# Session_2

June 10, 2017

```
In [1]: import numpy

In [2]: numpy.mean()

In [3]: import time

In [5]: time.ctime()
Out[5]: 'Wed Jun  7 18:13:26 2017'

In [9]: data = numpy.loadtxt("inflammation-01.csv", delimiter=',')

In [10]: data_mean = numpy.mean(data)

In [11]: print (data_mean)
6.14875

In [12]: data_mean
Out[12]: 6.1487499999999997

In [13]: mean_val , max_val, min_val = numpy.mean(data), numpy.max(data), numpy.mir

In [14]: import numpy as np

In [15]: mean_val = np.mean(data)

In [16]: import matplotlib.pyplot as plt

In [17]: %whos
Variable    Type       Data/Info
--------------------------------
data        ndarray    60x40: 2400 elems, type `float64`, 19200 bytes
data_mean   float64    6.14875
max_val     float64    20.0
mean_val    float64    6.14875
min_val     float64    0.0
np          module     <module 'numpy' from '/Us<...>kages/numpy/__init__.py'>
numpy       module     <module 'numpy' from '/Us<...>kages/numpy/__init__.py'>
plt         module     <module 'matplotlib.pyplo<...>es/matplotlib/pyplot.py'>
time        module     <module 'time' (built-in)>
```

```
In [18]: fig = plt.figure?

In [19]: fig = plt.figure(figsize=(10,3))

In [20]: axes1 = fig.add_subplot(1,3,1)

In [27]: axes1.plot(np.mean(data, axis=1))

Out[27]: [<matplotlib.lines.Line2D at 0x11726cd68>]

In [29]: plt.show()

In [30]: fig.show()

/Users/teaching/anaconda/lib/python3.6/site-packages/matplotlib/figure.py:402: User
  "matplotlib is currently using a non-GUI backend, "


In [31]: plt.show()

In [32]: element = "string"

In [33]: element[0]

Out[33]: 's'

In [34]: len(element)

Out[34]: 6

In [35]: element[5]

Out[35]: 'g'

In [36]: element[-1]

Out[36]: 'g'

In [37]: word = "universe"

In [38]: print(word[0])
         print(word[7])

u
e


In [39]: word = "elem"

         print(word[7])
```

```
        ---------------------------------------------------------------------------
        IndexError                                Traceback (most recent call last)

        <ipython-input-39-8f5ce6ebbcf9> in <module>()
          1 word = "elem"
          2
    ----> 3 print(word[7])


        IndexError: string index out of range
```

```
In [40]: for char in word:
             print(char)

e
l
e
m
```

```
In [43]: for x in word:
             print(x)

e
l
e
m
```

```
In [44]: letter = 'z'
         for letter in 'abc':
             print(letter)

         print('letter after the loop', letter)

a
b
c
letter after the loop c
```

```
In [45]: word = 'universe'

         length = 0

         for whatever in word:
```

```
            length= length+1

        print(length)
```

```
8
```

```
In [47]: length = 0

         for whatever in word:
             length += 1
         print(length)
```

```
8
```

```
In [48]: x= 2
         y = 3

         2**3
```

```
Out[48]: 8
```

```
In [49]: range?
