Numerical Method

National Cheng Kung University **Department of Engineering Science**

Instructor: Chi-Hua Yu

LAB2

注意事項

1. Lab 的繳交期限為**星期二(3/7)17:00 a.m.**。
2. Lab 的分數分配：Lab 分數 100%，Bonus 20%。
3. 請儘量於 Lab 時段完成練習，完成後請找助教檢查，檢查後即可離開。
4. 檔名規定: **檔名錯誤將記為 0 分**
   i. **Lab:** 請用 **學號_Lab** 為檔名做一個資料夾(e.g.,N96091350_Lab)，將 **ipynb** 檔放入資料夾，壓縮後上傳至課程網站(e.g., N96091350_Lab1.zip)
   ii. **Bonus:** 請用 **學號_bonus** 為檔名做一個資料夾 **(e.g.,N96091350_bonus)**，將 ipynb 檔放入資料夾，壓縮後上傳至課程網站**(e.g., N96091350_bonus.zip)**。
5. **Code 中需有註解。**
6. 未完成者可於**下周一 (3/13) 09:00 a.m.** 前上傳至 Moodle，惟補交的分數將乘以 0.8 計，超過期限後不予補交。
7. Bouns 需於**下周一 (3/13) 09:00 a.m.**前上傳至 Moodle，不予補交。
8. 準時繳交者，請交至「Lab2 準時繳交區」；補交者，請交至「Lab2 補交區」；bonus 請繳交至「bonus 繳交區」

請勿抄襲，抄襲者與被抄襲者本次作業皆 0 分計算

Total: 120%

1.(100%) download the template code "**`matrix.ipynb`**" and complete the `class Matrix`. The class has 6 basic function.

(1) initialize the matrix(construct a matrix **n**rows * **m**columns),the element in the matrix is `random int` from 0-10.

(2) add matrix and return a new matrix object after summation

(3) sub matrix and return a new matrix object after subtraction

(4) multiply matrix and return a new matrix object after multiplication

(5) return a new matrix object after transpose

(6) display the content in the matrix

Hint1: You can use the module copy

Hint2: the return objects of (2)~(5) should be Matrix or None

Hint2: Maybe you should check if the matrixes can be calculated or not.

Example: unacceptable adding/multiple

```
Enter A matrix's rows:3
Enter A matrix's cols:4
Matrix A(3, 4):
1 1 5 8
2 9 9 2
5 0 4 5

Enter B matrix's rows:2
Enter B matrix's cols:3
Matrix B(2, 3):
4 5 7
3 7 7

========== A + B ==========
Matrixs' size should be in the same size
========== A - B ==========
Matrixs' size should be in the same size
========== A * B ==========
Cannot multiply two matrixs with size (3, 4) and (2, 3)
===== the transpose of A*B =====
```

Example: acceptable adding/multiple

```
Enter A matrix's rows:3
Enter A matrix's cols:3
Matrix A(3, 3):
5 1 0
2 8 9
3 8 8

Enter B matrix's rows:3
Enter B matrix's cols:3
Matrix B(3, 3):
0 2 3
3 2 5
9 3 8

========== A + B ==========
5 3 3
5 10 14
12 11 16

========== A - B ==========
5 -1 -3
-1 6 4
-6 5 0

========== A * B ==========
3 12 20
105 47 118
96 46 113

===== the transpose of A*B =====
3 105 96
12 47 46
20 118 113
```

bonus.(20%) download the template code "**`map.ipynb`**" and complete the **`class Map.`**

The class has two function.

(1) initialize the map (construct a map nrows X ncolumns) and the function can also receive parameter p , if p==1 ,you need to construct a square inside the map as below example.

(2) Display the map

Example:

```
my_map = Map(5, 1)
my_map.display()
```