

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(1) Residual Sum of Squares:

$$SSR = SS_{res} = \sum_{i=1}^n (y_i - \hat{y}_i)^2$$

where y_i is the ground truth values (dependent variable) and \hat{y}_i is the predicted values.

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where y_i is the ground truth values (dependent variable) and \bar{y} is the average value of observation.

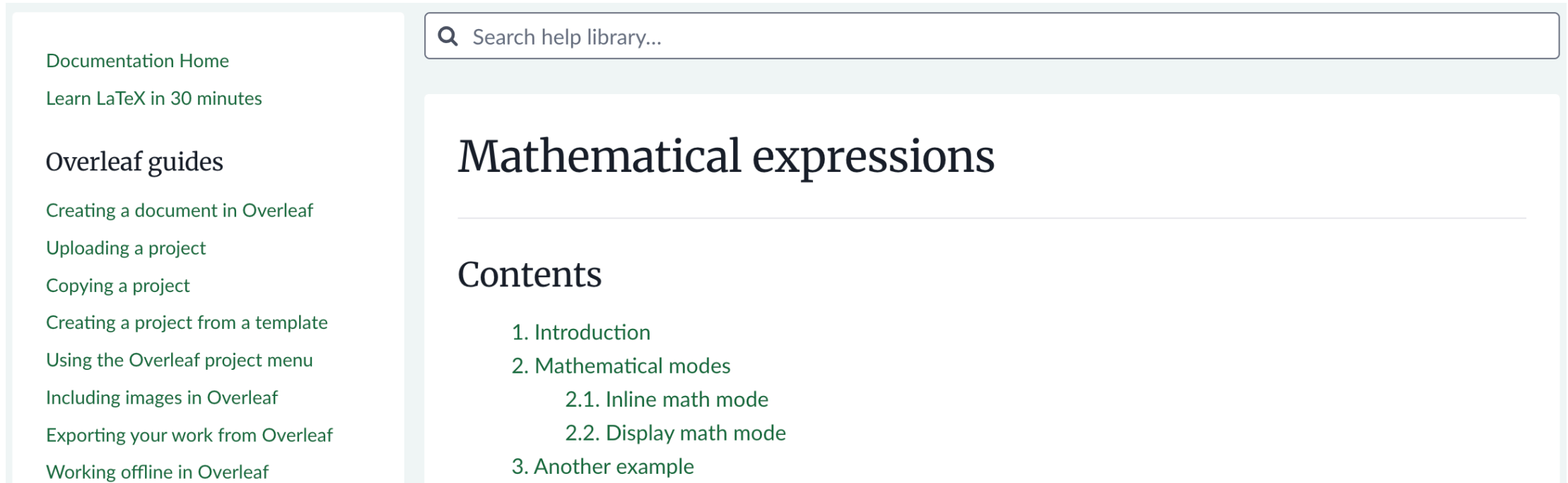
Hence, the **R squared** could be calculated by

$$R^2 = 1 - \frac{SSR}{SST} = 1 - \frac{SS_{res}}{SS_{total}} = 1 - \frac{\sum_{i=1}^n (y_i - \hat{y}_i)^2}{\sum_{i=1}^n (y_i - \bar{y})^2}$$

Markdown – LaTeX

- If you want more information about LaTeX.
- Please see information.

https://www.overleaf.com/learn/latex/Mathematical_expressions



The screenshot shows the Overleaf help library interface. On the left is a sidebar with navigation links. The main content area features a search bar at the top, followed by the title 'Mathematical expressions' and a 'Contents' section with a numbered list of topics.

Documentation Home
Learn LaTeX in 30 minutes

Overleaf guides

- Creating a document in Overleaf
- Uploading a project
- Copying a project
- Creating a project from a template
- Using the Overleaf project menu
- Including images in Overleaf
- Exporting your work from Overleaf
- Working offline in Overleaf

Search help library...

Mathematical expressions

Contents

1. Introduction
2. Mathematical modes
 - 2.1. Inline math mode
 - 2.2. Display math mode
3. Another example

The End

Thank you for your attention!

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