```

```
In [51]: result = 1
         for i in range(0,y):
             result= result*x
             print("i=", i)

         print(result)
```

```
i= 0
i= 1
i= 2
8
```

```
In [53]: for i,whatever in enumerate(word):
             length += 1
             print (i)
         print(length)
```

```
0
1
2
3
4
```

```
5
6
7
16
```

```
In [58]: string = "Newton"
         reverse_string = ''

         for i,char in enumerate(string):
             reverse_string=char+reverse_string
             print('i=',i, 'char =', char, 'reverse_string :', reverse_string)

         print ('reverse_string=', reverse_string)
```

```
i= 0 char = N reverse_string : N
i= 1 char = e reverse_string : eN
i= 2 char = w reverse_string : weN
i= 3 char = t reverse_string : tweN
i= 4 char = o reverse_string : otweN
i= 5 char = n reverse_string : notweN
reverse_string= notweN
```

```
In [64]: reverse_string=''
         for i in range(len(string)):
            print(string[-i-1])
            reverse_string=  reverse_string+ string[-i-1]

         print ('reverse_string=', reverse_string)
```

```
n
o
t
w
e
N
reverse_string= notweN
```

```
In [70]: for i in range(-1,-len(string)-1, -1):
             print(i,string[i])
```

```
-1 n
-2 o
-3 t
-4 w
-5 e
-6 N
```

```
In [71]: string = 'this is a string'
         reverse=''
         for i in range(0, len(string)):
             reverse[i]=string[-(i+1)]
             print(reverse)

         print(reverse)


        ---------------------------------------------------------------------------

        TypeError                                 Traceback (most recent call last)

        <ipython-input-71-abfac47875dd> in <module>()
          2 reverse=''
          3 for i in range(0, len(string)):
    ----> 4     reverse[i]=string[-(i+1)]
          5     print(reverse)
          6


        TypeError: 'str' object does not support item assignment


In [72]: type(string)

Out[72]: str

In [73]: mylist = [1,2,3,4]

In [74]: mylist

Out[74]: [1, 2, 3, 4]

In [75]: mylist2 = ['A', 'B', 'c']
         mylist2

Out[75]: ['A', 'B', 'c']

In [77]: mylist[0]

Out[77]: 1

In [78]: mylist[0]=11

In [80]: mylist

Out[80]: [11, 2, 3, 4]

In [81]: for elem in mylist:
             print(elem)
```

```
11
2
3
4
```

```
In [82]: mylist3=[[1,3,5],[0,2,4]]

In [83]: mylist3

Out[83]: [[1, 3, 5], [0, 2, 4]]

In [84]: mylist3[0]

Out[84]: [1, 3, 5]

In [85]: mylist3[0][0]

Out[85]: 1

In [86]: # back to mylist:

         mylist

Out[86]: [11, 2, 3, 4]

In [87]: mylist.append(5)

In [88]: mylist

Out[88]: [11, 2, 3, 4, 5]

In [89]: del mylist[0]

In [90]: mylist

Out[90]: [2, 3, 4, 5]

In [92]: mylist.reverse()

In [93]: mylist

Out[93]: [5, 4, 3, 2]

In [95]: mylist.index?

In [96]: help(mylist.index)

Help on built-in function index:

index(...) method of builtins.list instance
    L.index(value, [start, [stop]]) -> integer -- return first index of value.
    Raises ValueError if the value is not present.
