B03702108 譚丞佑

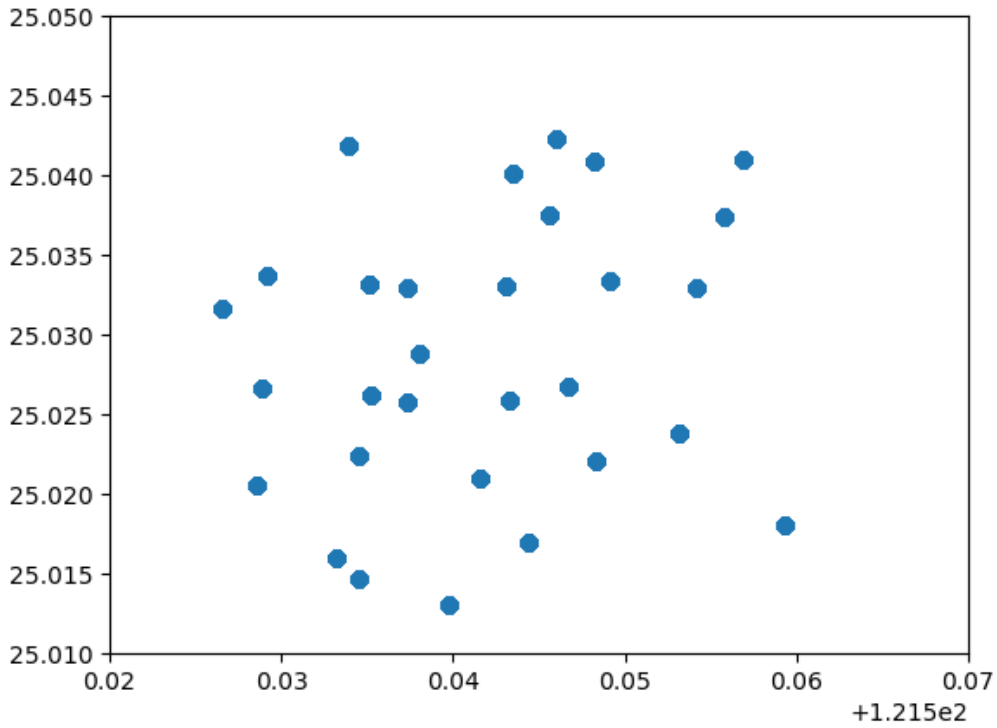
第一題

(a)

程式碼：

```
import csv

# 取出 csv 檔案中的 x,y 經緯度數值，存成兩個 list
def getPosition(fileName):
    fh = open(fileName, "r")
    csvFile = csv.DictReader(fh)
    next(csvFile)   # 跳過標題列

    y_latitude = [] # to store y 座標們
    x_longitude = []# to store x 座標們

    for row in csvFile:
        y_latitude.append(row["latitude"])
        x_longitude.append(row["longitude"])

    fh.close()
    return [x_longitude,y_latitude]

import matplotlib.pyplot as py

x = getPosition("D:\譚\python\HW8\Myubike.csv")[0]
y = getPosition("D:\譚\python\HW8\Myubike.csv")[1]

py.plot(x,y,'o')
py.ylim(25.01 , 25.05)
py.xlim(121.52 , 121.57)
py.show()
```

畫出來的圖：



(b)

程式碼：

```
import csv, math

# 取出 csv 檔案中的 x,y 經緯度數值，存成兩個 list
def getPosition(fileName):
        fh = open(fileName, "r")
        csvFile = csv.DictReader(fh)
        next(csvFile)   # 跳過標題列

        y_latitude = [] # to store y 座標們
        x_longitude = []# to store x 座標們

        for row in csvFile:
            y_latitude.append(float(row["latitude"]))
            x_longitude.append(float(row["longitude"]))
```

```
            fh.close()
            return [x_longitude , y_latitude]
x = getPosition("D:\譚\python\HW8\Myubike.csv")[0]
y = getPosition("D:\譚\python\HW8\Myubike.csv")[1]

# 算距離的函數
def haversine(lat1, lon1, lat2, lon2):
    lon1, lat1, lon2, lat2 = map(math.radians , [lon1, lat1, lon2, lat2])
    dlon = lon2 - lon1
    dlat = lat2 - lat1
    a = math.sin(dlat / 2) ** 2
    a += math.cos(lat1) * math.cos(lat2) * math.sin(dlon / 2) ** 2
    return 6367 * (2 * math.asin(math.sqrt(a)))

# 定義 Station()新型態，有計算距離的 member function
class Station:
    long = float()
    lat = float()

    def __init__(self,long,lat):
        self.long = long
        self.lat = lat

    def distance(self,other):
        return haversine(self.lat , self.long , other.lat , other.long )

stations = []           # 每個元素都是一個 Station()型態 list
for i in range(len(x)):
    gg = Station(x[i] , y[i])
    stations.append(gg)

# 找出所有車站之間距離(包括自己到自己的距離為 0)，找出距離最長的

maxDistance = 0     #初始值設為 0
for i in range(len(stations)):
    for j in range(len(stations)):
        Distance = stations[i].distance(stations[j])
        if Distance > maxDistance:
```

```
                # 紀錄最長距離
                maxDistance = Distance
                # 紀錄要存成紅點的兩組座標
                latR = stations[i].lat
                longR = stations[i].long
                latR2 = stations[j].lat
                longR2 = stations[j].long

import matplotlib.pyplot as py

py.plot(x,y,'bo')
py.plot(longR ,latR,'ro')
py.plot(longR2 ,latR2,'ro')
py.ylim(25.01 , 25.05)
py.xlim(121.52 , 121.57)
py.show()
```

<u>畫出來的圖：</u>