Python 程式設計作業

範圍： 條件判斷與迴圈二

銘傳大學電腦與通訊工程系

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作業成果	應繳作業共 10 題，每題 10 分 我共完成 10 題，應得 100 分
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■ 請確實填寫自己寫完成題數，填寫不實者(如上傳與作業明顯無關的答案，或是計算題數有誤者)，本次作業先扣 50 分。

EX 1:試設計一程式，當使用者輸入兩個正整數 h 和 w，程式會交錯使用「+」和「-」輸出一個長寬分別為 h 和 w 的長方形。

例如:

Input:	Output:
3 2	+-+ -+-
7 6	+-+-+-+ -+-+-+- +-+-+-+ -+-+-+- +-+-+-+ -+-+-+-
6 7	+-+-+- +-+-+- +-+-+- +-+-+- +-+-+- +-+-+- +-+-+-

程式碼：

```
h=int(input("輸入長:"))
w=int(input("輸入寬:"))

for i in range(1,h*w+1):
    if i%2==0:
        print('-',end='')
    if i%2!=0:
```

```
            print('+',end='')
    if i%h==0:
        print(end='\n')
```

執行結果擷圖：

In [14]:
```
h=int(input("輸入長:"))
w=int(input("輸入寬:"))

for i in range(1,h*w+1):
    if i%2==0:
            print('-',end='')
    if i%2!=0:
            print('+',end='')
    if i%h==0:
        print(end='\n')
```

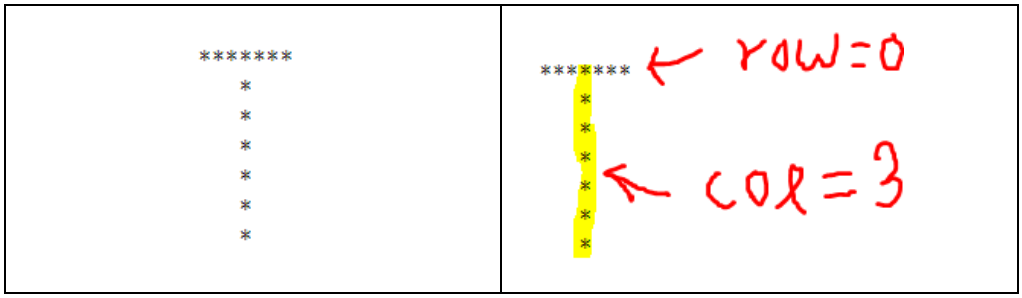
```
輸入長:3
輸入寬:2
+-+
-+-
```

In [15]:
```
h=int(input("輸入長:"))
w=int(input("輸入寬:"))

for i in range(1,h*w+1):
    if i%2==0:
            print('-',end='')
    if i%2!=0:
            print('+',end='')
    if i%h==0:
        print(end='\n')
```

```
輸入長:7
輸入寬:6
+-+-+-+
-+-+-+-
+-+-+-+
-+-+-+-
+-+-+-+
-+-+-+-
```

EX 2: 試撰寫一個 Python 程式來列印字母'T'的形狀：



程式碼：

```
for height in range(0,7):
    for width in range(0,7):
        if height==0:
            print('*',end='')
            if width==6:
                print(end='\n')
        else:
            if width==3:
                print('*',end='')
            elif width==6:
                print(' ',end='')
                print(end='\n')
            else:
                print(' ',end='')
```

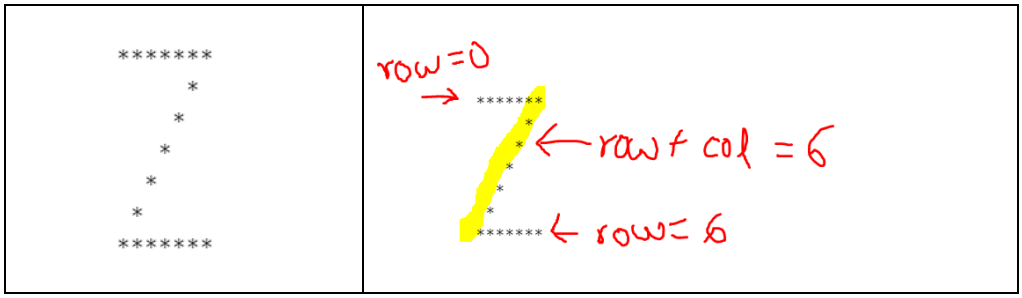
執行結果擷圖：

In [12]:

```
for height in range(0,7):
    for width in range(0,7):
        if height==0:
            print('*',end='')
            if width==6:
                print(end='\n')
        else:
            if width==3:
                print('*',end='')
            elif width==6:
                print(' ',end='')
                print(end='\n')
            else:
                print(' ',end='')
```

```
*******
   *
   *
   *
   *
   *
   *
```