```

```
In [97]: mylist4=["h","e","l","l","o"]

In [100]: string = ''
          for char in mylist4:
              string += char
              print(char, string)

          print (string)

h h
e he
l hel
l hell
o hello
hello


In [105]: count=0

          cons=""

          st=""

          for i,aye in enumerate(mylist4):

                  st=mylist4[i]

                  cons=cons+st

                  #count=count+1

          print(cons)

hello


In [107]: string = 'hello'
          mylist5=[]

          for char in string:
              mylist5.append(char)
              print(char, mylist5)
          print(mylist5)

h ['h']
e ['h', 'e']
l ['h', 'e', 'l']
l ['h', 'e', 'l', 'l']
o ['h', 'e', 'l', 'l', 'o']
```

```
['h', 'e', 'l', 'l', 'o']
```

```
In [110]: left ='L'
          Right = 'R'

          temp = Right
          Right = left
          left=temp
```

```
In [111]: left, Right
```

```
Out[111]: ('R', 'L')
```

```
In [114]: left ='L'
          Right = 'R'
          left, Right = [Right, left]
```

```
In [115]: left, Right
```

```
Out[115]: ('R', 'L')
```

```
In [116]: var1 = 1
          var2 = var1
          var1 = 20
```

```
In [117]: var2
```

```
Out[117]: 1
```

```
In [118]: # Load multiple files :
```

```
In [119]: data = numpy.loadtxt("inflammation-01.csv", delimiter=',')
```

```
In [120]: import glob
```

```
In [121]: glob.glob("inflammation*")
```

```
Out[121]: ['inflammation-01.csv',
           'inflammation-02.csv',
           'inflammation-03.csv',
           'inflammation-04.csv',
           'inflammation-05.csv',
           'inflammation-06.csv',
           'inflammation-07.csv',
           'inflammation-08.csv',
           'inflammation-09.csv',
           'inflammation-10.csv',
           'inflammation-11.csv',
           'inflammation-12.csv']
```

```
In [127]: file_list = glob.glob("inflammation*")
          for filename in file_list:
              data = numpy.loadtxt(filename, delimiter=',')
              print ("------------------")
              print('filename:', filename)
              print('mean :',data.mean())
```

```
------------------
filename: inflammation-01.csv
mean : 6.14875
------------------
filename: inflammation-02.csv
mean : 5.99083333333
------------------
filename: inflammation-03.csv
mean : 4.20458333333
------------------
filename: inflammation-04.csv
mean : 6.10958333333
------------------
filename: inflammation-05.csv
mean : 6.11833333333
------------------
filename: inflammation-06.csv
mean : 6.04333333333
