巨匠直播教學

APCS Python語法基礎班

檔案存取

本堂教學重點

1. 檔案存取
2. CSV 檔案格式解析

課程內容

1. **存取純文字檔案**
   - 1-1. 檔案存取
   - 1-2. 檔案讀取方式
   - 1-3. 讀取時的定位
2. **存取 CSV 檔案**
   - 2-1. CSV 格式
   - 2-2. 讀取 CSV 檔案
   - 2-3. 寫入 CSV 檔案

課程內容

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   - 1-1. 檔案存取
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   - 2-1. CSV 格式
   - 2-2. 讀取 CSV 檔案
   - 2-3. 寫入 CSV 檔案

Python 檔案存取

- Python 檔案存取
  - 使用Python io模組的內建函數open開啟檔案

```
open(fileStr, mode='r', buffering=-1, encoding=None, … )
```

    - 傳回一個檔案物件
    - fileStr：連結的檔名字串
      - 相對路徑 abc.txt
      - 絕對路徑 D:\APCSClass\Examples\abc.txt

Python 檔案存取

open(file, mode='r', buffering=-1, encoding=None, …)

- mode：檔案開啟模式
  - r：讀取模式開啟，未指定模式時的預設模式
  - w：寫入模式開啟，原檔案內容被覆蓋
  - a：寫入模式開啟，內容附加在原檔案內容之後
  - x：建立新檔案模式，檔案已存在則開啟失敗
  - +：打開磁碟上的檔案進行更新，可讀可寫
  - b：資料以二進位模式存取

Python 檔案存取

open(file, mode='r', buffering=-1, encoding=None, …)

- buffering：緩衝設定
  - 緩衝值為 0，不產生緩衝
  - 緩衝值為 1，訪問文件時將執行行緩衝
  - 緩衝值大於 1 ，緩衝區大小為指定的數值
  - 緩衝值為負，緩衝區大小為系統預設值

Python 檔案存取

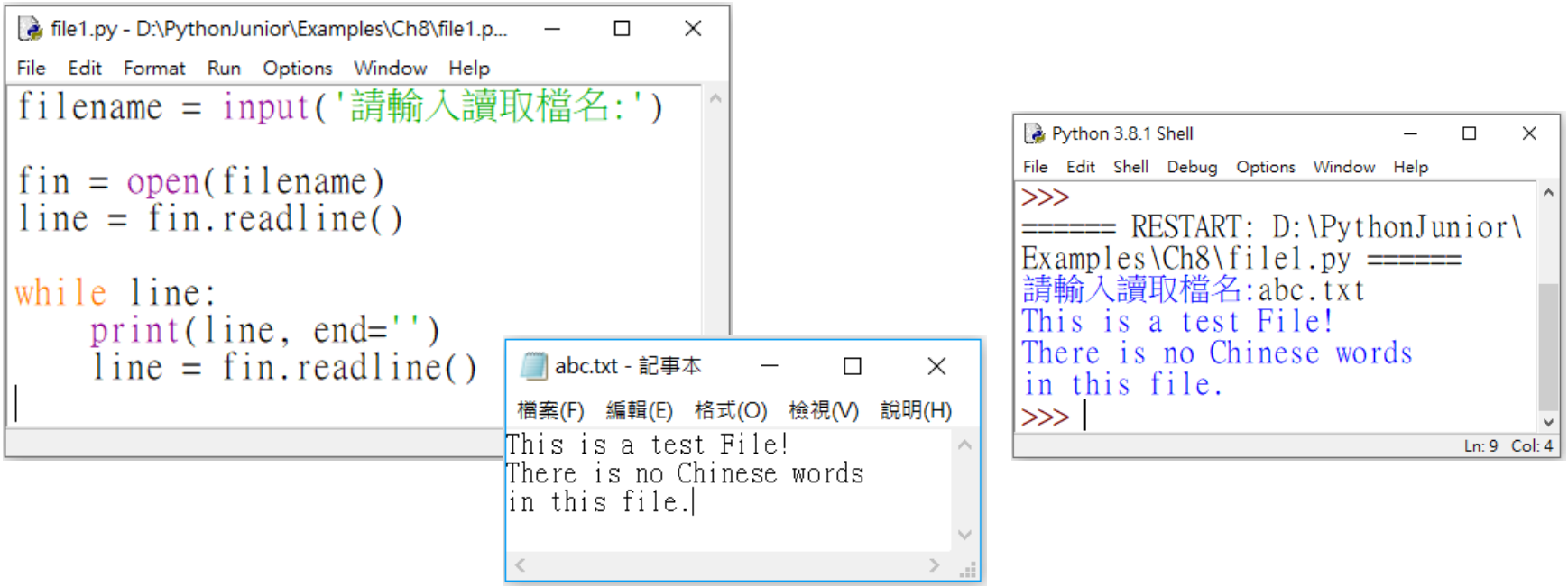
open(file, mode='r', buffering=-1, encoding=None, …)

- encoding：文字編碼設定
  - 未指定時使用預設編碼 (Windows系統為cp950)
  - 常用編碼字串
    - ascii(us-ascii)
    - latin_1(iso-8859-1)
    - big5(big5-tw) / cp950(ms950)：台灣
    - utf8(utf_8)

