
Jupyter Notebook



olsen software

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Introduction to Jupyter Notebook

- Jupyter Notebook is a handy way to create a web page that combines text and Python code
- A Jupyter notebook contains:
 - Plain text (in Markdown format)
 - Other rich media (e.g. images)
 - Python code cells (other languages are also supported, e.g. R)
 - The result of running Python code (e.g. data visualizations)
- Jupyter Notebook is widely used in data science
 - A very good way to run data analysis code and show the results

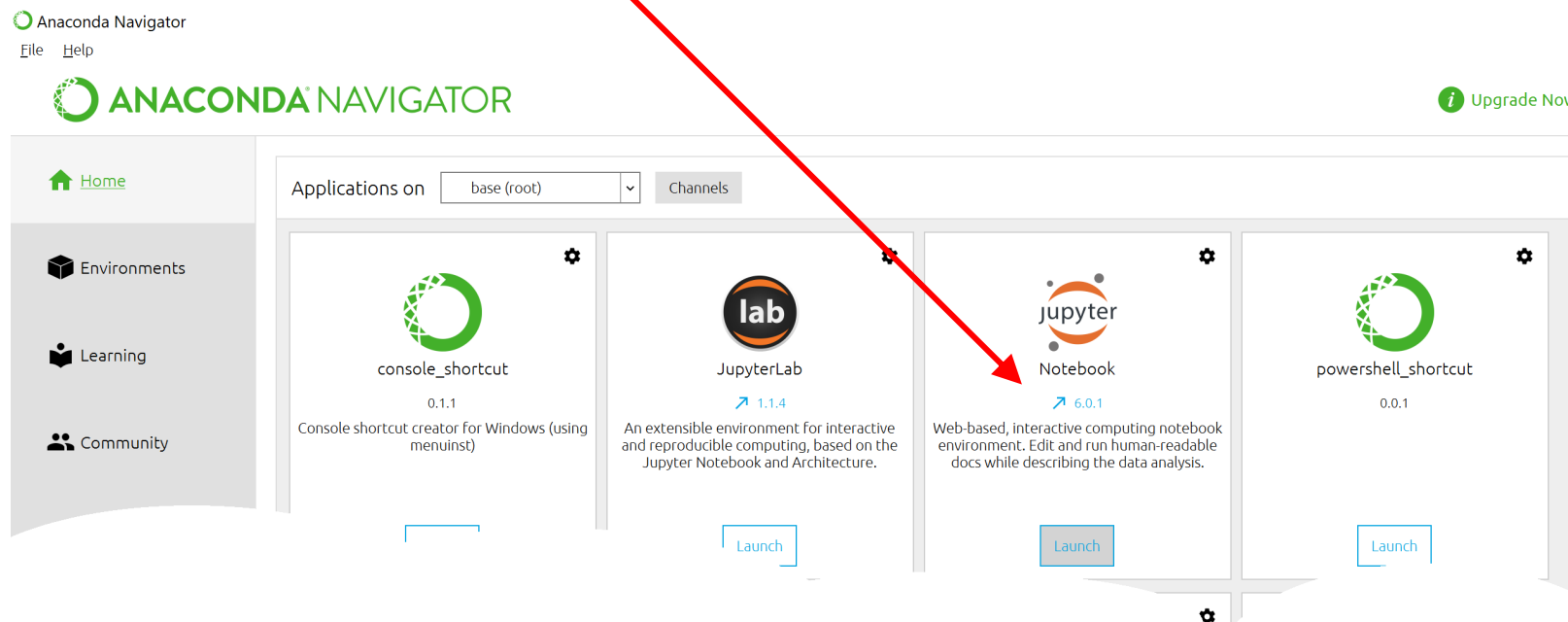
Installing Jupyter Notebook

- The easiest way to get started with Jupyter Notebook is by installing Anaconda
 - Anaconda is the most widely used Python distro for data science
 - Includes popular data science libraries (NumPy, Pandas, etc.)
 - Also has Jupyter preinstalled
- To get Anaconda:
 - Go to <https://www.anaconda.com/products/individual>
 - Follow the download instructions
- Alternatively you can install Jupyter separately

```
pip install jupyter
```

Running Jupyter Notebook (1 of 2)

