連結:https://colab.research.google.com/drive/1PRhOyTvjHqskeE6H6pX8BSPbqn7hFLjr?usp=sharing

```
pip install jieba
```

```
Looking in indexes: https://pypi.org/simple, https://us-python.pkg.dev/colab-wheels/public/simple/
Requirement already satisfied: jieba in /usr/local/lib/python3.9/dist-packages (0.42.1)
```

```
pip install zhon
```

```
Looking in indexes: https://pypi.org/simple, https://us-python.pkg.dev/colab-wheels/public/simple/
Collecting zhon
  Downloading zhon-1.1.5.tar.gz (99 kB)
     ━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━ 99.8/99.8 KB 7.2 MB/s eta 0:00:00
  Preparing metadata (setup.py) ... done
Building wheels for collected packages: zhon
  Building wheel for zhon (setup.py) ... done
  Created wheel for zhon: filename=zhon-1.1.5-py3-none-any.whl size=84318 sha256=38c439ec16a622ff10cb58d1a8b5085083d98de8498cd56f688302a5b517360
  Stored in directory: /root/.cache/pip/wheels/a3/4d/f7/33026ca375a2fbdbc04f9522ac48e3f3119e6f55d4a8f38fb6
Successfully built zhon
Installing collected packages: zhon
Successfully installed zhon-1.1.5
```

```
pip install wordcloud
```

```
Looking in indexes: https://pypi.org/simple, https://us-python.pkg.dev/colab-wheels/public/simple/
Requirement already satisfied: wordcloud in /usr/local/lib/python3.9/dist-packages (1.8.2.2)
Requirement already satisfied: numpy>=1.6.1 in /usr/local/lib/python3.9/dist-packages (from wordcloud) (1.22.4)
Requirement already satisfied: pillow in /usr/local/lib/python3.9/dist-packages (from wordcloud) (8.4.0)
Requirement already satisfied: matplotlib in /usr/local/lib/python3.9/dist-packages (from wordcloud) (3.7.1)
Requirement already satisfied: packaging>=20.0 in /usr/local/lib/python3.9/dist-packages (from matplotlib->wordcloud) (23.0)
Requirement already satisfied: fonttools>=4.22.0 in /usr/local/lib/python3.9/dist-packages (from matplotlib->wordcloud) (4.39.0)
Requirement already satisfied: python-dateutil>=2.7 in /usr/local/lib/python3.9/dist-packages (from matplotlib->wordcloud) (2.8.2)
Requirement already satisfied: contourpy>=1.0.1 in /usr/local/lib/python3.9/dist-packages (from matplotlib->wordcloud) (1.0.7)
Requirement already satisfied: importlib-resources>=3.2.0 in /usr/local/lib/python3.9/dist-packages (from matplotlib->wordcloud) (5.12.0)
Requirement already satisfied: kiwisolver>=1.0.1 in /usr/local/lib/python3.9/dist-packages (from matplotlib->wordcloud) (1.4.4)
Requirement already satisfied: pyparsing>=2.3.1 in /usr/local/lib/python3.9/dist-packages (from matplotlib->wordcloud) (3.0.9)
Requirement already satisfied: cycler>=0.10 in /usr/local/lib/python3.9/dist-packages (from matplotlib->wordcloud) (0.11.0)
Requirement already satisfied: zipp>=3.1.0 in /usr/local/lib/python3.9/dist-packages (from importlib-resources>=3.2.0->matplotlib->wordcloud) (3
Requirement already satisfied: six>=1.5 in /usr/local/lib/python3.9/dist-packages (from python-dateutil>=2.7->matplotlib->wordcloud) (1.15.0)
```

```
import requests
import re
from zhon.hanzi import punctuation

url = "https://github.com/cjwu/cjwu.github.io/raw/master/courses/nlp/hw1-dataset.txt"
response = requests.get(url)
data = response.text

sen_text = re.compile(u'[\u4E00-\u9F45|\s\w]').findall(data)
sentence = "".join(sen_text)
sentence = sentence.replace(' ', '')
sentence = sentence.replace('\t', '')
list = sentence.split('\n')
# print(list[:2])
articles = []
for l in list:
    articles.append((l, len(l)))
# print(articles[:2])
total_articles = len(articles)
print("文章總數:", total_articles)
```

```
文章總數: 418203
```

```
import jieba

seg_list = []

for article in articles:
    seg_list.append((jieba.lcut(article[0]), article[1]))

print(seg_list[:2])
```

```
Building prefix dict from the default dictionary ...
DEBUG:jieba:Building prefix dict from the default dictionary ...
Dumping model to file cache /tmp/jieba.cache
DEBUG:jieba:Dumping model to file cache /tmp/jieba.cache
Loading model cost 1.303 seconds.
DEBUG:jieba:Loading model cost 1.303 seconds.
```

```
Prefix dict has been built successfully.
DEBUG:jieba:Prefix dict has been built successfully.