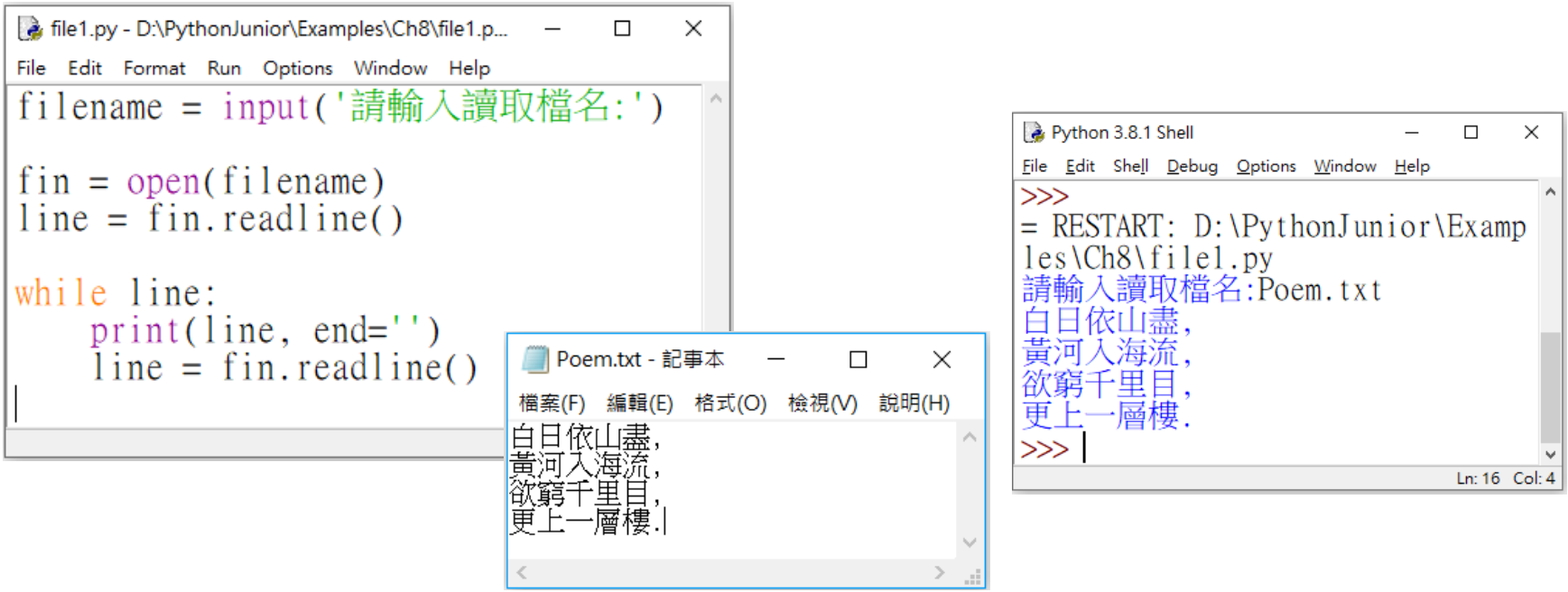
檔案物件-讀取內容操作

- 檔案物件方法
  - read(size=-1)
    - 從文件當前位置起讀取 size 個字元數量
    - 若無參數或size=-1，調用readall()方法讀取整個文件內容
  - readline(size=-1)
    - 讀取直到換行符號或檔案結尾EOF，傳回一個str
    - 若指定size大小，則至多讀size個字元
  - readlines()
    - 讀取多行字串置於序列list中傳回

程式範例


file1.py - D:\PythonJunior\Examples\Ch8\file1.p...
File Edit Format Run Options Window Help
filename = input('請輸入讀取檔名:')
fin = open(filename)
line = fin.readline()
while line:
print(line, end='')
line = fin.readline()
abc.txt - 記事本
檔案(F) 編輯(E) 格式(O) 檢視(V) 說明(H)
This is a test File!
There is no Chinese words
in this file.
Python 3.8.1 Shell
File Edit Shell Debug Options Window Help
>>>
====== RESTART: D:\PythonJunior\Examples\Ch8\file1.py ======
請輸入讀取檔名:abc.txt
This is a test File!
There is no Chinese words
in this file.
>>>
Ln: 9 Col: 4

程式範例


file1.py - D:\PythonJunior\Examples\Ch8\file1.p...
File Edit Format Run Options Window Help
filename = input('請輸入讀取檔名:')
fin = open(filename)
line = fin.readline()
while line:
print(line, end='')
line = fin.readline()
Poem.txt - 記事本
檔案(F) 編輯(E) 格式(O) 檢視(V) 說明(H)
白日依山盡,
黃河入海流,
欲窮千里目,
更上一層樓.
Python 3.8.1 Shell
File Edit Shell Debug Options Window Help
>>>
= RESTART: D:\PythonJunior\Examples\Ch8\file1.py
請輸入讀取檔名:Poem.txt
白日依山盡,
黃河入海流,
欲窮千里目,
更上一層樓.
>>>
Ln: 16 Col: 4

程式範例

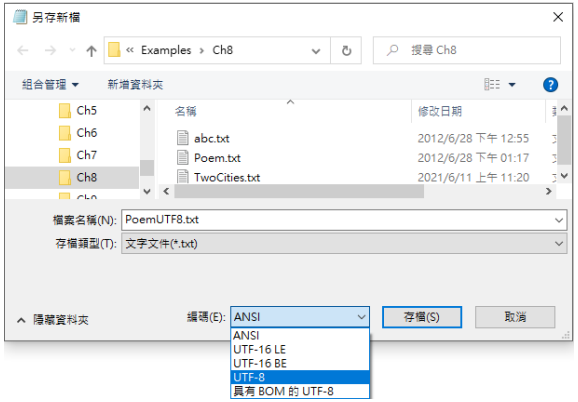
file1.py - D:\PythonJunior\Examples\Ch8\file1.p...