EX 3: 試撰寫一個 Python 程式來列印字母'Z'的形狀：



程式碼：

```
for row in range(0,7):
    for col in range(0,7):
        if row==0:
            print('*',end='')
            if col==6:
                print(end='\n')
        elif row==6:
            print('*',end='')

        else:
            if row+col==6:
                print('*',end='')
            elif col==6:
                print(' ',end='')
                print(end='\n')
            else:
                print(' ',end='')
```

執行結果擷圖：

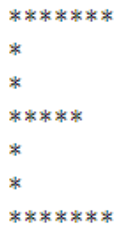
In [4]:

```
for row in range(0,7):
    for col in range(0,7):
        if row==0:
            print('*',end='')
            if col==6:
                print(end='\n')
        elif row==6:
            print('*',end='')

        else:
            if row+col==6:
                print('*',end='')
            elif col==6:
                print(' ',end='')
                print(end='\n')
            else:
                print(' ',end='')
```

```
*******
      *
     *
    *
   *
  *
 *
*******
```

EX4: 試撰寫一個 Python 程式來列印字母'E'的形狀：



程式碼：

```
for row in range(0,7):
    for col in range(0,7):
        if row==0:
            print('*',end='')
            if col==6:
                print(end='\n')

        elif row==3:
            if col>4:
                print(' ',end='')
            if col<=4:
                print('*',end='')
            if col==6:
                print(end='\n')

        elif row==6:
            print('*',end='')

        else:
            if col==0:
                print('*',end='')
            elif col==6:
                print(' ',end='')
                print(end='\n')
            else:
                print(' ',end='')
```

執行結果擷圖：

In [9]:
```
for row in range(0,7):
    for col in range(0,7):
        if row==0:
            print('*',end='')
            if col==6:
                print(end='\n')

        elif row==3:
            if col>4:
                print(' ',end='')
            if col<=4:
                print('*',end='')
            if col==6:
                print(end='\n')

        elif row==6:
            print('*',end='')

        else:
            if col==0:
                print('*',end='')
            elif col==6:
                print(' ',end='')
                print(end='\n')
            else:
                print(' ',end='')
```

```
*******
*
*
*****
*
*
*******
```

EX5: 試撰寫一個 Python 程式來列印字母'A'的形狀：

程式碼：

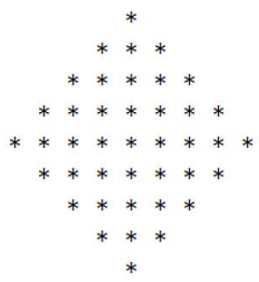
```
for row in range(0,7):
    for col in range(0,5):
        if (row==0 or row==3) and col>=1 and col<=3:
            print('*',end='')
        elif row!=0 and (col==0 or col==4):
            print('*',end='')
            if col==4:
                print(end='\n')
        elif col==4:
                print(end='\n')
        else:
            print(' ',end='')
            if col==4:
                print(end='\n')
```

執行結果擷圖：

In [7]:
```
for row in range(0,7):
    for col in range(0,5):
        if (row==0 or row==3) and col>=1 and col<=3:
            print('*',end='')
        elif row!=0 and (col==0 or col==4):
            print('*',end='')
            if col==4:
                print(end='\n')
        elif col==4:
                print(end='\n')
        else:
            print(' ',end='')
            if col==4:
                print(end='\n')
```

```
 ***
*   *
*   *
*****
*   *
*   *
*   *
```

EX6: 試撰寫一個 Python 程式來列下面形狀：



程式碼：

```
start=5
num=1
for row in range(1,6):
    for col in range(1,10):
        if col==start:
            for i in range(1,num+1):
                print('* ',end='')
        else:
            print('  ',end='')
            if col==9:
                print(end='\n')
    start=start-1
    num=num+2
start=2
num=7
for row in range(1,6):
    for col in range(1,10):
        if col==start:
            for i in range(1,num+1):
                print('* ',end='')
        else:
            print('  ',end='')#空兩隔
            if col==9:
                print(end='\n')
    start=start+1
    num=num-2
```

執行結果擷圖：

In [15]:
```
start=5
num=1
for row in range(1,6):
    for col in range(1,10):
            if col==start:
                for i in range(1,num+1):
                    print('* ',end='')
            else:
                print('  ',end='')
                if col==9:
                    print(end='\n')
    start=start-1
    num=num+2
start=2
num=7
for row in range(1,6):
    for col in range(1,10):
            if col==start:
                for i in range(1,num+1):
                    print('* ',end='')
            else:
                print('  ',end='')#空兩隔
                if col==9:
                    print(end='\n')
    start=start+1
    num=num-2
```

```
        *
      * * *
    * * * * *
  * * * * * * *
* * * * * * * * *
  * * * * * * *
    * * * * *
      * * *
        *
```

