

Pythonで出来ること

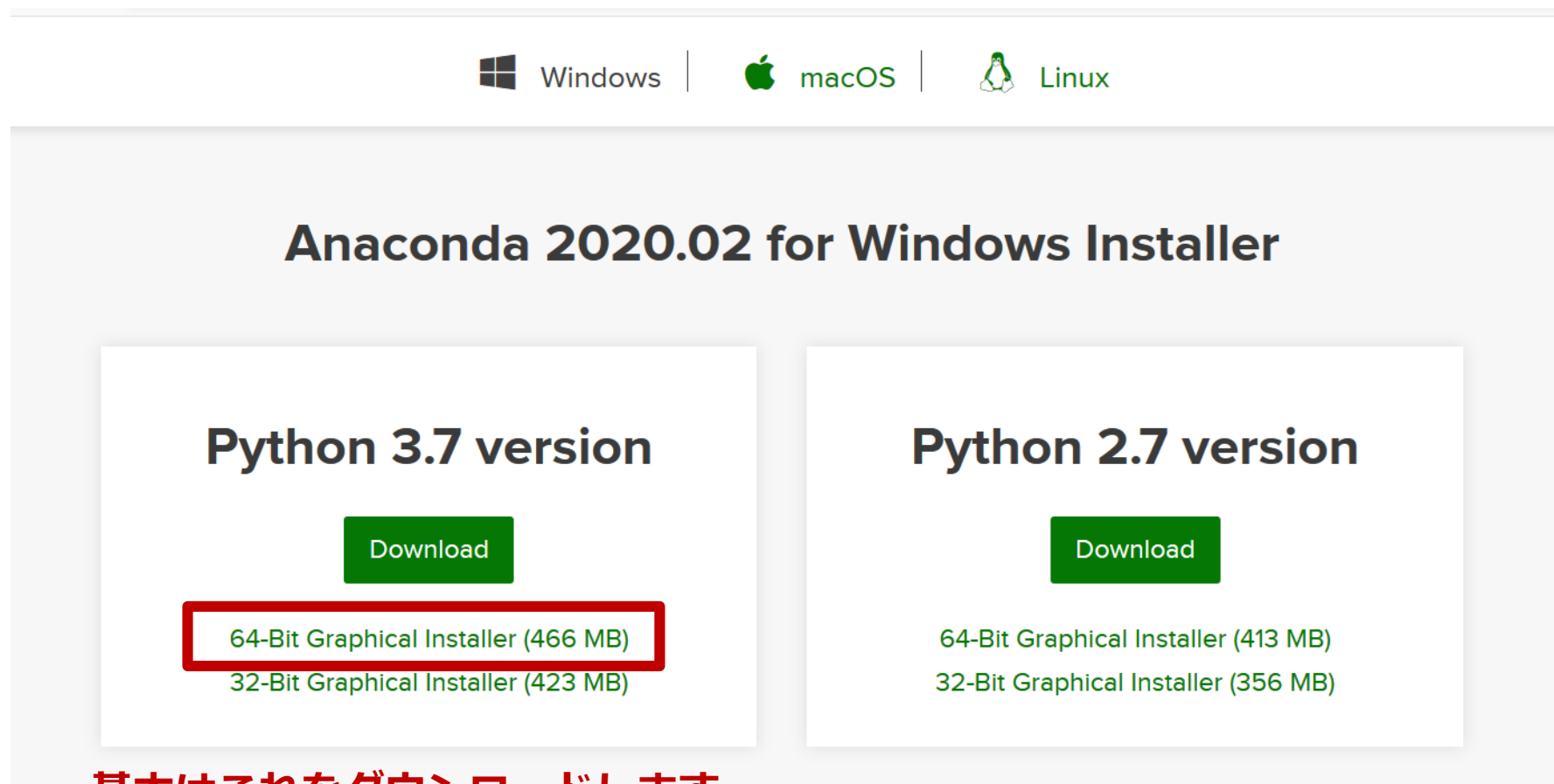
- データサイエンス、機械学習、AI
 - グラフ作成
 - 実験データの自動処理
- など