File Edit Format Run Options Window Help

```
filename = input('請輸入讀取檔名:')

fin = open(filename)
line = fin.readline()

while line:
    print(line, end='')
    line = fin.readline()
```



Python 3.8.1 Shell

File Edit Shell Debug Options Window Help

```
Ch8\file1.py ============
請輸入讀取檔名:PoemUTF8.txt
Traceback (most recent call last):
  File "D:\PythonJunior\Examples\Ch8\file1.py"
, line 4, in <module>
    line = fin.readline()
UnicodeDecodeError: 'cp950' codec can't decode
byte 0xe7 in position 0: illegal multibyte seq
uence
>>>
```

Ln: 15 Col: 4

PoemUTF8.txt ...

檔案(F) 編輯(E) 格式(O) 檢視(V) 說明

白日依山盡,
黃河入海流,
欲窮千里目,
更上一層樓.

100% Windows (CRLF) UTF-8

程式範例

encode1.py - D:/PythonJunior/Examples/Ch8/encode1.py (3.8.1)

File Edit Format Run Options Window Help

```
import locale

print(locale.getpreferredencoding())

fin1 = open('Poem.txt', encoding='cp950')
line = fin1.readline()

while line:
    print(line, end='')
    line = fin1.readline()

print('UTF-8')
fin2 = open('PoemUTF8.txt', encoding='utf-8')
line = fin2.readline()

while line:
    print(line, end='')
    line = fin2.readline()
```

Ln: 19 Col: 0

Poem.txt - 記事...

檔案(F) 編輯(E) 格式(O) 檢視(V) 說明

白日依山盡,
黃河入海流,
欲窮千里目,
更上一層樓.

100% Windows (CRLF) ANSI

PoemUTF8.txt ...

檔案(F) 編輯(E) 格式(O) 檢視(V) 說明

白日依山盡,
黃河入海流,
欲窮千里目,
更上一層樓.

100% Windows (CRLF) UTF-8

Python 3.8.1 Shell

File Edit Shell Debug Options Window Help

```
/Ch8/encode1.py
cp950
白日依山盡,
黃河入海流,
欲窮千里目,
更上一層樓.
UTF-8
白日依山盡,
黃河入海流,
欲窮千里目,
更上一層樓.
>>>
```

Ln: 47 Col: 4

檔案物件-輸出資料操作

- 使用print()輸出至檔案
  - print(*objects, sep=' ', end='\n', file=sys.stdout, flush=False)
    - file屬性預設為sys.stdout標準輸出，輸出至Console
    - 將file屬性設定為檔案物件，列印內容輸出至指定檔案
    - flush=True, 將緩衝區的內容沖入串流

檔案物件-輸出資料操作

- 檔案物件方法
  - write(s)
    - 將字串s寫入串流
    - 傳回寫出的字元數
  - flush()
    - 將緩衝區的內容沖入串流
  - close()
    - 關閉開啟的資料流

with … as 語法

- 檔案資源自動關閉
  - with … as 語法：

    ```
    with open('file', 'r', encoding='utf-8') as f :
    ```

  - 檔案物件支援Context管理協定
    - 進入with區段時傳回file物件
    - 離開with區間，自動關閉file資源
      - 不必再呼叫close()

Context Management Protocol 內容管理協定

- context management protocol 內容管理協定
  - __enter__
    - 進入with區段時執行
    - 方法傳回的物件，可以使用as指定給變數
  - __exit__：離開with區段時執行，釋放資源

程式範例

file2.py - D:\PythonJunior\Examples\Ch8\file2.py (3.8.1)

File Edit Format Run Options Window Help

```
poem = '''床前明月光
疑是地上霜
舉頭望明月
低頭思故鄉
'''


try:
    print(poem, file=open('output.txt', 'w'), flush=True)
    print('資料寫出至output.txt')
except Exception as e:
    print('資料寫出失敗:', e)
```

Python 3.6.1 Shell

File Edit Shell Debug Options Window Help

```
>>>
========== RESTART: D:\Python\
Examples\file2.py ==========
資料寫出至output.txt
>>>
========== RESTART: D:\Python\
Examples\file2.py ==========
資料寫出至output.txt
>>>
```

Ln: 9 Col: 4

output.txt - 記事本

檔案(F) 編輯(E) 格式(O) 檢視(V) 說明(H)

```
床前明月光
疑是地上霜
舉頭望明月
低頭思故鄉
```

程式範例

file3.py - D:\PythonJunior\Examples\Ch8\file3.py ...

