

## Numerical Method

National Cheng Kung University

Department of Engineering Science

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### LAB2

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#### 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. 請盡量於 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**

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**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 **nrows** \* **mcolumns**),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**.

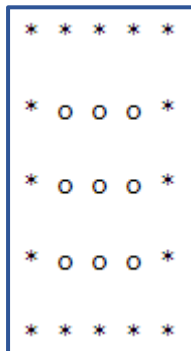
The class has two function.

(1) initialize the map (construct a map nrow X ncolumn) 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()
```



```
* * * * *
* o o o *
* o o o *
* o o o *
* * * * *
```