世の中にはいろいろなプログラミング言語がありますが、
機械学習関連ではPythonがメインで利用されています

Pythonのインストール

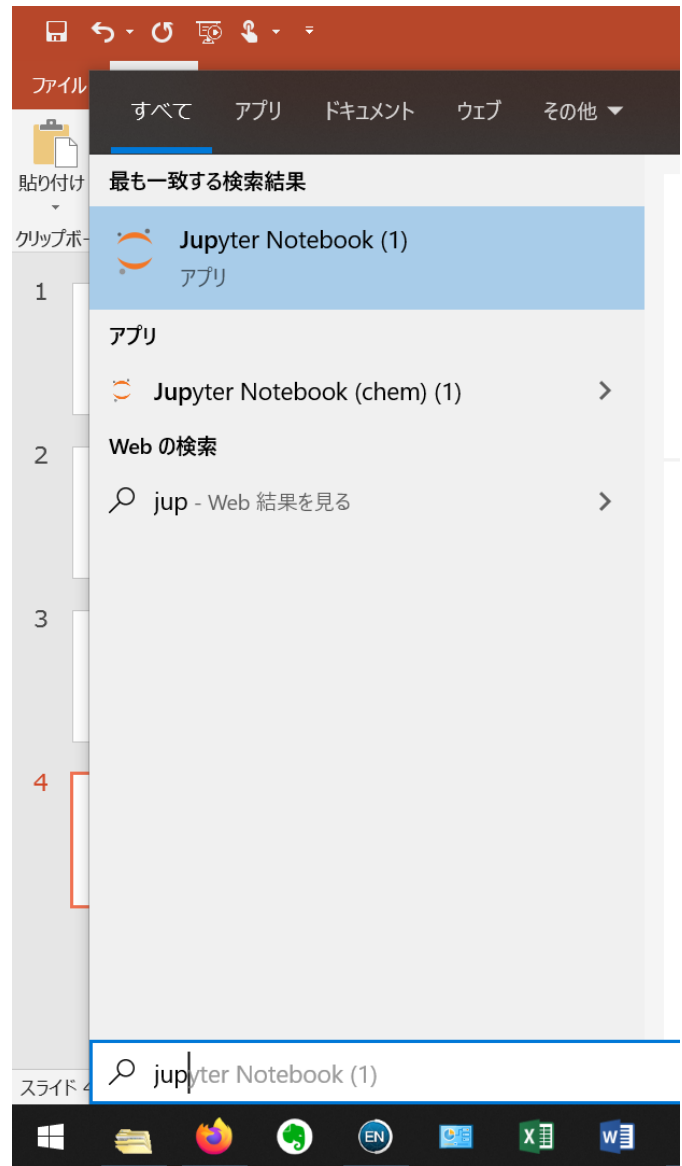
Anacondaというパッケージをダウンロードし、実行

<https://www.anaconda.com/distribution/#download-section>



基本はこれをダウンロードします
(python 3.7, windows, 64bit PCの場合)

