Big Data Programming 1: 2021 (25 Points)

Assignment 2: Python programming

Due date: 10. March**.2023 23:55**

How to submit:

The assignment must only be done in Python programming language using version 3.

assignments must be submitted by each individual in zip format with the name convention : matriculationNumber-fullName-assignment-2.zip

The zip file must contain :

1. the source code for Exercise 1 in python (.py) file format (if modules / packages are used then zip all python files).Please name the main file as Exercise1.py
2. the source code for Exercise 2 in python (.py) file format (if modules / packages are used then zip all python files). Please name the main file as Exercise2.py

Exercise 1: (10 Points)

City Council for City 'X' has decided to test recovered patients of COVID-19 so that it can safely confirm that patients cured of the virus are not getting infected again. Given the huge number of tests City 'X' needs to do on all its inhabitants, the council has decided not to test all recovered patients but instead choose 1 random recovered patients in every recovered patient 5 . The list of the recovered patients is as below and can grow in future. The below list can be hard coded in your program:

```
['p1','p2','p3','p4','p5','p6','p7','p8','p9','p10','p11','p12','p13','p14','p15',
'p16','p17','p18','p19','p20']
```

The batch size of 5 can change depending on whether City 'X' wants to do more or less testing. Before choosing the next patient, City 'X' also needs to record the test date as its an important parameter to know when the patient was tested. Only print the test date in your program

Write an object-oriented python program that helps City 'X' choose recovered patients for testing.

Keep in mind about performance and memory consumption as number of recovered patients can be in millions.

Hint

```
#Generate a random number
import random
# generate a random number between 0 and 100 : inclusive of 0 and 100
random_number = random.randint(0,100)
```

Exercise 2: Rectangle (15 Points)

Write a function that takes a list of cartesian co-ordinates (x,y) and returns the numbers of squares formed by these co-ordinates

a square should have its four corners amongst the co-ordinates to be counted as a square. Only squares whos sides are parallel to the x and y axes to be considered

sample input = coordinates = `[ [0,0],[0,1],[1,1][1,0], [2,1][2,0],[3,1],[3,0] ]`

try and get the optimum big O notation (considering the worst case) and mention the reason for the same in a comment.