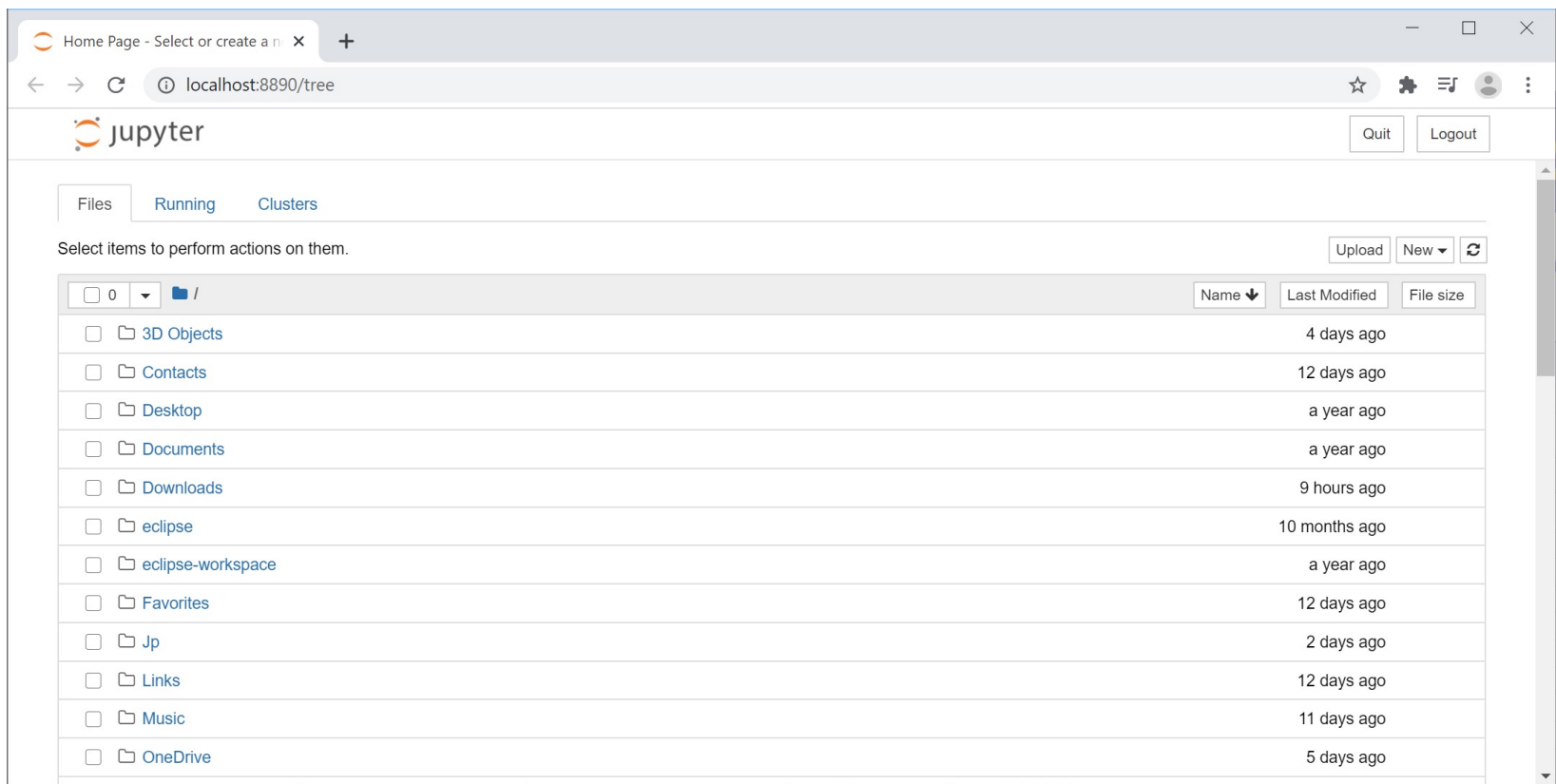
- You can run Jupyter Notebook directly, or launch it from the Anaconda Navigator window



- When you run Jupyter Notebook, a Python web server starts up
 - The web server serves up your Jupyter notebooks
 - A Jupyter notebook is actually a small web app (very portable!)

