

Data Science

HW#3: Panorama

Submission Deadline:

2020/12/22 23:55

Submit to E3

Hard deadline, No extensions

Tutorials of Jupyter Notebook

工欲善其事，必先利其器。

Install

- conda install jupyter
- pip install jupyter
- video: <https://www.youtube.com/watch?v=HW29067qVWk>

優點1：在內部寫
Markdown語法
優點2：分段執行

The screenshot shows the nbviewer website interface. At the top, there's a navigation bar with 'JUPYTER' and 'FAQ' links. The main title is 'nbviewer' with the subtitle 'A simple way to share Jupyter Notebooks'. Below that, a text input field says 'Enter the location of a Jupyter Notebook to have it rendered here:' followed by a 'Go!' button. There are three examples below:

- IPython**: Shows a code cell with 'In [9]: display()' and 'IP[y]: IPython Interactive Computing'. It also shows code to display a Python logo SVG.
- IRuby**: Shows a red Ruby logo.
- IJulia**: Shows a Julia logo and a preview of a notebook cell containing text and code.

- \$ jupyter notebook

```
[I 11:09:56.584 NotebookApp] http://localhost:9999/?token=ada716c64e909f9d5b59165484884bbc1c88102bc4ec79
[I 11:09:56.584 NotebookApp] Use Control-C to stop this server and shut down all kernels (twice to skip confirmation).
[C 11:09:56.585 NotebookApp]
```

Copy/paste this URL into your browser when you connect for the first time,
to login with a token:

`http://localhost:9999/?token=ada716c64e909f9d5b59165484884bbc1c88102bc4ec79`

```
[I 11:09:57.098 NotebookApp] Accepting one-time-token-authenticated connection from ::1
[W 11:09:57.564 NotebookApp] 404 GET /static/components/moment/locale/zh-tw.js?v=20171204110956 (::1)
) 13.12ms referer=http://localhost:9999/tree
```

- jupyter notebook --port 9999

[Logout](#)[Files](#) [Running](#) [Clusters](#)

Select items to perform actions on them.

[Upload](#) [New ▾](#) 0 [Name ▾](#) [Last Modified](#)

The notebook list is empty.



Logout

Files Running Clusters

Select items to perform actions on them.

0

The notebook list is empty.

Upload New ▾

Notebook:
Python 3

Other: Create a new notebook with Py

Text File

Folder

Terminal



Untitled

Last Checkpoint: a minute ago (unsaved changes)



Logout

File Edit View Insert Cell Kernel Help

Trusted | Python 3



In []:

[Logout](#)[Files](#) [Running](#) [Clusters](#)

Select items to perform actions on them.

[Upload](#) [New ▾](#) [⟳](#) 0 [Name ↴](#)[Last Modified](#) 01_hello_python.ipynb

Running a minute ago

jupyter 01_hello_python Last Checkpoint: 16 minutes ago (unsaved changes)  Logout

File Edit View Insert Cell Kernel Help Trusted Python 3

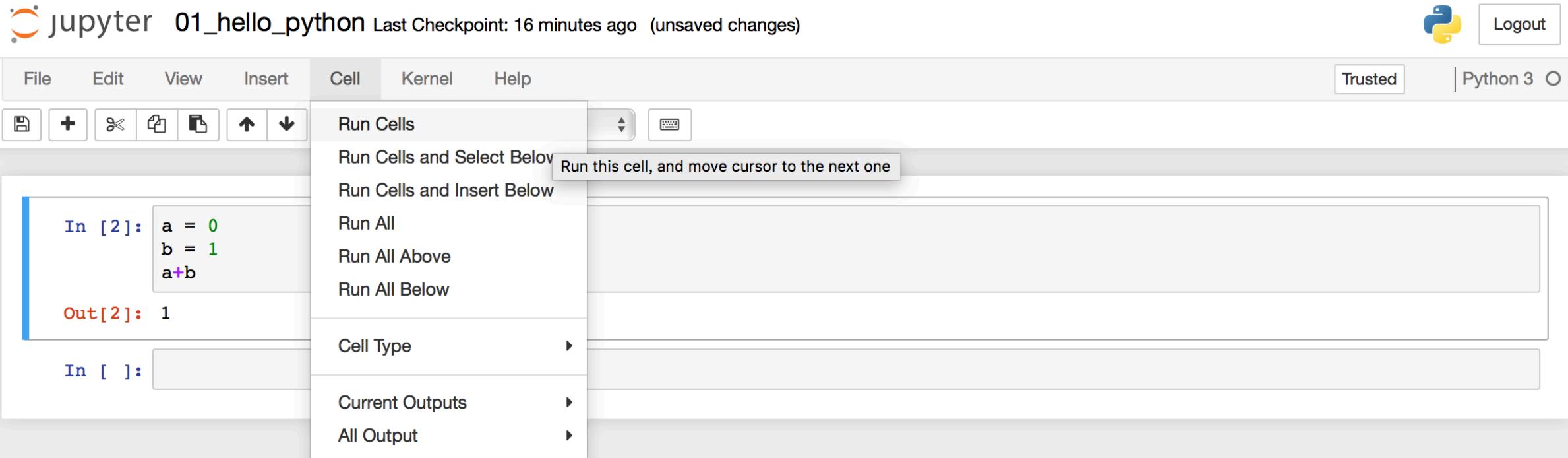
In [2]: `a = 0
b = 1
a+b`

Out[2]: 1

In []:

Run Cells Run Cells and Select Below Run Cells and Insert Below Run All Run All Above Run All Below Cell Type Current Outputs All Output

Run this cell, and move cursor to the next one



shift + enter

在cell旁邊為藍色時

- 按下x：刪除當前選擇的cell
- 按下a：在當前選擇的上方新增一個cell
- 按下b：在當前選擇的下方新增一個cell
- 按下Shift-Enter：執行當前的cell並且選到下一個cell
- 按下Ctrl-Enter：執行當前cell
- 按下M：轉成markdown模式，可以看到紅色框框內容從code變成markdown

SIFT Implementation

Tutorials

- OpenCV tutorials (for reference):
 - https://opencv-python-tutorials.readthedocs.io/en/latest/py_tutorials/py_feature2d/py_sift_intro/py_sift_intro.html
- Matlab implementation
 - <http://ftp.cs.toronto.edu/pub/jepson/teaching/vision/2503/SIFTtutorial.zip>
- Original Paper:
 - <http://faculty.cse.tamu.edu/jchai/CPSC641/iccv2003.pdf>
- 知乎:
 - <https://blog.csdn.net/abcjennifer/article/details/7639681>

Goals

- Recognising Panoramas
 - Feature detection
 - Feature matching
 - Image matching
 - ~~Bundle adjustment~~
 - Blending

Dataset: NCTU + Parrington



hw3.ipynb

```
f = open('testfile.txt', 'r')
dirname = str(f.readline()).strip()
while dirname:
    imageout=SIFT(dirname)
    plt.figure()
    plt.imshow(imageout)
    cv2.imwrite(dirname+'.jpg', imageout)
    dirname = str(f.readline()).strip()
```

```
def read_directory(directory_name):
    filenumber = len([name for name in os.listdir(directory_name) if
for i in range(1,filenumber+1):
    img = cv2.imread(directory_name + "/" + str(i)+".jpg")
    array_of_img.append(img)

def SIFT(inputname):
    read_directory(inputname)
    #use: len(array_of_img) for looping the image, array_of_img[0],
    #array_of_img[1],array_of_img[2],...for processing each image
    #Start SIFT here

    #End of SIFT here and use imageoutput for your output
    imageoutput = array_of_img[0]
    array_of_img.clear()
    return imageoutput
```

Quick note

- Read testfile.txt
 - Images are all from left to right
 - Number of images for each panorama is different (* use filenumber to iterate).
- Output directory_name.jpg

評分方式與配分

- 評分方式

- 助教執行上傳的程式(**hw3.ipynb**)
- 助教會測試五個datasets
- 輸出檔案請和hw2.ipynb在同一個資料夾

- 配分 (**total 100%**)

- 20 points for each dataset
 - 會跟標準答案做similarity比較，所以不要resize。
- Total 40 minutes for 5 datasets
 - 也就是你的程式運行5個datasets，最久不能超過這個時間，如果超過的話會直接卡掉，沒輸出檔案就沒有分。