起動方法



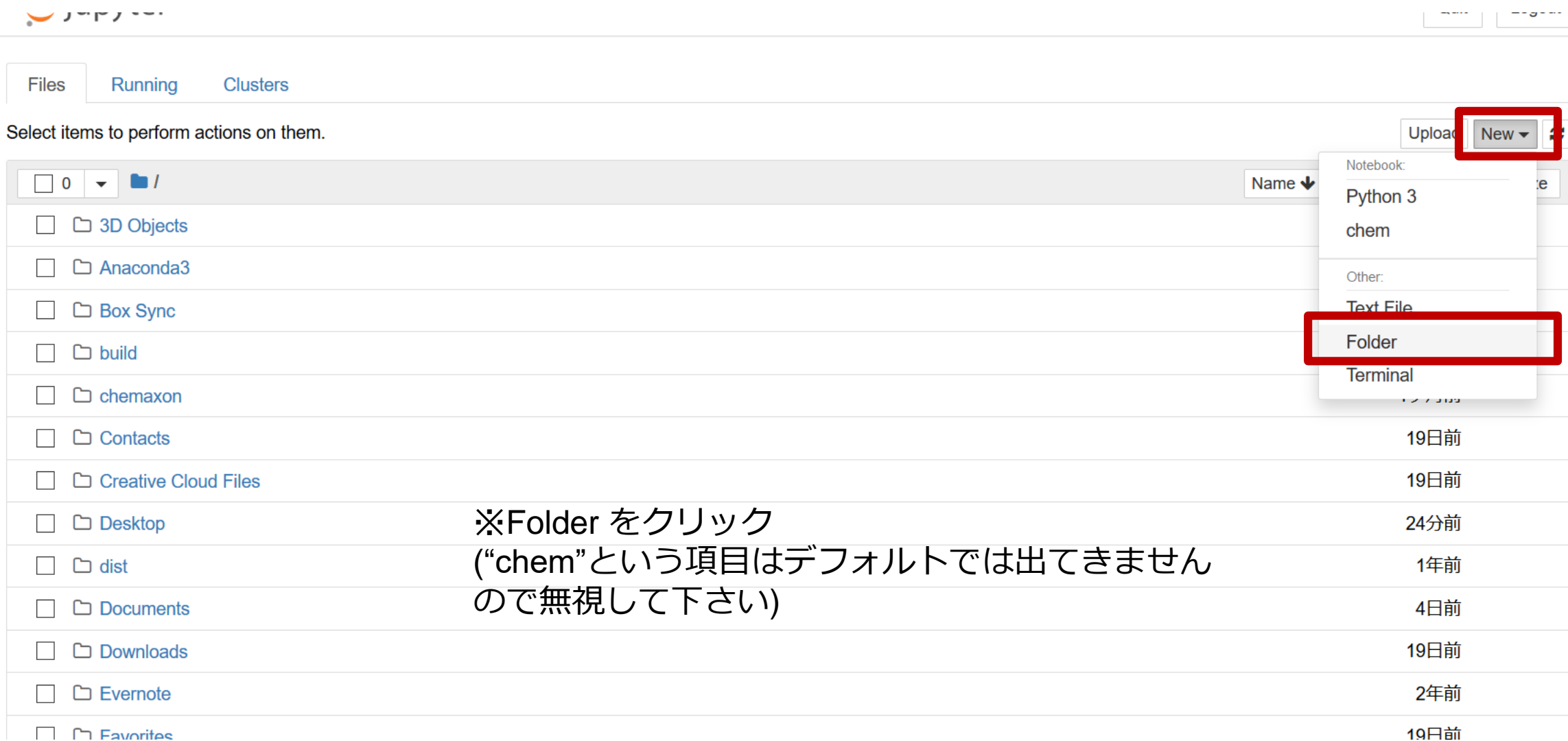
Windowsのスタートメニューから
“Jupyter notebook”と入力し、
このアプリを実行

ブラウザにこんな感じの画面が出てくる

The screenshot displays the JupyterLab web interface in a browser. The address bar shows the URL `localhost:8888/tree`. The Jupyter logo is visible in the top left, and 'Quit' and 'Logout' buttons are in the top right. Below the navigation tabs ('Files', 'Running', 'Clusters'), there is a message 'Select items to perform actions on them.' and buttons for 'Upload', 'New', and a refresh icon. The main area shows a file browser view with a table of files and folders. The table has columns for 'Name', 'Last Modified', and 'File size'. The files listed are '3D Objects', 'Anaconda3', 'Box Sync', 'build', 'chemaxon', 'Contacts', and 'Creative Cloud Files', each with a checkbox and a folder icon. The 'Last Modified' column shows dates like '19日前' and '7ヶ月前'.

<input type="checkbox"/> 0	Name ↓	Last Modified	File size
<input type="checkbox"/>	3D Objects	19日前	
<input type="checkbox"/>	Anaconda3	7ヶ月前	
<input type="checkbox"/>	Box Sync	1年前	
<input type="checkbox"/>	build	1年前	
<input type="checkbox"/>	chemaxon	1ヶ月前	
<input type="checkbox"/>	Contacts	19日前	
<input type="checkbox"/>	Creative Cloud Files	19日前	