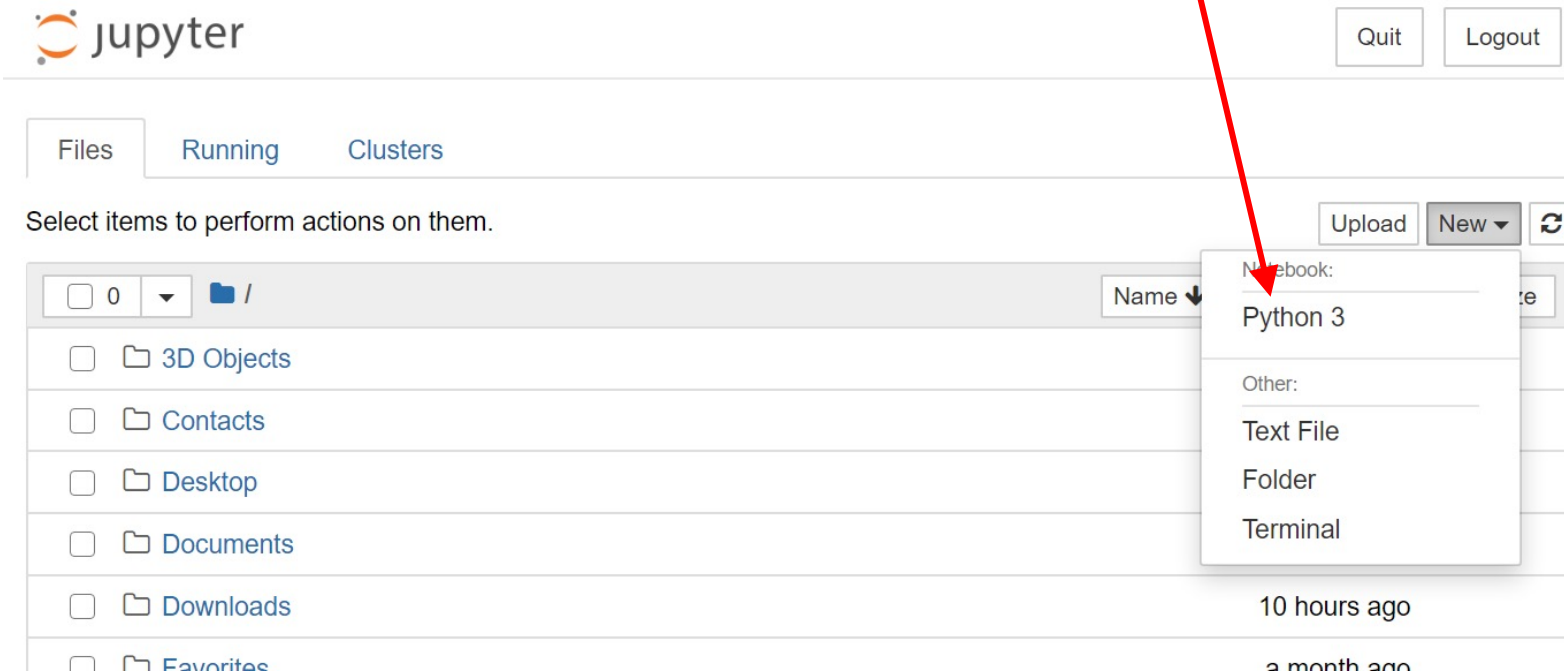
Running Jupyter Notebook (2 of 2)

- A browser opens, e.g. to `http://localhost:xxxx/tree`
 - This is the Jupyter dashboard
 - Shows your home folder by default, e.g. `C:\Users\Administrator`



Creating a Simple Notebook (1 of 2)

- In the Jupyter dashboard, click New | Python 3



The screenshot shows the Jupyter dashboard interface. At the top left is the Jupyter logo. To the right are 'Quit' and 'Logout' buttons. Below the logo are tabs for 'Files', 'Running', and 'Clusters'. A message says 'Select items to perform actions on them.' Below this is a file browser showing a list of folders: '3D Objects', 'Contacts', 'Desktop', 'Documents', 'Downloads', and 'Favorites'. On the right side of the file browser, there are buttons for 'Upload', 'New', and a refresh icon. The 'New' button is clicked, opening a dropdown menu. A red arrow points from the text 'New | Python 3' in the list above to the 'Python 3' option in the dropdown menu. The dropdown menu has two sections: 'Notebook:' with 'Python 3' selected, and 'Other:' with 'Text File', 'Folder', and 'Terminal'.

jupyter

Quit Logout

Files Running Clusters

Select items to perform actions on them.