------------------
filename: inflammation-07.csv
mean : 6.01958333333
------------------
filename: inflammation-08.csv
mean : 4.20458333333
------------------
filename: inflammation-09.csv
mean : 6.03291666667
------------------
filename: inflammation-10.csv
mean : 6.0525
------------------
filename: inflammation-11.csv
mean : 4.20458333333
------------------
filename: inflammation-12.csv
mean : 6.06166666667
```

```
In [132]: import matplotlib.pyplot as plt

          %matplotlib inline
```

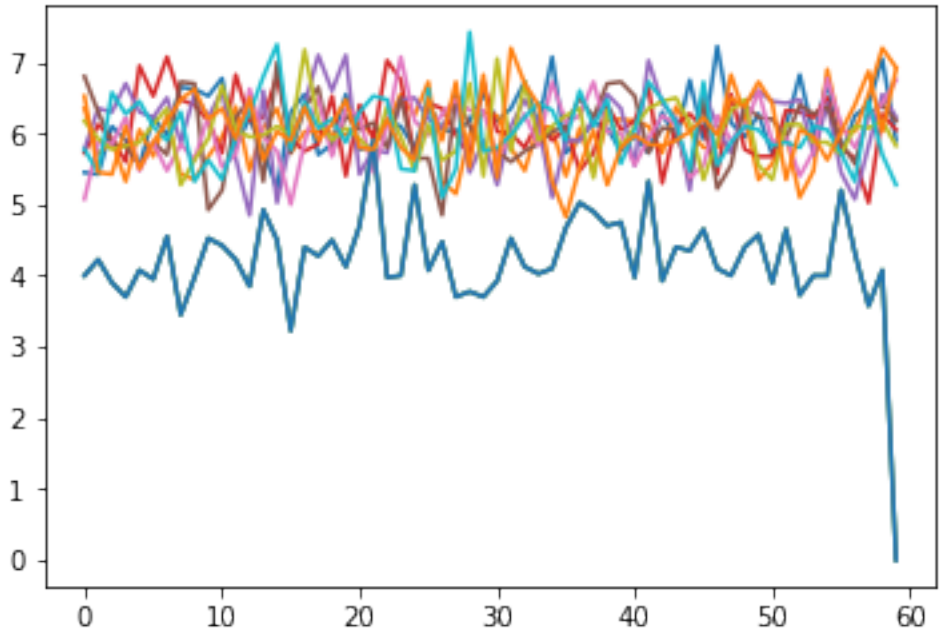
```
file_list = glob.glob("inflammation*")


for filename in file_list:
    data = numpy.loadtxt(filename, delimiter=',')
    print ("------------------")
    print('filename:', filename)
    print('mean :',numpy.mean(data, axis=1))
    plt.plot(numpy.mean(data, axis=1))
```

```
------------------
filename: inflammation-01.csv
mean : [ 5.45   5.425  6.1    5.9    5.55   6.225  5.975  6.65   6.625  6.525
  6.775  5.8    6.225  5.75   5.225  6.3    6.55   5.7    5.85   6.55
  5.775  5.825  6.175  6.1    5.8    6.425  6.05   6.025  6.175  6.55
  6.175  6.35   6.725  6.125  7.075  5.725  5.925  6.15   6.075  5.75
  5.975  5.725  6.3    5.9    6.75   5.925  7.225  6.15   5.95   6.275  5.7
  6.1    6.825  5.975  6.725  5.7    6.25   6.4    7.05   5.9  ]
------------------
filename: inflammation-02.csv
mean : [ 6.35   5.7    5.9    5.325  6.05   5.675  6.25   5.425  5.35   5.675
  5.95   6.375  5.475  6.075  6.35   5.725  6.025  6.025  6.     5.975
  6.15   5.975  6.125  6.55   6.25   6.725  5.325  5.15   6.     6.3    6.25
  5.8    5.475  6.125  6.075  5.4    6.075  5.45   6.175  6.2    6.175  6.1
  5.725  6.375  6.025  5.8    5.8    6.825  6.25   5.35   5.575  6.     5.1
  5.475  6.9    6.025  6.025  6.55   7.2    6.925]
------------------
filename: inflammation-03.csv
mean : [ 4.     4.225  3.9    3.7    4.075  3.95   4.55   3.45   3.975  4.525
  4.425  4.225  3.85   4.925  4.5    3.225  4.4    4.275  4.5    4.125  4.7
  5.9    3.975  4.     5.275  4.075  4.475  3.7    3.775  3.7    3.925
  4.525  4.125  4.025  4.1    4.675  5.025  4.9    4.7    4.75   3.975
  5.325  3.925  4.4    4.35   4.65   4.1    4.     4.4    4.575  3.9    4.65
  3.725  4.     4.     5.2    4.325  3.575  4.075  0.   ]
------------------
filename: inflammation-04.csv
mean : [ 5.725  6.125  5.925  5.6    6.95   6.525  7.075  6.475  6.4    6.175
  5.725  6.825  6.175  6.225  6.8    5.925  5.75   5.85   6.525  5.4    6.4
  5.925  7.025  6.75   5.65   6.425  6.35   5.975  5.675  6.725  6.025  6.