好きな場所に作業用フォルダを作る

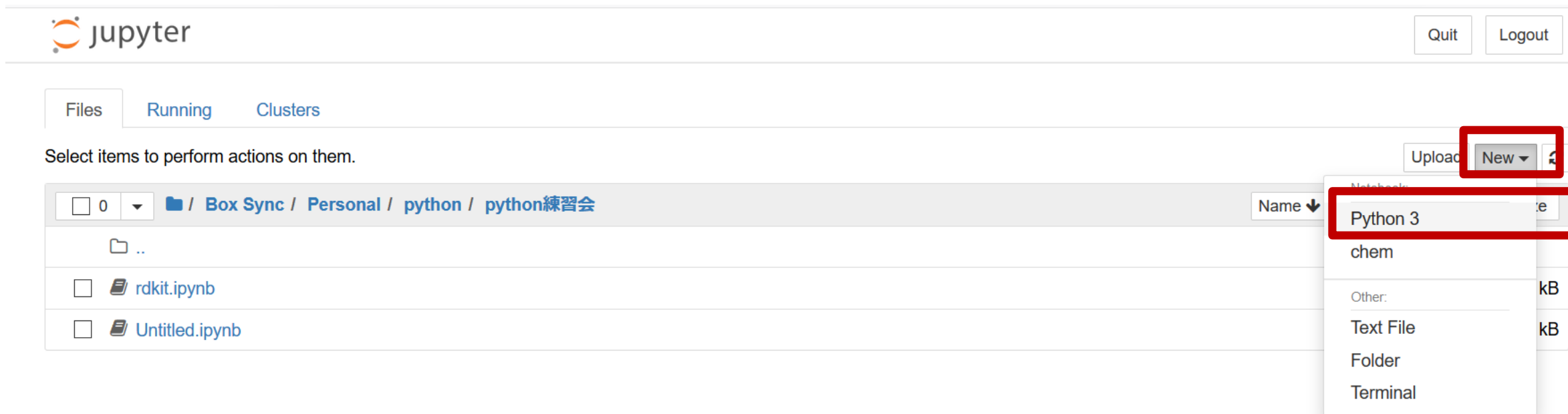


The screenshot shows a cloud storage interface with a top navigation bar containing 'Files', 'Running', and 'Clusters' tabs. Below the tabs is a prompt: 'Select items to perform actions on them.' The main area displays a list of folders. A 'New' button in the top right corner is highlighted with a red box, and its dropdown menu is open, showing options like 'Notebook', 'Python 3', 'chem', 'Text File', 'Folder' (highlighted with a red box), and 'Terminal'. The folder list includes '3D Objects', 'Anaconda3', 'Box Sync', 'build', 'chemaxon', 'Contacts', 'Creative Cloud Files', 'Desktop', 'dist', 'Documents', 'Downloads', 'Evernote', and 'Favorites'. A text overlay is present over the 'Desktop' folder entry.

Folder Name	Last Modified
3D Objects	
Anaconda3	
Box Sync	
build	
chemaxon	
Contacts	19日前
Creative Cloud Files	19日前
Desktop	24分前
dist	1年前
Documents	4日前
Downloads	19日前
Evernote	2年前
Favorites	19日前

※Folder をクリック
("chem"という項目はデフォルトでは出てきません
ので無視して下さい)