File Edit Format Run Options Window Help

```
poem = '''床前明月光
疑是地上霜
舉頭望明月
低頭思故鄉
'''

try:
    file=open('output2.txt', 'x')
    file.write(poem)
    file.flush()
    file.close()
    print('資料寫出至output2.txt')
except Exception as e:
    print('資料寫出失敗:', e)
```

Ln: 14 Col: 0

Python 3.6.1 Shell

File Edit Shell Debug Options Window Help

```
========== RESTART: D:\Python
\Examples\file3.py ==========
資料寫出至output2.txt
>>>
========== RESTART: D:\Python
\Examples\file3.py ==========
資料寫出失敗: [Errno 17] File exists: '
output2.txt'
>>>
```

Ln: 9 Col: 4

output2.txt - 記事本

檔案(F) 編輯(E) 格式(O) 檢視(V) 說明(H)

床前明月光
疑是地上霜
舉頭望明月
低頭思故鄉

程式範例

file4.py - D:\PythonJunior\Examples\Ch8\file4.py (3.8.1)

File Edit Format Run Options Window Help

```
poem = '''床前明月光
疑是地上霜
舉頭望明月
低頭思故鄉
'''
try:
    with open('output3.txt', 'a') as f:
        f.write(poem)
    print('資料寫出至output3.txt')
except Exception as e:
    print('資料寫出失敗:', e)
```

Ln: 12

Python 3.6.1 Shell

File Edit Shell Debug Options Window Help

```
========== RESTART: D:\Python
\Examples\file4.py ==========
資料寫出至output3.txt
>>>
========== RESTART: D:\Python
\Examples\file4.py ==========
資料寫出至output3.txt
>>>
```

Ln: 9 Col: 4

output3.txt - 記事本

檔案(F) 編輯(E) 格式(O) 檢視(V) 說明(H)

```
床前明月光
疑是地上霜
舉頭望明月
低頭思故鄉
床前明月光
疑是地上霜
舉頭望明月
低頭思故鄉
```

讀取時的定位

- tell( ) 方法
  - 讀得目前讀取文件所在的字元位置。
- seek（offset [，from] ）方法
  - 更改目前讀取文件所在的字元位置
  - offset 參數表示要移動的字元數。
  - from 參數指定要移動的起始位置。0：代表從文件的開頭作為起始位置；1：使用當前位置作為起始位置；2：以文件的結尾作為起始位置 。

程式範例

file5.py - D:\PythonJunior\Examples\Ch8\file5.py (3.8.1)

File Edit Format Run Options Window Help

```
f=open('TwoCities.txt', 'r')
str = f.read(15)
print ("讀取的字串是 : ", str)
position = f.tell()
print ("目前位置 : ", position)
position = f.seek(28, 0)
str = f.read(16)
print ("重新調整後讀取的字串是 : ", str)
position = f.tell()
print ("目前位置 : ", position)
f.close()
```

Ln: 12 Col: 0

TwoCities.txt - 記...

檔案(F) 編輯(E) 格式(O) 檢視(V) 說明

```
It was the best of times,
it was the worst of times.
```

100% Windows (CRLF) UTF-8

Python 3.8.1 Shell

File Edit Shell Debug Options Window Help

```
>>>
= RESTART: D:\PythonJunior\Examples\Ch8\file5.py
讀取的字串是 :  It was the best
目前位置 :  15
重新調整後讀取的字串是 :  it was the worst
目前位置 :  44
>>>
```

Ln: 43 Col: 4

Q：下列描述何者正確？

a) 中文Window 作業系統中，open()開啟檔案預設編碼格式是UTF-8

b) readlines() 讀取檔案時一次讀一行，並使用字典dict儲存

c) write(3) 會將字串'3'寫入檔案

d) 使用 with open(…) 開啟的檔案，離開區段時會自動關閉

Q：哪一個檔案開啟模式會將內容附加在原內容之後？

a) open(..., mode='r')

b) open(..., mode='w')

c) open(..., mode='a')

d) open(..., mode='r+')

Q：檔案未指定開啟模式mode時預設模式為何？

a) 'r'

b) 'w'

c) 'a'

d) 'b'

5 分鐘

練習：檔案內容英文單字出現次數

- 修改英文單字出現次數程式
  - 輸入讀取檔案名稱
  - 使用例外處理防止檔案不存在錯誤
  - 讀入檔案資料，計算各單字出現次數
  - 忽略大小寫差異

課程內容

1. **存取純文字檔案**
   - 1-1. 檔案存取
   - 1-2. 檔案讀取方式
   - 1-3. 讀取時的定位
2. **存取 CSV 檔案**
   - 2-1. CSV 格式
   - 2-2. 讀取 CSV 檔案
   - 2-3. 寫入 CSV 檔案

CSV 格式

- CSV 格式
  - Comma-Separated Values 逗號分隔值
  - 通用的簡單資料格式
    - 資訊領域很早開始使用，沒有一致性的標準
    - 廣泛的應用在程式之間表格資料轉移

CSV 格式資料特性

- CSV格式資料特性
  - 每一行是一筆資料
  - 資料有多個欄位, 通常用，隔開
  - 欄位為純文字型態
  - 可以被不同軟體開啟
    - 純文字編輯器、Excel、...
  - 不限定使用的字元集(ASCII、UTF-8 、BIG5...)
    - 使用軟體開啟時還是有可能出現亂碼