[(['為', '什麼', '聖結', '石會', '被', '酸', '而', '這群', '人', '不會質', '感劇本', '成員', '都', '差', '很多', '好', '嗎', '不要', '拿', '腎',
```

```
import math
from collections import Counter

## 計算tf & 依照tf排列
N = 0
rtps = []
for article in seg_list:
    counter = Counter(article[0])
    for item in counter.items():
        rtps.append((N , item[0], item[1] / article[1]))
        N += 1

rtps = sorted(rtps, key=lambda item:item[2], reverse=True)
print(rtps[:5])
```

```
[(2843346, '咩', 1.0), (5149869, '人', 1.0), (5919836, '人', 1.0), (1814372, '啦', 0.9), (2865431, '噢', 0.8636363636363636)]
```

```
## 計算idf
idf = {}

for article in seg_list:
    counter = Counter(article[0])
    for item in counter.items():
        exist_idf = idf.get(item[0])
        if exist_idf:
            idf.update({item[0]: exist_idf + item[1]})
        else:
            idf[item[0]] = item[1]

for iDF in idf.items():
    idf[iDF[0]] = math.log(total_articles/iDF[1], 10)

## 依照idf權重排列
list_idf = sorted(idf.items(), key=lambda item:item[1], reverse=True)
list_idf = list_idf

dict_idf = {}
for lt in list_idf:
    dict_idf[lt[0]] = lt[1]


## 計算tf-idfs
rtf_idfs = []
for item in rtps:
    rtf_idfs.append((item[0], item[1], item[2] * idf[item[1]]))

rtf_idfs = sorted(rtf_idfs, key=lambda item:item[2], reverse=True)
print(rtf_idfs[:5])
```

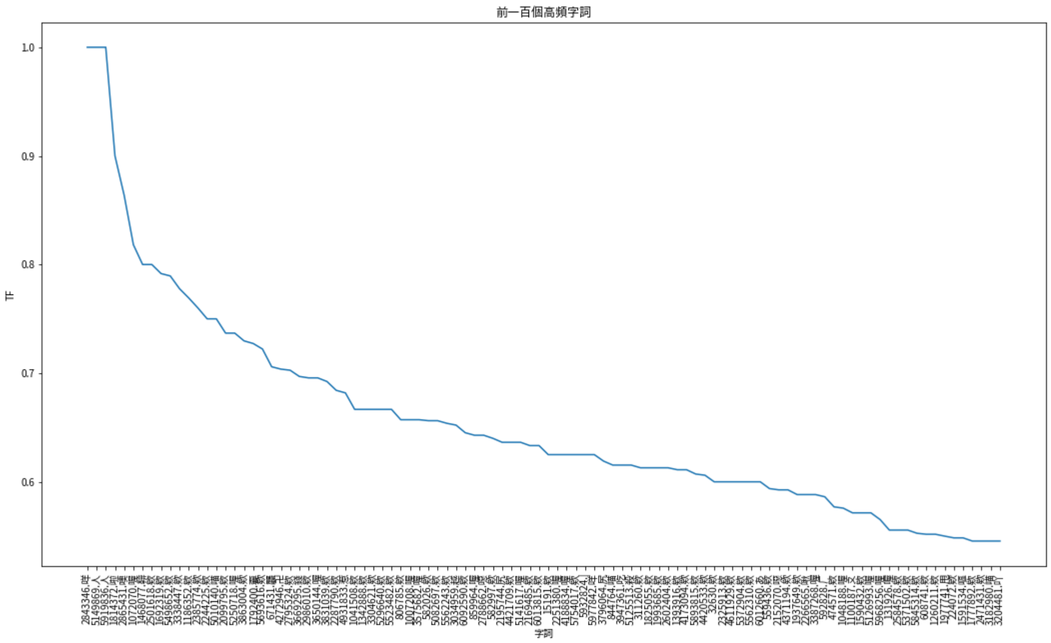
```
[(1468077, '韓', 3.3651310367640437), (2865431, '噢', 3.0349711959673664), (671431, '齉', 2.9055791757218588), (1100187, '夕', 2.868186944341662
```

```
!wget -O taipei_sans_tc_beta.ttf https://drive.google.com/uc?id=1eGAsTN1HBpJAkeVM57_C7ccp7hbgSz3_&export=download
```

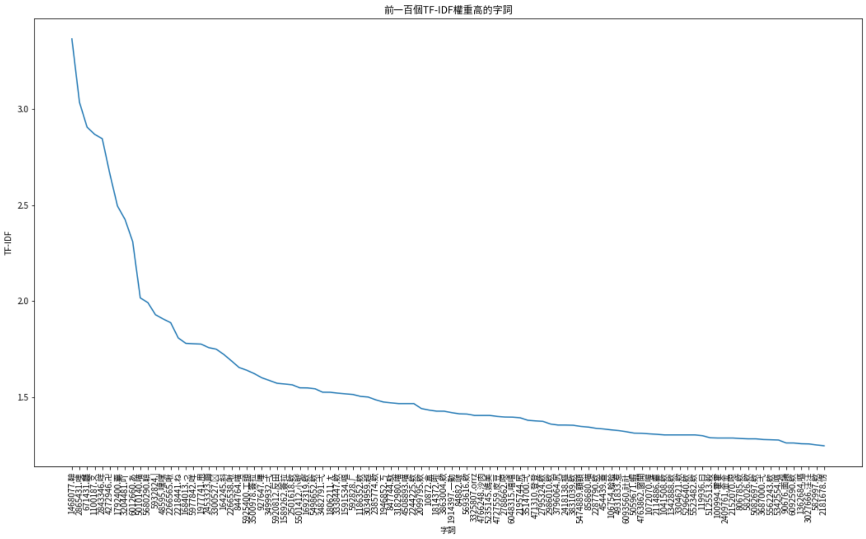
```
--2023-03-18 16:24:31--  https://drive.google.com/uc?id=1eGAsTN1HBpJAkeVM57_C7ccp7hbgSz3_
Resolving drive.google.com (drive.google.com)... 172.253.63.102, 172.253.63.100, 172.253.63.113, ...
