



111-1基礎程式設計(14)

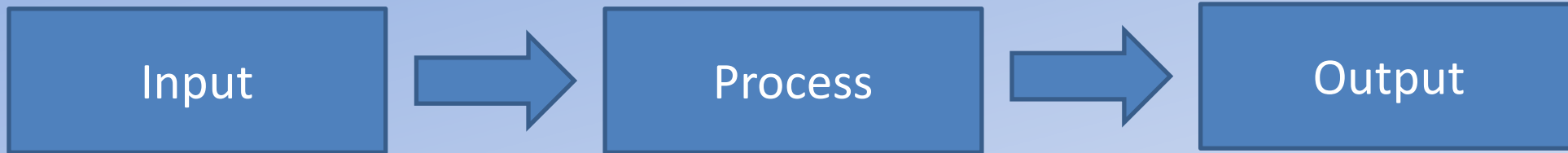
亞大資工系

課程大綱

- Week14-進階函數
 - Topic 1(主題1)-函數定義和呼叫的複習
 - Topic 2(主題2)-參數和傳回值的資料型別
 - Topic 3(主題3)-遞迴函數 (Recursion)
 - Topic 4(主題4)-Lambda 函數
 - Topic 5(主題5)-JSON格式處理
 - Topic 6(主題6)-亂數(random)
 - Topic 7(主題7)-用圖表呈現資料



IPO Model (W14)



從檔案輸入資料
I/O函數:open()
I/O函數:read()

使用for 迴圈讀入檔案內容
with/as的使用
資料排序, sorted()函數
內建函數max()/min()函數

I/O函數:close()
I/O函數:write()



Topic 1-函數定義和呼叫的複習

- 函數的定義(definition)
- 函數的呼叫(call)
- 可變參數*參數
- 可變參數**參數



Topic 2-參數和傳回值的資料型別(3.5 版新加入)

```
def gcd1(x, y):  
    r=x%y  
    while r!=0:  
        x=y;y=r  
        r=x%y  
    return y
```

```
a=240; b=96  
print(f"{a}, {b}, {gcd1(a,b)}")
```

```
def gcd2(x:int, y:int)->int:  
    r=x%y  
    while r!=0:  
        x=y;y=r  
        r=x%y  
    return y
```

```
a=240; b=96  
print(f"{a}, {b}, {gcd2(a,b)}")
```



Topic 3-遞迴函數 (Recursion)

```
def gcd1(x, y):  
    r=x%y  
    while r!=0:  
        x=y;y=r  
        r=x%y  
    return y
```

```
a=240; b=96  
print(f"{a}, {b}, {gcd1(a,b)}")
```

```
def gcd2(x, y):  
    if y == 0:  
        return x  
    else:  
        return gcd2(y, x%y)
```

```
a=240; b=96  
print(f"{a}, {b}, {gcd2(a,b)}")
```



Topic 4-Lambda 函數

```
def gcd1(x, y):  
    r=x%y  
    while r!=0:  
        x=y;y=r  
        r=x%y  
    return y
```

```
a=240; b=96  
print(f"{a}, {b}, {gcd1(a,b)}")
```

```
gcd = lambda x,y : (gcd(y,x%y)) if x%y else y  
  
a=240; b=96  
print(f"{a}, {b}, {gcd(a,b)}")
```



在map()和filter()中使用Lambda函數

```
base=[1, 2, 3, 4]
```

```
square=list(map(lambda x: x**2, base))  
print(square)
```

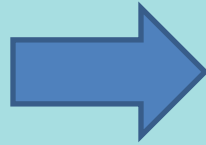
```
data=[0,1,2,3,4,7,8,14,19,31,34]
```

```
odds =list(filter(lambda x: x%2 > 0, data))  
print(odds)  
evens=list(filter(lambda x: x%2 ==0, data))  
print(evens)
```



Topic 5-JSON

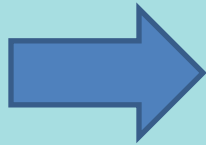
Python Data



JSON Data

```
import json
data = [ { 'a' : 1, 'b' : 2, 'c' : 3, 'd' : 4, 'e' : 5 } ]
file = open("test.json", "w")
json.dump(data, file)
file.close()
```

Python Data



JSON Data

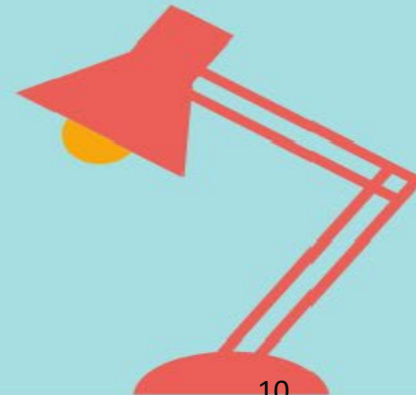
```
import json
file = open ('test.json')
json_data = json.load(file)
file.close()
```



