Week 2 Homework

1. One of the reasons to run a desk check is to diagnose of errors in the code. In the following a and b are integer inputs. Where s is the sum of a and b.

```
a = input('>>> ')   # Ask user to input a number.
b = input('>>> ')
s = a + b
```

There is an error in the code. What is it? You may want to use a desk check to help you.

https://sites.google.com/a/campioncollege.com/it_eveningschoool/problem-solving-and-programming/desk-check-guide

2. A vector is a structure to represent a stream of numbers together. For example, to represent the 'yes' and 'no' opinions of a group of people. We can say:

$$\mathbf{x} = \begin{bmatrix} 0 & 1 & 1 & 0 & 1 \end{bmatrix}$$

for 5 people. An important property of a vector is how big they are. Which we call as dimensions. Formally, we start with its number of rows then number of columns. So the above example has 1 row and 5 columns, so the dimension is 1, 5.

A matrix means both rows and columns have more than one. For example,

$$\mathbf{x} = \begin{bmatrix} 1 & 0 & 1 \\ 0 & 0 & 0 \end{bmatrix}$$

It has 2 rows and 3 columns. We will denote the dimension as row x columns. For example $\mathbf{x}$ has dimension of 2,3. In the following, we will look at the dimensions under different vector/ matrix operations.

   a. What is the dimension of

$$\mathbf{a} = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

   b. Transpose means the matrices invert their rows and columns. For example,

$$\begin{bmatrix} 2 & 3 & 5 \\ 1 & 4 & 0 \end{bmatrix}^{T} = \begin{bmatrix} 2 & 1 \\ 3 & 4 \\ 5 & 0 \end{bmatrix}$$

What is the dimension of the transposed matrix?

c. Matrix addition means the elements from both matrices added together. An example would be:

$$\begin{bmatrix} 2 & -1 & 3 \\ 0 & 5 & 1 \end{bmatrix} + \begin{bmatrix} 1 & 1 & 1 \\ 0 & 1 & 3 \end{bmatrix} = \begin{bmatrix} 3 & 0 & 4 \\ 0 & 6 & 4 \end{bmatrix}$$

What is the dimension for above example?

d. Multiplication means the i,j-element multiplies with the ji-element at the other matrix. Here is an example:

$$\begin{bmatrix} 2 & 1 & 3 \end{bmatrix} \begin{bmatrix} 2 \\ 1 \\ 3 \end{bmatrix} = [14]$$

What are the dimensions of each matrices?

3. In Python there is a guideline to name variables. In the following, comment if the variables are technically valid or aligned with conventions?

	Valid	Convention
age		
name		
class		
darksideoftheworld		
1stname		
last_name		
Tweets		