Upload New ↕ ↻

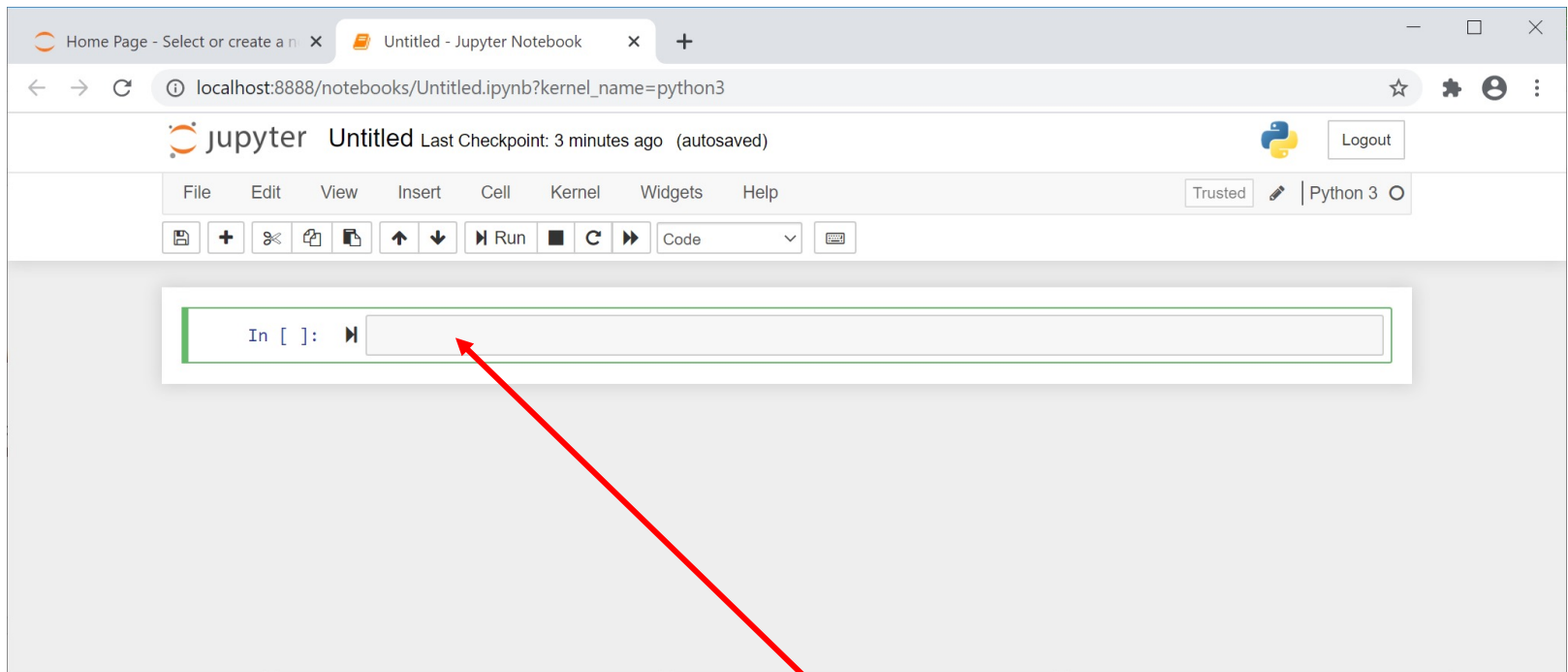
Notebook:
Python 3

Other:
Text File
Folder
Terminal

10 hours ago
a month ago

Creating a Simple Notebook (2 of 2)