Topic 6-亂數(random)

```
rd.seed(12345)
a=rd.random()
b=rd.uniform(2.5, 10.0)
c=rd.randrange(10)
d=rd.choice(['win', 'lose', 'draw'])
print(a,b,c,d)
```

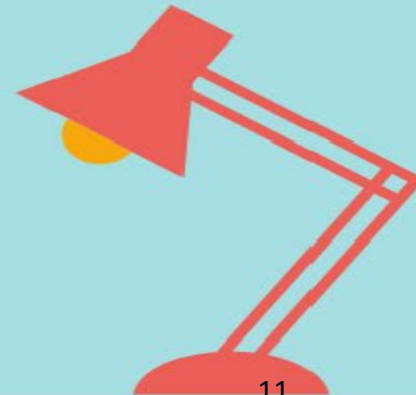
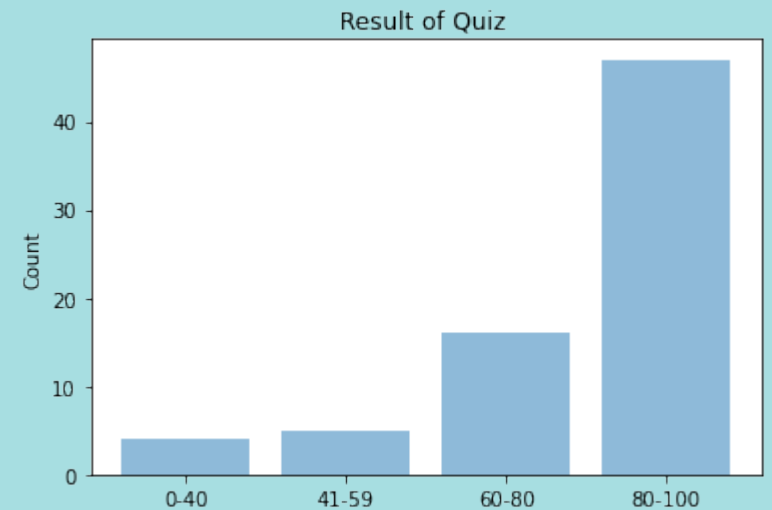
```
# Random float:  0.0 <= x < 1.0
# Random float:  2.5 <= x < 10.0
# Integer from 0 to 9 inclusive
# Single random element from a sequence
```



Topic 7-用圖表呈現資料-長條圖

#畫出人數分佈的長條圖

```
import matplotlib.pyplot as plt
import numpy as np
stats = [4, 5, 16, 47]
labels = ('0-40', '41-59', '60-80', '80-100')
y_pos = np.arange(len(stats))
plt.bar(y_pos, stats, align='center', alpha=0.5)
plt.xticks(y_pos, labels)
plt.ylabel('Count')
plt.title('Result of Quiz ')
plt.show()
```

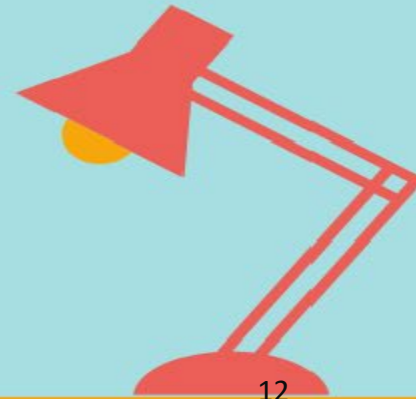
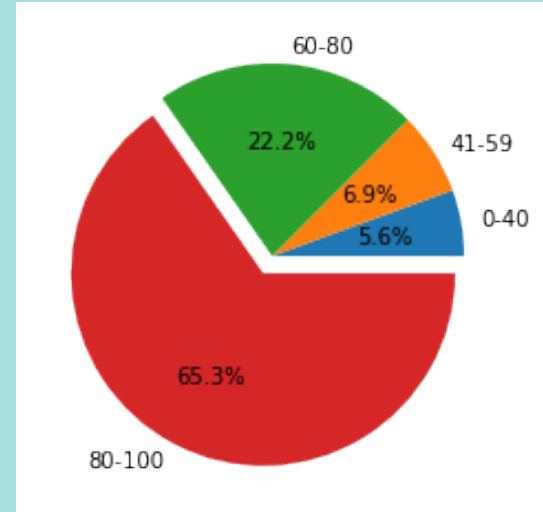


Topic 7-用圖表呈現資料-圓餅圖

```
import matplotlib.pyplot as plt

# Pie chart

stats = [4, 5, 16, 47]
labels = ('0-40', '41-59', '60-80', '80-100')
explode = (0, 0, 0, 0.1) # 切開'80-100'的人數
fig1, ax1 = plt.subplots()
ax1.pie(stats, labels=labels, explode=explode, autopct='% .1f%%')
plt.show()
```





Thanks!

Q&A