標準函式庫 csv 模組

- 標準函式庫 csv 模組
  - 提供讀寫CSV格式表格數據的類別
    - 程式輸出可供EXCEL讀取的數據
    - 讀取以EXCEL編輯的數據至程式中
  - reader/writer 物件：資料以序列方式處理
  - DictReader/DictWriter 物件：資料以字典方式處理

reader 物件讀取 CSV 檔案

- 使用 reader 物件讀取 CSV 檔案
  - 匯入csv模組

    ```
    import csv
    ```

  - 建立 reader 物件

    ```
    csv.reader(csvfile, dialect='excel', **fmtparams)
    ```

  - 使用 for-in 迴圈， 逐行取出資料
  - CSV 檔案中每一行資料被包裝為一個List，使用索引讀取

reader 物件讀取 CSV 檔案

- csv.reader(csvfile, dialect='excel', **fmtparams)
  - csvfile：要開啟的檔案物件
  - dialect：指定特定CSV方言(一組的格式參數設定)
    - excel (.csv)
    - excel-tab (.tsv)
    - unix
  - fmtparams：覆寫指定方言中的特定格式參數

常用格式參數

- 常用格式參數
  - delimiter：設定欄位分隔符號。預設為，
  - quotechar：設定引用符號。預設為 ' " '
  - lineterminator：設定換行符號。預設為 '\r\n'
  - strict：csv格式錯誤時是否拋出例外。預設為 False
  - quoting ：設定引用模式。預設為QUOTE_MINIMAL
    - csv.QUOTE_ALL - 所有資料均使用引用符號。
    - csv.QUOTE_MINIMAL – 字串包含特殊字元時時使用引用符號
    - csv.QUOTE_NONNUMERIC - 引用所有不是數值的字串
    - csv.QUOTE_NONE - 任何資料均不使用引用符號

程式範例

data.csv - 記事本

檔案(F) 編輯(E) 格式(O) 檢視(V) 說明(H)

```
"name","gender","score","age","ageStage","birthday"
"Ada","Female",92.1,12,"child","2004/03/02"
"Buddy","Male",71.2,20,"youth","1996/04/08"
"Candy","Female",88.5,31,"middle","1985/12/01"
"David","Male",82.3,25,"youth","1991/05/12"
"Emily","Female",90.8,22,"youth","1994/06/25"
"Feng","Female",55.8,47,"middle","1969/05/11"
"George","Male",68.9,58,"elder","1958/01/10"
"Henry","Male",77.2,60,"elder","1956/09/11"
"Iris","Female",42.2,9,"child","2007/04/04"
"Jimmy","Male",81.4,17,"teens","1999/08/09"
"Keley","Female",75.3,36,"middle","1980/10/24"
"Leon","Male",80.2,28,"youth","1988/12/12"
```

	A	B	C	D	E	F
1	name	gender	score	ge	ageStage	birthday
2	Ada	Female	92.1	12	child	2004/3/2
3	Buddy	Male	71.2	20	youth	1996/4/8
4	Candy	Female	88.5	31	middle	1985/12/1
5	David	Male	82.3	25	youth	1991/5/12
6	Emily	Female	90.8	22	youth	1994/6/25
7	Feng	Female	55.8	47	middle	1969/5/11
8	George	Male	68.9	58	elder	1958/1/10
9	Henry	Male	77.2	60	elder	1956/9/11
10	Iris	Female	42.2	9	child	2007/4/4
11	Jimmy	Male	81.4	17	teens	1999/8/9
12	Keley	Female	75.3	36	middle	1980/10/24
13	Leon	Male	80.2	28	youth	1988/12/12
14						

data

csv1.py - D:\PythonJunior\Examples\C...

File Edit Format Run Options Window Help

```
import csv

file = open('data.csv', 'r')
csvCursor = csv.reader(file)

for row in csvCursor:
    print(row[0], row[2])

file.close()
```

Ln: 10 Col: 0

Python 3.6.1 Shell

File Edit Shell Debug Options Window Help

```
Examples/csv1.py ==========
name score
Ada 92.1
Buddy 71.2
Candy 88.5
David 82.3
Emily 90.8
Feng 55.8
George 68.9
Henry 77.2
Iris 42.2
Jimmy 81.4
Keley 75.3
Leon 80.2
>>>
```

Ln: 33 Col: 4

程式範例

data2.csv - 記事本

檔案(F) 編輯(E) 格式(O) 檢視(V) 說明(H)

```
"Ada","Female",92.1,12,"child","2004/03/02"
"Buddy","Male",71.2,20,"youth","1996/04/08"
"Candy","Female",88.5,31,"middle","1985/12/01"
"David","Male",82.3,25,"youth","1991/05/12"
"Emily","Female",90.8,22,"youth","1994/06/25"
"Feng","Female",55.8,47,"middle","1969/05/11"
"George","Male",68.9,58,"elder","1958/01/10"
"Henry","Male",77.2,60,"elder","1956/09/11"
"Iris","Female",42.2,9,"child","2007/04/04"
"Jimmy","Male",81.4,17,"teens","1999/08/09"
"Keley","Female",75.3,36,"middle","1980/10/24"
"Leon","Male",80.2,28,"youth","1988/12/12"
```

	A	B	C	D	E	F
1	Ada	Female	92.1	12	child	2004/3/2
2	Buddy	Male	71.2	20	youth	1996/4/8
3	Candy	Female	88.5	31	middle	1985/12/1
4	David	Male	82.3	25	youth	1991/5/12
5	Emily	Female	90.8	22	youth	1994/6/25
6	Feng	Female	55.8	47	middle	1969/5/11
7	George	Male	68.9	58	elder	1958/1/10
8	Henry	Male	77.2	60	elder	1956/9/11
9	Iris	Female	42.2	9	child	2007/4/4
10	Jimmy	Male	81.4	17	teens	1999/8/9
11	Keley	Female	75.3	36	middle	1980/10/24
12	Leon	Male	80.2	28	youth	1988/12/12
13						

data2

csv1.py - D:\PythonJunior\Examples\C...

