**HOMEWORK 5 - DATA STRUCTURES AND FUNCTIONS (PART II)**
**VERY CHALLENGING VERSION**

**Part I**

Please complete all 7 in-class exercises at the end of the week 5 notes. Place the relevant source code in a file named `hw5_1.py` which should be in your home directory under week5 (**home directory > python > week5**).

**Part II**

Write a program that asks the user to enter a variable number of integers. Each integer should be stored in a list called `data`. Once `data` is created, please write a function that **sorts** this list of integers (ascending). Here are the caveats:

- You must write the sorting algorithm yourself
- You cannot use any of the following - `.sort(), sorted(), max(), min()`
- Write the algorithm using only list methods covered in Weeks 4 and 5

Place the relevant source code in a file named `hw5_2.py` which should be in your home directory under week5 (**home directory > python > week5**).

**Part III**

Write a function, `CreateTable`, that takes as its parameter a data matrix represented as a **list of lists**. The function should then read the data matrix and create a nicely formatted, evenly spaced table to be displayed (output shown below). Here the caveats:

- Do not use any third-party libraries but write the function yourself
- Table cells should be left-aligned and text should be padded from the left cell walls by 2 spaces. Text should be padded from the right cell walls by **at least** 2 spaces.
- You can assume that all rows in the matrix have the same number of columns
- The data matrix should be able to hold both strings and integers.
- Please make sure your function could work with any data matrices of this type, not just my example matrices.

Sample Output:

Running the Following:

```
data1 = [[1, 2, 3, 78],
         [4, 5, 6, 42],
         [7, 8, 9, 90]]

data2 = [['albert', 'tom', 'sarahughes'],
         ['abe', 'abrahamlincoln', 'ac'],
         ['this is a random string', 'john', 'todd'],
         ['yu', 'chen', 'cheng']]
```

```
data3 = [[1, 5],
         ['albert', 'hwang'],
         [79, 'seventy-nine']]

print CreateTable(data1)
print ''
print CreateTable(data2)
print ''
print CreateTable(data3)
```

Should produce the following:

```
+=======================+
|  1  |  2  |  3  |  78  |
|=====+=====+=====+======|
|  4  |  5  |  6  |  42  |
|=====+=====+=====+======|
|  7  |  8  |  9  |  90  |
+=======================+

+=============================================================+
|  albert                    |  tom              |  sarahughes  |
|============================+===================+==============|
|  abe                       |  abrahamlincoln   |  ac          |
|============================+===================+==============|
|  this is a random string   |  john             |  todd        |
|============================+===================+==============|
|  yu                        |  chen             |  cheng       |
+=============================================================+

+============================+
|  1       |  5              |
|==========+=================|
|  albert  |  hwang          |
|==========+=================|
|  79      |  seventy-nine   |
+============================+
```

Hints:

- To get the length of a string - `len(str1)`
- `'=' * 3` is the same as `'=' + '=' + '='`

Place the relevant source code in a file named `hw5_3.py` which should be in your home directory under week5 (**home directory > python > week5**).