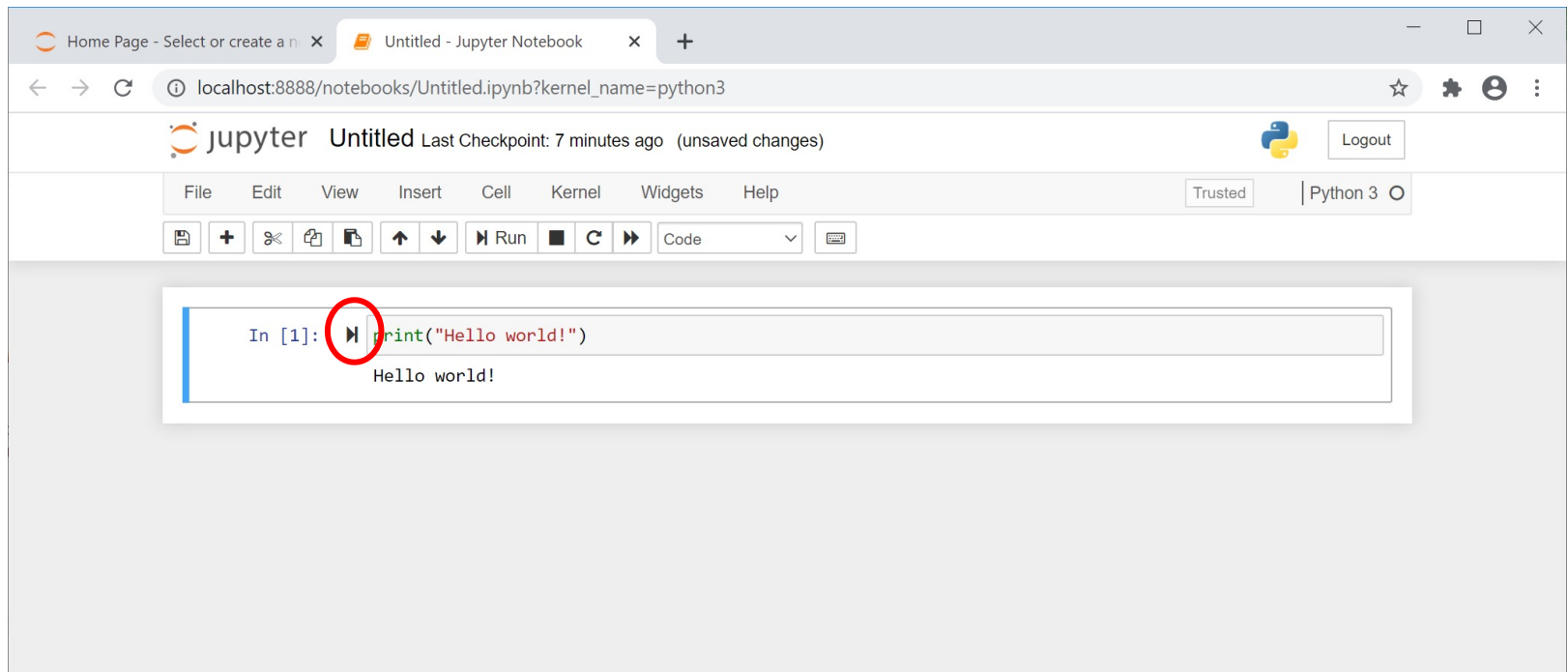
- Jupyter creates a new notebook called `Untitled.ipynb`



- The notebook contains a single cell initially
 - There are 2 types of cell - code or text
 - The cell here is a code cell (empty initially)

Entering and Running Code in a Code Cell

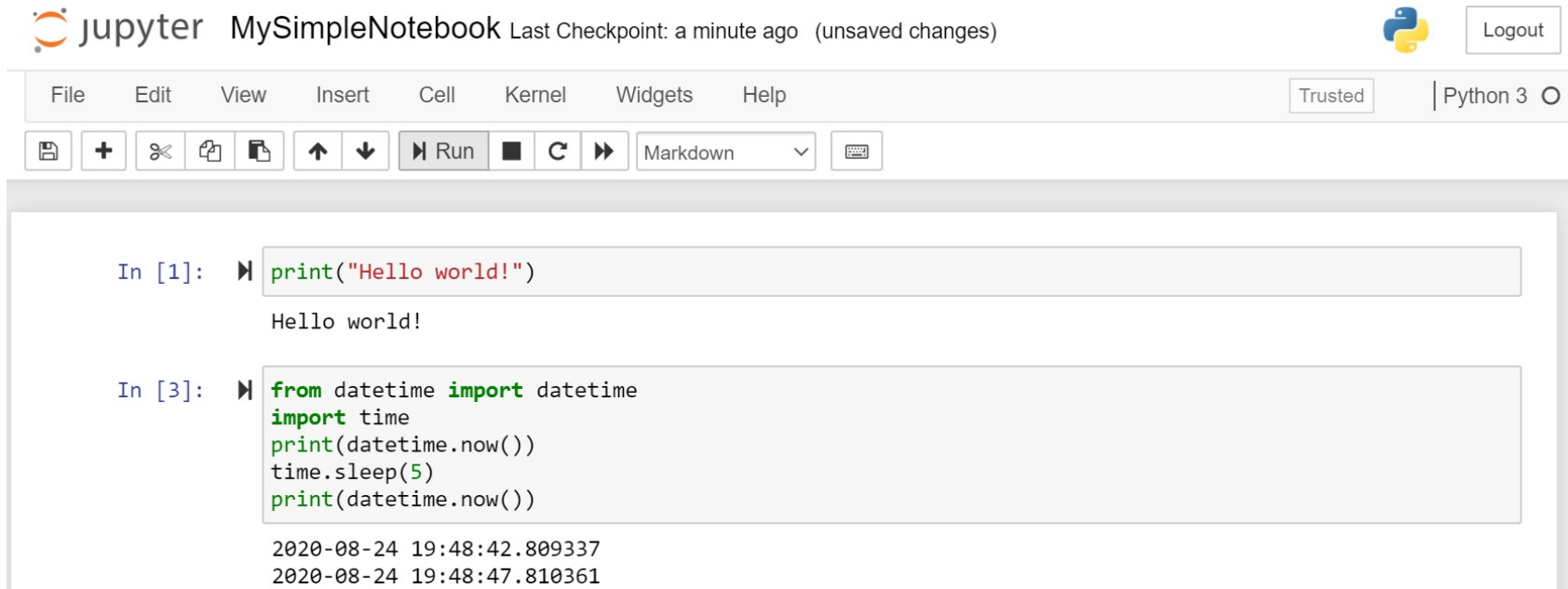
- Enter Python code in the cell, then click the **Run** button
 - When you run a cell, its output is displayed just beneath it