File Edit Format Run Options Window Help

```
import csv

file = open('data2.csv', 'r')
csvCursor = csv.reader(file)

for row in csvCursor:
    print(row[0], row[2])

file.close()
```

Ln: 10 Col: 0

Python 3.6.5 Shell

File Edit Shell Debug Options Window Help

```
L12\Examples\csv1.py ========
Ada 92.1
Buddy 71.2
Candy 88.5
David 82.3
Emily 90.8
Feng 55.8
George 68.9
Henry 77.2
Iris 42.2
Jimmy 81.4
Keley 75.3
Leon 80.2
>>>
```

Ln: 15 Col: 4

DictReader物件讀取 CSV 檔案

- 使用 DictReader 物件讀取 CSV 檔案
  - 匯入csv模組

    ```
    import csv
    ```

  - 建立 DictReader 物件

    ```
    csv.DictReader(csvfile, fields=None, restkey=None, restval=None,
                   dialect= 'excel', *args, **kwds)
    ```

  - 使用 for-in 迴圈， 逐行取出資料
  - CSV 檔案中每一行資料被包裝為一個Dict，使用欄位名稱讀取

DictReader物件讀取 CSV 檔案

- csv.DictReader(csvfile, fields=None, restkey=None, restval=None, dialect= 'excel', *args, **kwds)
  - csvfile：要開啟的檔案物件
  - fields：資料欄位名稱序列，未指定則以檔案第一行為名稱
  - restkey：資料欄位比名稱序列多時，剩餘數據使用此名稱
  - restval：名稱序列比資料欄位多時，剩餘名稱使用此數據
  - dialect：指定特定CSV方言(一組的格式參數設定)
  - *args：額外的參數(List)
  - **kwds：額外的參數(Dict)

程式範例

data.csv - 記事本

檔案(F) 編輯(E) 格式(O) 檢視(V) 說明(H)

```
"name","gender","score","age","ageStage","birthday"
"Ada","Female",92.1,12,"child","2004/03/02"
"Buddy","Male",71.2,20,"youth","1996/04/08"
"Candy","Female",88.5,31,"middle","1985/12/01"
"David","Male",82.3,25,"youth","1991/05/12"
"Emily","Female",90.8,22,"youth","1994/06/25"
"Feng","Female",55.8,47,"middle","1969/05/11"
"George","Male",68.9,58,"elder","1958/01/10"
"Henry","Male",77.2,60,"elder","1956/09/11"
"Iris","Female",42.2,9,"child","2007/04/04"
"Jimmy","Male",81.4,17,"teens","1999/08/09"
"Keley","Female",75.3,36,"middle","1980/10/24"
"Leon","Male",80.2,28,"youth","1988/12/12"
```

	A	B	C	D	E	F
1	name	gender	score	ge	ageStage	birthday
2	Ada	Female	92.1	12	child	2004/3/2
3	Buddy	Male	71.2	20	youth	1996/4/8
4	Candy	Female	88.5	31	middle	1985/12/1
5	David	Male	82.3	25	youth	1991/5/12
6	Emily	Female	90.8	22	youth	1994/6/25
7	Feng	Female	55.8	47	middle	1969/5/11
8	George	Male	68.9	58	elder	1958/1/10
9	Henry	Male	77.2	60	elder	1956/9/11
10	Iris	Female	42.2	9	child	2007/4/4
11	Jimmy	Male	81.4	17	teens	1999/8/9
12	Keley	Female	75.3	36	middle	1980/10/24
13	Leon	Male	80.2	28	youth	1988/12/12
14						

data

csv2.py - D:\PythonJunior\Examples\Ch8\csv2.py ...

File Edit Format Run Options Window Help

```
import csv

file = open('data.csv', 'r')
csvCursor = csv.DictReader(file)

for row in csvCursor:
    print(row['name'], row['score'])

file.close()
```

Ln: 10 Col: 0

Python 3.6.1 Shell

File Edit Shell Debug Options Window Help

```
========== RESTART: D:/Python/Examples/csv2.py ==========
Ada 92.1
Buddy 71.2
Candy 88.5
David 82.3
Emily 90.8
Feng 55.8
George 68.9
Henry 77.2
Iris 42.2
Jimmy 81.4
Keley 75.3
Leon 80.2
>>>
```