EX7: 試撰寫一個 Python 程式來列下面形狀：

程式碼：

```
for row in range(0,6):
    for col in range(0,6):
        if (row==0 or row==5) and col!=0 and col!=5:
            print('* ',end='')
        elif col==0 or col==5:
            print('* ',end='')
            if col==5:
                print(end='\n')
        else:
            print('  ',end='')
```

執行結果擷圖：

In [4]:
```
for row in range(0,6):
    for col in range(0,6):
        if (row==0 or row==5) and col!=0 and col!=5:
            print('* ',end='')
        elif col==0 or col==5:
            print('* ',end='')
            if col==5:
                print(end='\n')
        else:
            print('  ',end='')
```

```
* * * * * *
*         *
*         *
*         *
*         *
* * * * * *
```

EX8: 若有一個 point_list = [(2, 8),(3, 5),(4, 6),(1.5, 7), (2, 6),(6, 5),(4, 6),(2.5, 1.7)]，試求(9, 4)與這個 list 中每一個座標點的歐式距離值。

答案型式如下:

```
0.0
1.5848931924611136
1.5157165665103982
```

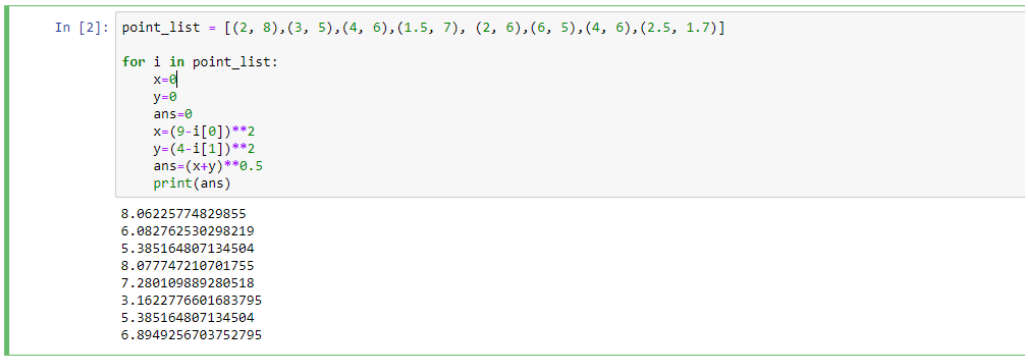
...

程式碼：

```
point_list = [(2, 8),(3, 5),(4, 6),(1.5, 7), (2, 6),(6, 5),(4, 6),(2.5, 1.7)]

for i in point_list:
    x=0
    y=0
    ans=0
    x=(9-i[0])**2
    y=(4-i[1])**2
    ans=(x+y)**0.5
    print(ans)
```

執行結果擷圖：



EX9: 若有一個 point_list = [(2, 8),(3, 5),(4, 6),(1.5, 7), (2, 6),(6, 5),(4, 6),(2.5, 1.7)]，試找出(9, 4)與這個 list 中每一個座標點之歐式距離值的最小者。

程式碼：

```
point_list = [(2, 8),(3, 5),(4, 6),(1.5, 7), (2, 6),(6, 5),(4, 6),(2.5, 1.7)]

x=(9-point_list[0][0])**2
y=(4-point_list[0][0])**2
small=(x+y)**0.5

for i in point_list:
    x=0
    y=0
    ans=0
    x=(9-i[0])**2
    y=(4-i[1])**2
    ans=(x+y)**0.5
    if small>ans:
        small=ans
        point_x=i[0]
        point_y=i[1]
print('(',point_x,',',point_y,')')
print(small)
```

執行結果擷圖：

In [6]:
```
point_list = [(2, 8),(3, 5),(4, 6),(1.5, 7), (2, 6),(6, 5),(4, 6),(2.5, 1.7)]

x=(9-point_list[0][0])**2
y=(4-point_list[0][0])**2
small=(x+y)**0.5

for i in point_list:
    x=0
    y=0
    ans=0
    x=(9-i[0])**2
    y=(4-i[1])**2
    ans=(x+y)**0.5
    if small>ans:
        small=ans
        point_x=i[0]
        point_y=i[1]
print('(',point_x,',',point_y,')')
print(small)
```

```
( 6 , 5 )
3.1622776601683795
```

EX10: 鳶尾花資料集是非常著名的生物資訊資料集之一，取自美國加州大學歐文分校的機器學習資料庫 http://archive.ics.uci.edu/ml/datasets/Iris，資料的筆數為 150 筆，共有五個欄位：

1. 花萼長度(Sepal Length)：計算單位是公分。
2. 花萼寬度(Sepal Width)：計算單位是公分。
3. 花瓣長度(Petal Length) ：計算單位是公分。
4. 花瓣寬度(Petal Width)：計算單位是公分。
5. 類別(Class)：可分為 Setosa，Versicolor 和 Virginica 三個品種。