- Notice the label to the left of the cell is now In [1]
 - If you run the code again, the label changes to In [2]

Inserting a Code Cell

- To insert another code cell:
 - Click Insert | Insert Cell Below
 - Click Cell | Cell Type | Code
 - Enter code in the new cell as appropriate, and run it



The screenshot displays the Jupyter Notebook interface. At the top, the header shows the Jupyter logo, the notebook name "MySimpleNotebook", and the status "Last Checkpoint: a minute ago (unsaved changes)". On the right, there is a Python logo and a "Logout" button. Below the header is a menu bar with options: File, Edit, View, Insert, Cell, Kernel, Widgets, and Help. To the right of the menu bar are "Trusted" and "Python 3" indicators. A toolbar below the menu bar contains icons for saving, adding cells, undo, redo, copy, paste, and navigation, along with a "Run" button and a "Markdown" dropdown menu. The main area shows two code cells. The first cell, labeled "In [1]:", contains the code `print("Hello world!")` and has executed, showing the output "Hello world!". The second cell, labeled "In [3]:", contains the code `from datetime import datetime`, `import time`, `print(datetime.now())`, `time.sleep(5)`, and `print(datetime.now())`. It has also executed, showing two timestamps: "2020-08-24 19:48:42.809337" and "2020-08-24 19:48:47.810361".

jupyter MySimpleNotebook Last Checkpoint: a minute ago (unsaved changes)  Logout

File Edit View Insert Cell Kernel Widgets Help Trusted Python 3

Save Add Undo Redo Copy Paste Up Down Run Interrupt Restart Markdown

```
In [1]: ▶ print("Hello world!")
Hello world!
```

```
In [3]: ▶ from datetime import datetime
import time
print(datetime.now())
time.sleep(5)
print(datetime.now())

2020-08-24 19:48:42.809337
2020-08-24 19:48:47.810361
```

Inserting a Markdown Cell

- To insert a Markdown cell:
 - Click Insert | Insert Cell Below
 - Click Cell | Cell Type | Markdown
 - Enter Markdown text in the cell, as appropriate
- Here's some sample Markdown
 - For details, see <https://www.markdownguide.org/cheat-sheet/>

```
# This is an H1
```

```
## This is an H2
```

```
**This is bold text**
```

```
*This is italicized text*
```

```
Ordered list:
```

1. First item
2. Second item
3. Third item

```
Unordered List:
```

- First item
- Second item
- Third item

Saving your Notebook

- It's good practice to save your notebook regularly
 - To do this, press Ctrl+S
 - This saves your notebook via the "Save and Checkpoint" command
- What is a "checkpoint"?
 - When you create a notebook, Jupyter also creates a checkpoint file
 - Located in a hidden subdirectory named `.ipynb_checkpoints`
- What's the point of the "checkpoint"?
 - Jupyter autosaves your notebook every 2min to the checkpoint file, without altering your actual notebook file
 - When you do "Save and Checkpoint", Jupyter updates both the primary file and the checkpoint file

Renaming your Notebook

- The notebook is currently named `Untitled.ipynb`
 - You probably want a better name 😊
- Interestingly you can't rename a notebook while it's running (remember, a notebook is a mini web app)
 - You have to shut it down first, via File | Close and Halt
 - This takes you back to the Jupyter dashboard
- You can now rename the notebook file in the dashboard
 - Select the notebook in the dashboard
 - Then click Rename in the dashboard controls

Any Questions?