Ln: 47 Col: 4

程式範例

data2.csv - 記事本

檔案(F) 編輯(E) 格式(O) 檢視(V) 說明(H)

```
"Ada","Female",92.1,12,"child","2004/03/02"
"Buddy","Male",71.2,20,"youth","1996/04/08"
"Candy","Female",88.5,31,"middle","1985/12/01"
"David","Male",82.3,25,"youth","1991/05/12"
"Emily","Female",90.8,22,"youth","1994/06/25"
"Feng","Female",55.8,47,"middle","1969/05/11"
"George","Male",68.9,58,"elder","1958/01/10"
"Henry","Male",77.2,60,"elder","1956/09/11"
"Iris","Female",42.2,9,"child","2007/04/04"
"Jimmy","Male",81.4,17,"teens","1999/08/09"
"Keley","Female",75.3,36,"middle","1980/10/24"
"Leon","Male",80.2,28,"youth","1988/12/12"
```

	name	gender	score	age	ageStage	birthday
1	Ada	Female	92.1	12	child	2004/3/2
2	Buddy	Male	71.2	20	youth	1996/4/8
3	Candy	Female	88.5	31	middle	1985/12/1
4	David	Male	82.3	25	youth	1991/5/12
5	Emily	Female	90.8	22	youth	1994/6/25
6	Feng	Female	55.8	47	middle	1969/5/11
7	George	Male	68.9	58	elder	1958/1/10
8	Henry	Male	77.2	60	elder	1956/9/11
9	Iris	Female	42.2	9	child	2007/4/4
10	Jimmy	Male	81.4	17	teens	1999/8/9
11	Keley	Female	75.3	36	middle	1980/10/24
12	Leon	Male	80.2	28	youth	1988/12/12
13						

data2

csv3.py - D:\PythonJunior\Examples\Ch8\csv3.py (3.8.1)

File Edit Format Run Options Window Help

```
import csv

file = open('data2.csv', 'r')
fields = ["name","gender","score",
          "age","ageStage","birthday"]

csvCursor = csv.DictReader(file, fields)

for row in csvCursor:
    print(row['name'], row['score'])

file.close()
```

Ln: 13 Col: 0

Python 3.6.1 Shell

File Edit Shell Debug Options Window Help

```
========== RESTART: D:/Python/Examples/csv3.py ==========
Ada 92.1
Buddy 71.2
Candy 88.5
David 82.3
Emily 90.8
Feng 55.8
George 68.9
Henry 77.2
Iris 42.2
Jimmy 81.4
Keley 75.3
Leon 80.2
>>>
```

Ln: 75 Col: 4

writer 物件輸出至CSV檔案

- 使用 writer 物件輸出至CSV 檔案
  - 匯入csv模組

    ```
    import csv
    ```

  - 建立 writer 物件

    ```
    csv.writer(csvfile, dialect='excel', **fmtparams)
    ```

    - csvfile：要輸出的檔案(file-like)物件
    - dialect：指定特定CSV方言(一組的格式參數設定)
    - fmtparams：覆寫指定方言中的特定格式參數

writer 物件輸出至CSV檔案

- csv.writer.writerow(row)：寫出一筆資料
  - Row：資料以序列形式組成
  - 序列資料會被轉成一行以分隔符號隔開的字串後寫出
    - 非字串型態資料透過 str() 轉成字串
    - None 會轉成空字串
- csv.writer.writerows(rows)：寫出多筆資料
  - rows：序列資料集合

程式範例

csv4.py - D:\PythonJunior\Examples\Ch8\csv4.py (3.8.1)

File Edit Format Run Options Window Help

```
import csv

header = ['name', 'address', 'tel', 'email', 'age']
data = [['Sean', '123, Oak Street, Taipei', '02-9876-5432', 'sean@gmail.com', 40],
        ['Amy', '456, Park Avenue, Taichung', '04-8877-6655', 'amy@gmail.com', 30],
        ['David', '789 First Road Tainan', '06-654-3210', 'david@gmail.com', 25]]

file = open('contact.csv', 'w')
csvCursor = csv.writer(file)
csvCursor.writerow(header)
for d in data:
    csvCursor.writerow(d)
file.close()
print('聯絡人輸出至contact.csv')
```

Python 3.6.3 Shell

File Edit Shell Debug Options Window Help

```
>>>
========== RESTART: C:\PythonClass\L9\Examples\csv4.py ==========
聯絡人輸出至contact.csv
>>>
```

Ln: 6 Col: 4

	A	B	C	D	E
1	name	address	tel	email	age
2					
3	Sean	123, Oak Street, Taipei	02-9876-5432	sean@gmail.com	40
4					
5	Amy	456, Park Avenue, Taichung	04-8877-6655	amy@gmail.com	30
6					
7	David	789 First Road Tainan	06-654-3210	david@gmail.com	25

contact

contact.csv - 記事本

檔案(F) 編輯(E) 格式(O) 檢視(V) 說明(H)

```
name,address,tel,email,age
Sean,"123, Oak Street, Taipei",02-9876-5432,sean@gmail.com,40
Amy,"456, Park Avenue, Taichung",04-8877-6655,amy@gmail.com,30
David,789 First Road Tainan,06-654-3210,david@gmail.com,25
```

程式範例

csv5.py - D:\PythonJunior\Examples\Ch8\csv5.py (3.8.1)