試求 [4.21 3.02 1.09 0.1] 與 Iris data 中 150 筆資料的歐式距離值，並將每一筆距離的計算結果利用.append 敘述存在 mylist 這個串列(list)之中。

程式碼：

```
from sklearn import datasets
iris = datasets.load_iris()
ans=[]
X = iris.data[:, :4]
com=[4.21,3.02,1.09,0.1]
for i in X:
    a=(com[0]-i[0])**2
    b=(com[1]-i[1])**2
    c=(com[2]-i[2])**2
    d=(com[3]-i[3])**2
    ans.append((a+b+c+d)**0.5)
print(ans)
print(len(ans))
```

執行結果擷圖：

In [7]:

```
from sklearn import datasets
iris = datasets.load_iris()
ans=[]
X = iris.data[:, :4]
com=[4.21,3.02,1.09,0.1]
for i in X:
    a=(com[0]-i[0])**2
    b=(com[1]-i[1])**2
    c=(com[2]-i[2])**2
    d=(com[3]-i[3])**2
    ans.append((a+b+c+d)**0.5)
print(ans)
print(len(ans))
```

```
[1.0623558725775462, 0.7632823854904556, 0.5714892824891822, 0.5801723881744113, 1.0327632836231155, 1.6286804474788787, 0.6577233460962135, 0.9729337079164232, 0.3957271787481877, 0.8065977932030316, 1.4340850741849316, 0.8732697177848318, 0.6667833231267859, 0.0927361849549569, 1.8736595208308255, 2.0934660255184467, 1.5246638973885362, 1.0763828315241746, 1.8001666589513319, 1.2683059567785682, 1.393771860815105, 1.2298780427343192, 0.7117583859709696, 1.1843141475132344, 1.0763828315241746, 0.9458329662260668, 1.057638879769461, 1.1783887304281215, 1.109324118551472, 0.7366138744428116, 0.7903163923391693, 1.3485547819795831, 1.5213809516357168, 1.778370040233472, 0.8127730310486443, 0.8237718130647591, 1.3959226339593467, 0.9532051195833983, 0.3009983388658484, 1.0557461816175322, 0.9688137075826292, 0.8286132994346642, 0.35014282800023216, 1.1681609478149833, 1.4651279807579947, 0.6961321713582843, 1.2925169244539891, 0.5390732788777419, 1.3522573719525435, 0.8992218858546537, 4.747483543941991, 4.291456629164508, 4.870174534860122, 3.4771540086685837, 4.4240093127410408, 3.916197134976737, 4.44168886790740 05, 2.5601953050499877, 4.414362921192593, 3.266282290311111, 2.877950659757738, 3.8063893652646734, 3.6269270739842567, 4.278854987026318, 3.1123303166559849, 4.341958083630011, 3.939619270944846, 3.5356187577282703, 4.268559475982501, 3.3314561380873675, 4.42070130182 9835, 3.6781245220900285, 4.5950625675827315, 4.2264169221694 16, 4.0687344469748 83, 4.2846936880015125, 4.7128123238677775, 4.9 03937193725058, 4.099585344885504, 3.0024323472811174, 3.2237555738610206, 3.1097588330930104, 3.425872151730125, 4.65151588194 6443, 3.8735771581317446, 4.1504939465080 54, 4.6041937404935 51, 4.157234657798378, 3.525989222899015, 3.441307890904271, 3.7425 39244951214, 4.193161098741617, 3.518891871029856, 2.6146892740821 04, 3.6258240442691094, 3.6197513726774 11, 3.6532998781923176, 3.9646689647434625, 2.3896861718644145, 3.573317786035829, 5.857866505819333, 4.685146742632507, 5.957230900342877, 5.254769262298774, 5.6425703362917865, 6.771454791992634, 3.864531019412317, 6.292582935488415, 5.616457958535789, 6.335345294457122, 4.996658883694183, 5.085528487777844, 5.4915025266314865, 4.624781075899702, 4.893526335884992, 5.233794034923423, 5.2519139368424534, 6.97643175269421, 7.138108993283866, 4.596150563243115, 5.7758635717959965, 4.484038358444317, 6.878270131362973, 4.677242777534645, 5.6152114831055115, 5.997549499587311, 4.545613269955991, 4.580240168375454, 5.402277297584789, 5.77707538465615, 6.2100402575184654, 6.784585470019521, 5.4400919109882695, 4.7388395203889315, 5.077263042230528, 6.490038520686915, 5.490227681981868, 5.2096640966572885, 4.456298912775 04, 5.460640988015968, 5.642393109310977, 5.306844636881694, 4.685146742632507, 5.892079429199847, 5.769800689798566, 5.285130083545721, 4.813169433959291, 5.074110759532156, 5.246008006093777, 4.671894690593956]
150
```