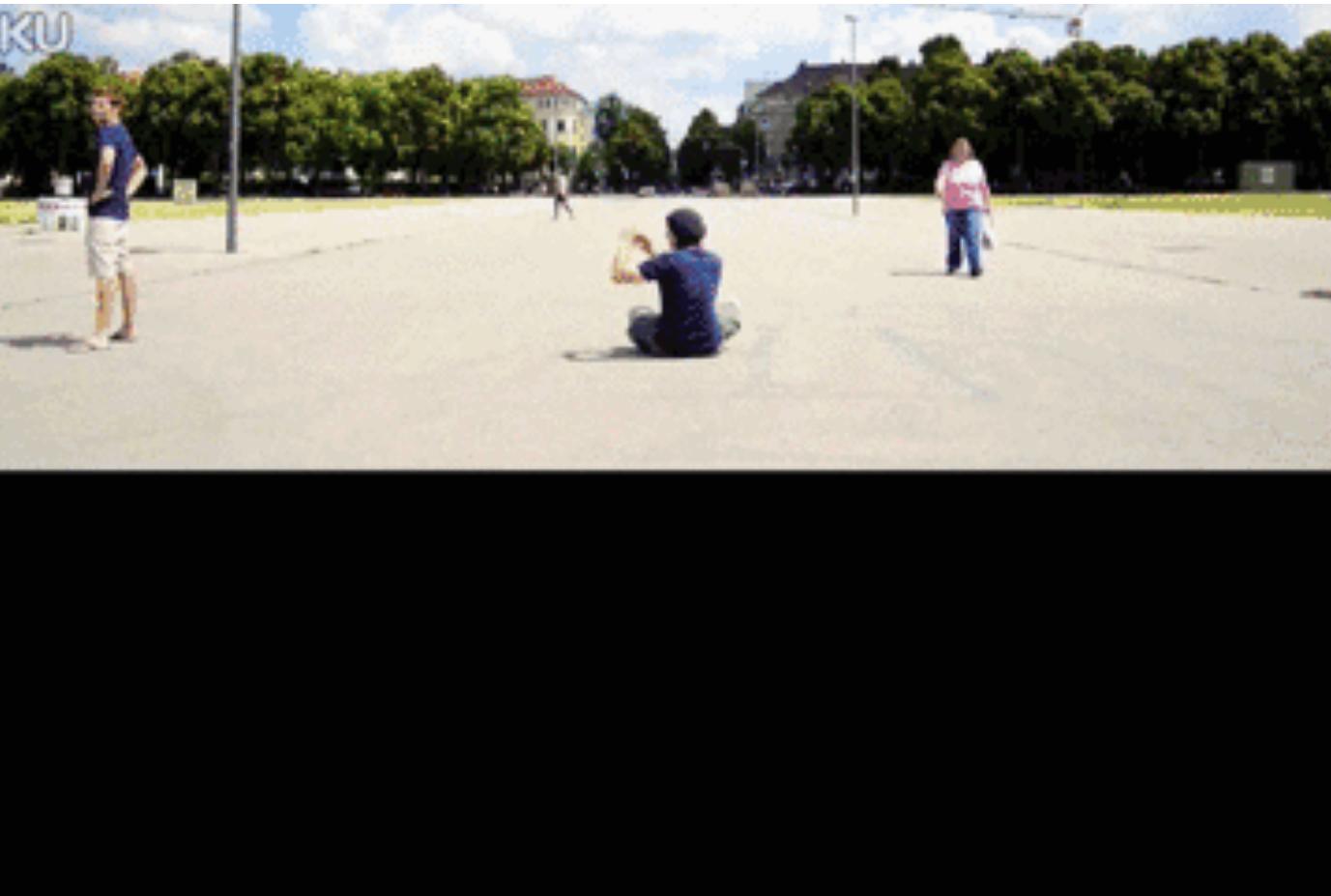
- Best Panorama Award (pano.jpg)

- [First place]10, [Second place] 7, [Third place] 4

Group assignment:
1~2 person(s)
One submission for one group



头条 @手机教授



头条 @手机教授

執行環境

- OS: Ubuntu 18.04.3 LTS
- Python version: python3.6
- CPU: Intel(R) Core(TM) i7-8700K CPU @ 3.70GHz 6 Cores 12 Threads
 - Multiprocess\thread 請參考這個核心數
- RAM: 15G
 - 如果單次執行超過這個上限會直接被kill

繳交內容 - 1

- 請繳交一個`{studentID}.zip`壓縮檔到new e3，並且保證
使用右鍵->解壓縮至此或是使用指令`unzip {studentID}.zip`解壓縮後有一個名稱為`{studentID}`的資料夾產生，`{studentID}`資料夾中至少包含以下四個檔案
(檔案名稱請完全相同)：
 - `hw3.ipynb`
 - `requirements.txt`
 - `pano.jpg`
 - `group.txt`

繳交內容 - 2

- hw2.ipynb
 - 就是python code
- requirements.txt
 - 在你的執行環境中使用以下指令產生
`pip3 freeze > requirements.txt`
- pano.jpg
 - 參加投票的panorama (必須要是自己程式跑出來的)
- group.txt
 - 分組名單(一人一組就填自己學號就好)

繳交內容 - 3

- requirements.txt 範例

```
asn1crypto==0.24.0
attrs==17.4.0
Automat==0.6.0
cffi==1.11.5
constantly==15.1.0
cryptography==2.2.1
cssselect==1.0.3
hyperlink==18.0.0
idna==2.6
incremental==17.5.0
lxml==4.2.1
parsel==1.4.0
pyasn1==0.4.2
pyasn1-modules==0.2.1
pycparser==2.18
PyDispatcher==2.0.5
pyOpenSSL==17.5.0
```

繳交內容 - 4

- group.txt 範例
 - 023939889 0800995995
 - 028825252

- If you have any question about HW#3, please email to 吳易倫 or post on Facebook group.
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