# 0516 Lecture

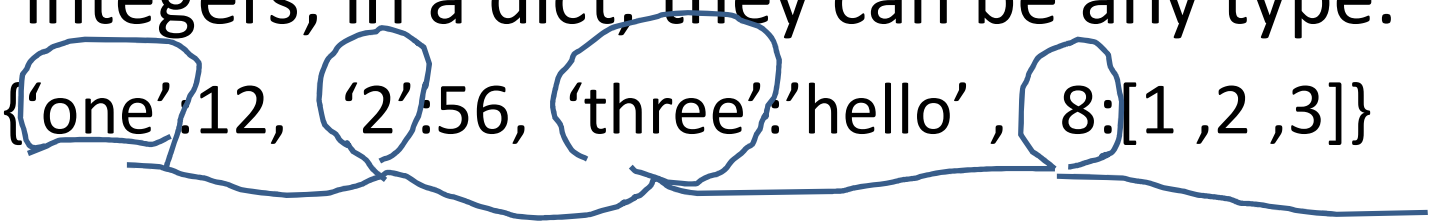
- Review
  - NumPy array
  - CSV 資料格式
  - 政府資料平台(JSON, CSV):腸病毒資料集

- Today
  - Python built-in type: dictionary
  - Pandas: Series, DataFrame
  - JSON資料格式
  - 政府資料平台(JSON, CSV):腸病毒資料集

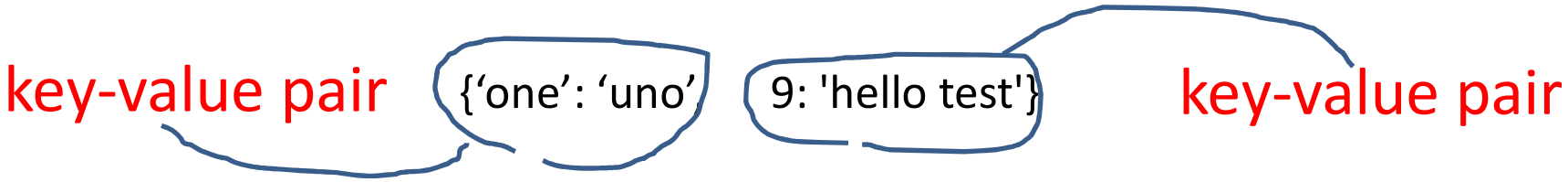
- Project
  - 自選資料集
  - DataFrame
  - 視覺化
  - 分析

# dictionary

- A dict is like a list. In a list, the indices have to be integers; in a dict, they can be any type.
  - {‘one’:12, ‘2’:56, ‘three’:’hello’ , 8:[1 ,2 ,3]}




- A dict contains a collection of indices, which are called keys, and a collection of values. Each key is associated with a single value.
  - A key-value pair, or an item



# dict

- 取值
  - Use the keys to look up the corresponding values

```
print(eng2sp)
{'one': 'uno', 9: 'hello test', 'life': 'happy'}
```

This is a dict !

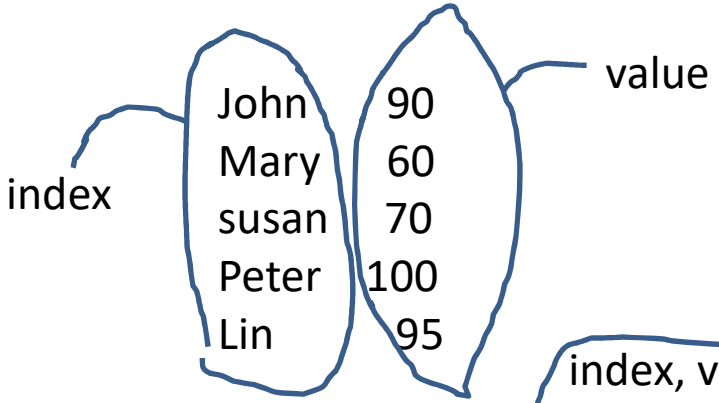
```
eng2sp['life']
'happy
```

- 判斷key 是否在字典: in

```
'one' in eng2sp

True
```

# Pandas :

- 建構於NumPy之上的套件(package)
- import pandas as pd
- A Pandas series is a one-dimensional array of indexed data.

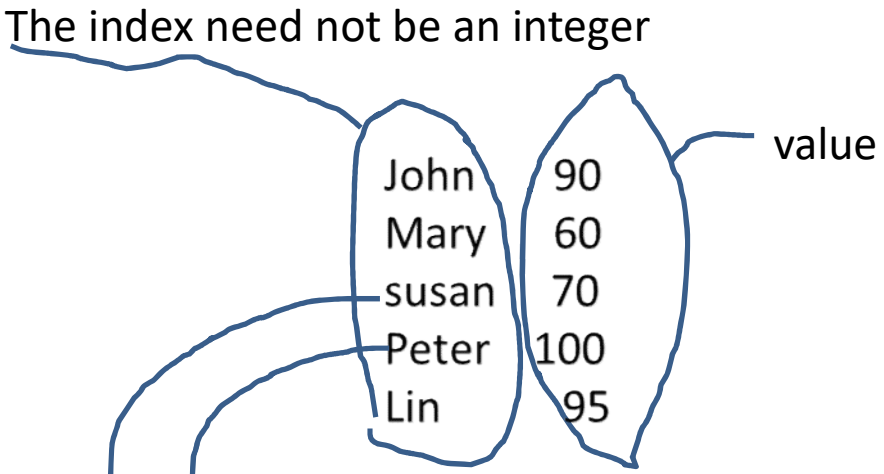



Series就是有index 的 array

index, value

The NumPy array has an implicitly defined integer index used to access the values, the Pandas series has explicitly defined index associated with the values.