Connecting to drive.google.com (drive.google.com)|172.253.63.102|:443... connected.
HTTP request sent, awaiting response... 303 See Other
Location: https://doc-0k-9o-docs.googleusercontent.com/docs/securesc/ha0ro937gcuc7l7deffksulhg5h7mbp1/sicjsrtvoccqvhvk0tb6jvgjcbhl3i55/167915662
Warning: wildcards not supported in HTTP.
--2023-03-18 16:24:35--  https://doc-0k-9o-docs.googleusercontent.com/docs/securesc/ha0ro937gcuc7l7deffksulhg5h7mbp1/sicjsrtvoccqvhvk0tb6jvgjcbh
Resolving doc-0k-9o-docs.googleusercontent.com (doc-0k-9o-docs.googleusercontent.com)... 142.251.111.132, 2607:f8b0:4004:c19::84
Connecting to doc-0k-9o-docs.googleusercontent.com (doc-0k-9o-docs.googleusercontent.com)|142.251.111.132|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 20659344 (20M) [application/x-font-ttf]
Saving to: ‘taipei_sans_tc_beta.ttf’

taipei_sans_tc_beta 100%[===================>]  19.70M  52.6MB/s    in 0.4s

2023-03-18 16:24:35 (52.6 MB/s) - ‘taipei_sans_tc_beta.ttf’ saved [20659344/20659344]
```

```
import matplotlib.pyplot as plt
import matplotlib
```

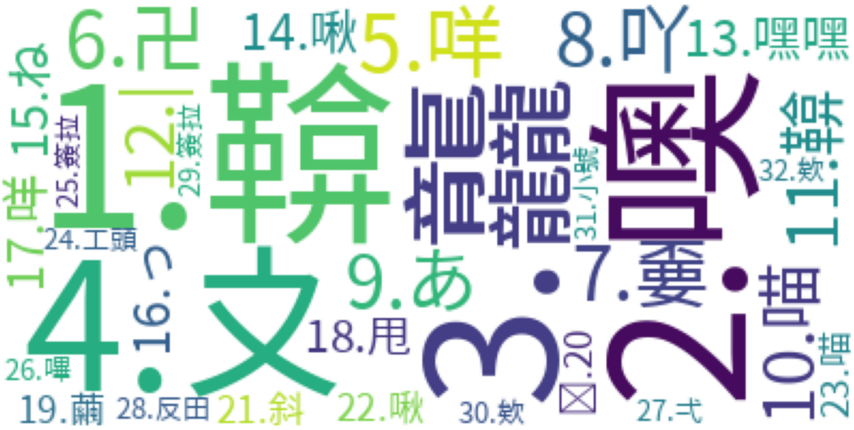
```
from matplotlib.font_manager import FontProperties

matplotlib.font_manager.fontManager.addfont('taipei_sans_tc_beta.ttf')
matplotlib.rc('font', family='Taipei Sans TC Beta')


#前一百個高頻字詞
x_axis = []
y_axis = []

for item in rtps[:100]:
        x_axis.append(str(item[0]) + '.' + item[1])
        y_axis.append(item[2])

plt.figure(figsize = (18 , 10))
plt.plot(x_axis, y_axis)
plt.title("前一百個高頻字詞")
plt.ylabel("TF",)
plt.xlabel("字詞")
plt.xticks(rotation = 90)
plt.show()
```



```
#前一百個TF-IDF權重高的字詞
x_axis = []
y_axis = []

for item in rtf_idfs[:100]:
        x_axis.append(str(item[0]) + '.' + item[1])
        y_axis.append(item[2])

plt.figure(figsize = (18 , 10))
plt.plot(x_axis, y_axis)
plt.title("前一百個TF-IDF權重高的字詞")
plt.ylabel("TF-IDF",)
plt.xlabel("字詞")
plt.xticks(rotation = 90)
plt.show()
```



```
#製作取前32個文字雲
from wordcloud import WordCloud

num = 1
cloud = {}
for l in rtf_idfs[:32]:
        cloud[str(num) + '.' + l[1]] = l[2]
        num += 1

my_wordcloud = WordCloud(background_color="white", contour_width=3, contour_color='blue', font_path= 'taipei_sans_tc_beta.ttf').generate_from_fr
plt.figure(figsize = (18, 10))
plt.imshow(my_wordcloud)
plt.axis("off")
plt.show()
```



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