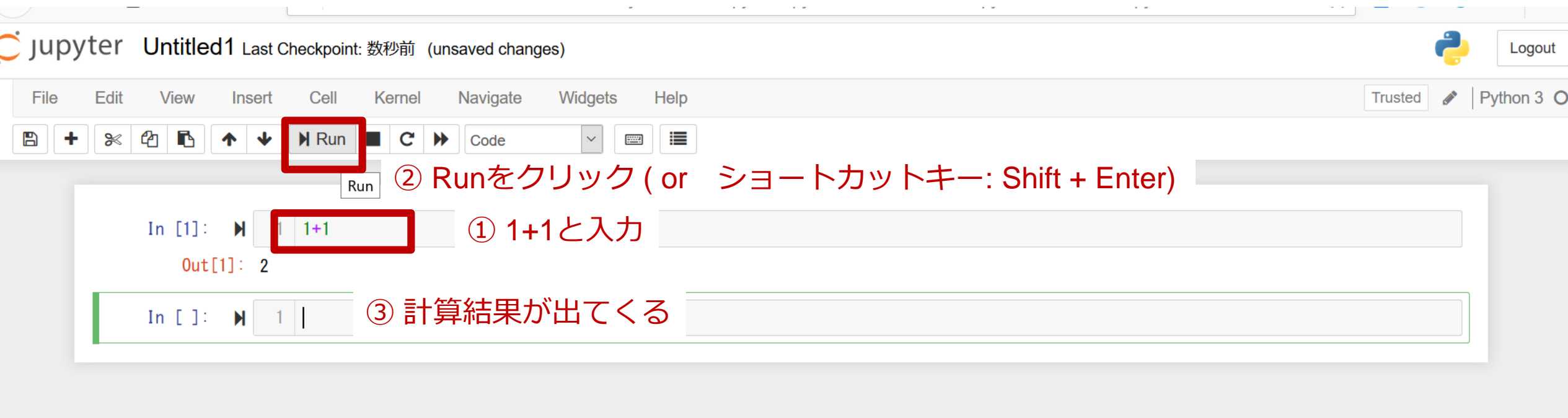
好きな場所にpython用のファイルを作る



The screenshot shows the JupyterLab web interface. At the top, there's a header with the Jupyter logo and 'jupyter' text, and buttons for 'Quit' and 'Logout'. Below the header, there are tabs for 'Files', 'Running', and 'Clusters'. The 'Files' tab is active, showing a file browser. The breadcrumb path is '/ Box Sync / Personal / python / python練習会'. The file list contains three items: '..' (a folder), 'rdkit.ipynb', and 'Untitled.ipynb'. On the right side of the file list, there are buttons for 'Upload' and 'New'. The 'New' button is highlighted with a red box, and its dropdown menu is open, also highlighted with a red box. The dropdown menu lists 'Python 3' (highlighted with a red box), 'chem', and 'Other:' followed by 'Text File', 'Folder', and 'Terminal'.

※Python 3をクリック
(“chem”という項目はデフォルトでは出てきませんので無視して下さい)

スクリプトの入力画面が出てくる



The screenshot displays the Jupyter Notebook interface. At the top, the title bar shows 'jupyter' and 'Untitled1' with a status message 'Last Checkpoint: 数秒前 (unsaved changes)'. The top menu bar includes 'File', 'Edit', 'View', 'Insert', 'Cell', 'Kernel', 'Navigate', 'Widgets', and 'Help'. On the right, there is a 'Logout' button and a 'Python 3' indicator. Below the menu bar is a toolbar with various icons. The 'Run' button, which has a play icon, is highlighted with a red rectangle. Below the toolbar, a code cell is shown with the prompt 'In [1]:' followed by the code '1 + 1'. The code input area is also highlighted with a red rectangle. To the right of the code cell, there are two red annotations: '② Runをクリック (or ショートカットキー: Shift + Enter)' and '① 1+1と入力'. Below the code cell, the output is displayed as 'Out[1]: 2'. At the bottom, another code cell is shown with the prompt 'In []:' followed by the code '1'. To the right of this code cell, there is a red annotation: '③ 計算結果が出てくる'.

jupyter Untitled1 Last Checkpoint: 数秒前 (unsaved changes)

File Edit View Insert Cell Kernel Navigate Widgets Help Trusted Python 3

Run

② Runをクリック (or ショートカットキー: Shift + Enter)

In [1]: 1 + 1 ① 1+1と入力

Out[1]: 2

In []: 1 ③ 計算結果が出てくる

もっと複雑な計算をする

- “import numpy as np”
と入力 (計算用ライブラリnumpyをnpという略称で使いますという宣言)

色々と計算を試みる

例)

$\sin(2) + \cos(999)$

$\sin(\pi)$

$\sin(1+i)$

$\exp(1)$

```
In [2]: 1 import numpy as np
```

```
In [4]: 1 np.sin(2)+np.cos(222)
```

```
Out[4]: 0.41439901223627934
```

```
In [11]: 1 np.sin(np.pi)
```

```
Out[11]: 1.2246467991473532e-16
```

```
In [12]: 1 np.sin(1+1j)
```

```
Out[12]: (1.2984575814159773+0.6349639147847361j)
```

```
In [14]: 1 np.exp(1)
```

```
Out[14]: 2.718281828459045
```


トレーニング

オイラーの公式で有名な次の式の値はいくつになるか？

$$e^{-i\pi}$$