File Edit Format Run Options Window Help

```
import csv

header = ['name', 'address', 'tel', 'email', 'age']
data = [['Sean', '123, Oak Street, Taipei', '02-9876-5432', 'sean@gmail.com', 40],
        ['Amy', '456, Park Avenue, Taichung', '04-8877-6655', 'amy@gmail.com', 30],
        ['David', '789 First Road Tainan', '06-654-3210', 'david@gmail.com', 25]]

file = open('contact2.csv', 'w')
csvCursor = csv.writer(file, dialect='excel-tab')
csvCursor.writerow(header)
for d in data:
    csvCursor.writerow(d)
file.close()
print('聯絡人輸出至contact2.csv')
```

Python 3.6.3 Shell

File Edit Shell Debug Options Window Help

```
>>>
========== RESTART: C:\PythonClass\L9\Examples\csv5.py ==========
聯絡人輸出至contact2.csv
>>>
```

Ln: 6 Col: 4

	A	B	C
1	nameaddresstelemailage		
2			
3	Sean123	Oak Street	Taipei02-9876-5432sean@gmail.com40
4			
5	Amy456	Park Avenue	Taichung04-8877-6655amy@gmail.com30
6			
7	David789 First Road Tainan06-654-3210david@gmail.com25		

contact2

contact2.csv - 記事本

檔案(F) 編輯(E) 格式(O) 檢視(V) 說明(H)

```
name    address tel     email   age
Sean    123, Oak Street, Taipei 02-9876-5432    sean@gmail.com  40
Amy     456, Park Avenue, Taichung      04-8877-6655    amy@gmail.com   30
David   789 First Road Tainan   06-654-3210     david@gmail.com 25
```

DictWriter物件輸出至CSV檔案

- 使用 DictWriter物件輸出至CSV 檔案
  - 匯入csv模組

    ```
    import csv
    ```

  - 建立 DictWriter物件

    ```
    csv.DictWriter(csvfile, fields, restval='', extrasaction='raise', dialect='excel',
                   *args, **kwds)
    ```

  - csv.DictWriter.writeheader()：寫出欄位名稱標頭序列
  - csv.DictWriter.writerow(row)：寫出一筆資料
    - row：資料以字典Dict形式組成

DictWriter物件輸出至CSV檔案

- csv.DictWriter(csvfile, fields, restval='', extrasaction='raise', dialect='excel', *args, **kwds)
  - csvfile：要開啟的檔案物件
  - fields：資料欄位名稱序列
  - restval：名稱序列比資料欄位多時，剩餘名稱使用此數據
  - extrasaction：資料包含未指定欄位時操作行為
    - raise：拋出 ValueError / ignore ：忽略此欄位
  - dialect：指定特定CSV方言(一組的格式參數設定)
  - *args：額外的參數(List)
  - **kwds：額外的參數(Dict)

程式範例

csv6.py - D:\PythonJunior\Examples\Ch8\csv6.py (3.8.1)

File Edit Format Run Options Window Help

```
import csv
header = ['name','address','tel','email','age']
data = [{'name':'Sean', 'address':'123, Oak Street, Taipei', 'tel':'02-9876-5432', 'email':'sean@gmail.com', 'age':40},
        {'name':'Amy', 'address':'456, Park Avenue, Taichung', 'tel':'04-8877-6655', 'email':'amy@gmail.com', 'age':30},
        {'name':'David', 'address':'789 First Road Tainan', 'tel':'06-654-3210', 'email':'david@gmail.com', 'age':25}]

file = open('contact3.csv', 'w')
csvWriter = csv.DictWriter(file, header, dialect='unix')
csvWriter.writeheader()
for d in data:
    csvWriter.writerow(d)
file.close()
print('聯絡人輸出至contact3.csv')
```

Ln: 14 Col: 0

Python 3.6.3 Shell

File Edit Shell Debug Options Window Help

```
========== RESTART: C:\PythonClass\L9\Examples\csv6.py ==========
聯絡人輸出至contact3.csv
>>>
```

Ln: 6 Col: 4

contact3.csv - 記事本

```
"name","address","tel","email","age"
"Sean","123, Oak Street, Taipei","02-9876-5432","sean@gmail.com","40"
"Amy","456, Park Avenue, Taichung","04-8877-6655","amy@gmail.com","30"
"David","789 First Road Tainan","06-654-3210","david@gmail.com","25"
```

	A	B	C	D	E
1	name	address	tel	email	age
2	Sean	123, Oak Street, Taipei	02-9876-5432	sean@gmail.com	40
3	Amy	456, Park Avenue, Taichung	04-8877-6655	amy@gmail.com	30
4	David	789 First Road Tainan	06-654-3210	david@gmail.com	25

contact3

Q：使用記事本開啟CSV檔案，欄位分隔字元為何？

a) =

b) @

c) ,

d) ^

Q：下列哪個指令可以將串列資料輸出至CSV檔案？

a) writer( )

b) writerow( )

c) output( )

d) print( )

練習：Covid-19 全球疫情

- 至政府資料開放平台下載Covid-19 全球疫情資訊csv檔案
  - https://data.gov.tw/dataset/120449
  - 顯示前10筆資料

檢視資料 ×

資料資源欄位	country_ch、country_en、cases、deaths
檔案格式	CSV
編碼格式	UTF-8
資料量	0
資料下載網址	https://od.cdc.gov.tw/eic/covid19/covid19_global_cases_and_deaths.csv
資料資源描述	country_ch (國家地區中文名), country_en (國家地區英文名), cases (累積病例數), deaths (累積死亡數)

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