# Series: Access the item




```
students=['John','Mary','susan','Peter','Lin']
Grade=[90,60,70,100,95]
data1_series = pd.Series(Grade,index=students)
```

創造一個 Series

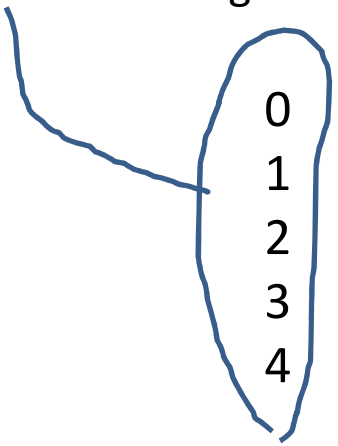
```
print(data1_series[0])
print(data1_series[3])

print(data1_series['susan'])
```

# Another Series:

- The series values can be list
- Example:

```
t2=[[1,2,3],[2,3,4],[4,5,6],[0,2,4.5],['go','go','never give up']]
data_5=pd.Series(t2)
print(data_5)
```

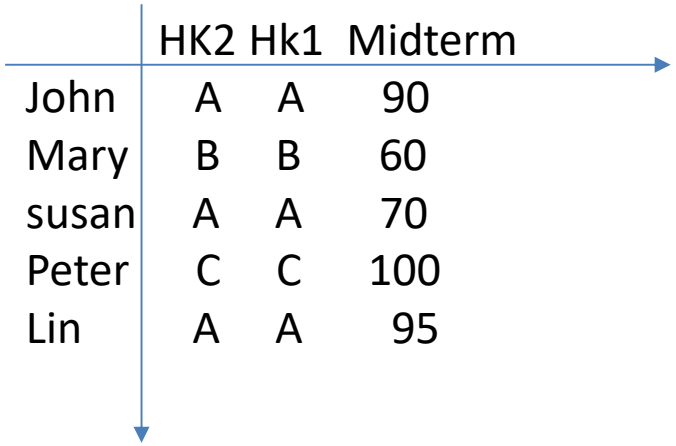
The index is an integer



```
0                [1, 2, 3]
1                [2, 3, 4]
2                [4, 5, 6]
3             [0, 2, 4.5]
4    [go, go, never give up]
```

# Pandas : DataFrame

- A Pandas DaraFrame is a two-dimensional array of indexed data.




創造一個 DataFrame

```
pd1=pd.DataFrame( {'Midterm':midterm_series,
'Hk1':hk1_series,    'HK2':hk2_series})
```

# DataFrame 取值

Given

| | HK2 | Hk1 | Midterm |
|---|---|---|---|
| John | A | A | 90 |
| Mary | B | B | 60 |
| susan | A | A | 70 |
| Peter | C | C | 100 |
| Lin | A | A | 95 |

- 單欄:

```
col=pd1['Hk1']
print(col)
```

```
John     A
Mary     B
susan    A
Peter     C
Lin       A
Name: Hk1, dtype: object
```

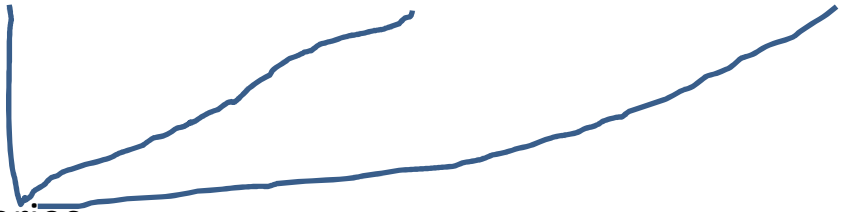
- 多欄:

```
cols=pd1[['Hk1','HK2']]
print(cols)
```

| | Hk1 | HK2 |
|---|---|---|
| John | A | A |
| Mary | B | A |
| susan | A | A |
| Peter | C | B |
| Lin | A | A |

# Create the DataFrame from Series

```
students=['John','Mary','susan','Peter','Lin']
Grade=[90,60,70,100,95]
midterm_series = pd.Series(Grade,index=students)
hk1=['A','B','A','C','A']
hk1_series=pd.Series(hk1,students)
hk2=['A','A','A','B','A']
hk2_series=pd.Series(hk2,students)
pd1=pd.DataFrame({'Midterm':midterm_series   ,'Hk1':hk1_series  ,'HK2':hk2_series })
print(pd1)
```



Series

3 個 Series 組成

| | HK2 | Hk1 | Midterm |
|---|---|---|---|
| John | A | A | 90 |
| Mary | A | B | 60 |
| Susan | A | A | 70 |
| Peter | B | C | 100 |
| Lin | A | A | 95 |

# JSON

- JSON (**J**ava**S**cript **O**bject **N**otation)
- Example:
- 展覽資訊| 政府資料開放平臺
- {‘version’: xxx ,
  ‘UID’: xxx ,
  ‘title’: xxx ,
  … ,
  ‘showInfo’:[{‘AA‘: , ‘BB‘: ,’CC‘: }]
  }
- 每一筆資料都是一個dict

# JSON

- How to create a DataFrame from the given many dicts ?
- import pandas as pd
- df1=pd.DataFrame([{ }, { }, …,{ } ])