  5.8    6.175  5.9    6.075  5.475  5.725  6.4    6.05   6.175  6.675  5.3
  6.125  6.275  6.075  5.425  6.55   5.775  5.675  5.675  6.325  6.3    6.225
  6.5    5.8    5.65   5.025  6.275  6.05 ]
------------------
filename: inflammation-05.csv
mean : [ 5.775  6.35   6.3    6.7    6.3    6.225  6.5    5.875  6.55   6.225  6.6
```

```
  5.65   4.85   6.6    5.025  5.925  6.4    7.1    6.6    7.1    5.425
  5.775  5.725  6.475  6.5    6.2    6.075  6.475  5.45   5.9    5.275  6.1
  6.475  6.15   5.1    5.9    5.9    6.2    6.55   6.35   5.55   7.025
  6.425  6.2    5.2    6.6    6.1    5.725  6.425  6.6    6.45   6.425
  6.475  5.7    6.425  5.45   5.075  5.825  6.55   6.225]
------------------
filename: inflammation-06.csv
mean : [ 6.8    6.3    5.85   5.825  5.55   5.875  5.7    6.725  6.7    4.925  5.2
  6.225  6.475  5.325  7.     5.725  6.35   6.65   5.725  6.25   6.05   6.15
  5.8    6.5    5.65   5.65   4.85   6.575  6.1    5.775  5.75   5.6    5.75
  5.85   6.025  6.1    6.5    6.225  6.7    6.725  6.525  5.725  6.075
  6.05   5.375  6.475  5.225  5.55   6.4    6.225  6.2    5.925  6.4    6.275
  6.375  5.875  5.575  6.275  6.4    6.175]
------------------
filename: inflammation-07.csv
mean : [ 5.075  5.875  5.85   6.225  5.475  5.875  5.475  5.85   5.625  6.25
  5.525  5.7    6.625  5.95   5.75   5.     5.875  6.5    5.675  6.35   6.25
  5.45   6.1    7.075  6.175  5.975  6.275  6.475  6.325  6.325  5.65   5.95
  6.275  5.825  6.725  6.15   6.25   6.725  6.025  6.     5.55   5.925
  6.25   6.125  5.375  5.55   6.25   5.9    6.075  6.6    5.875  5.95   5.4
  5.75   6.775  6.125  5.8    6.2    6.425  6.75 ]
------------------
filename: inflammation-08.csv
mean : [ 4.     4.225  3.9    3.7    4.075  3.95   4.55   3.45   3.975  4.525
  4.425  4.225  3.85   4.925  4.5    3.225  4.4    4.275  4.5    4.125  4.7
  5.9    3.975  4.     5.275  4.075  4.475  3.7    3.775  3.7    3.925
  4.525  4.125  4.025  4.1    4.675  5.025  4.9    4.7    4.75   3.975
  5.325  3.925  4.4    4.35   4.65   4.1    4.     4.4    4.575  3.9    4.65
  3.725  4.     4.     5.2    4.325  3.575  4.075  0.   ]
------------------
filename: inflammation-09.csv
mean : [ 6.175  5.925  5.775  5.825  5.875  6.125  6.35   5.275  5.625  5.925
  6.675  6.05   5.95   5.975  6.1    5.975  7.175  6.175  5.9    6.075
  5.925  5.725  6.375  5.95   5.475  6.125  5.625  5.75   6.7    5.4    7.05
  5.75   6.725  5.9    6.1    6.25   6.35   5.375  6.325  5.8    6.1    6.35
  6.45   6.5    6.15   5.35   5.9    6.325  6.475  5.55   5.35   6.125
  6.125  5.875  5.875  5.7    6.1    6.075  6.175  5.825]
------------------
filename: inflammation-10.csv
mean : [ 5.775  5.45   6.575  6.275  6.45   6.1    5.9    6.3    5.325  5.625
  5.35   5.95   6.275  6.8    7.25   5.775  6.45   6.075  6.2    5.875  6.3
  6.525  6.475  5.5    5.475  6.625  5.1    5.5    7.425  5.75   5.8    5.975
  6.225  6.425  6.325  5.9    6.6    6.1    6.475  5.575  6.05   6.725
  6.475  6.15   5.475  6.725  5.55   5.875  6.1    6.05   5.825  5.875  5.8
  6.1    6.05   5.725  5.325  6.45   5.7    5.275]
------------------
filename: inflammation-11.csv
mean : [ 4.     4.225  3.9    3.7    4.075  3.95   4.55   3.45   3.975  4.525
```

```
  4.425  4.225  3.85   4.925  4.5    3.225  4.4    4.275  4.5    4.125  4.7
  5.9    3.975  4.     5.275  4.075  4.475  3.7    3.775  3.7    3.925
  4.525  4.125  4.025  4.1    4.675  5.025  4.9    4.7    4.75   3.975
  5.325  3.925  4.4    4.35   4.65   4.1    4.     4.4    4.575  3.9    4.65
  3.725  4.     4.     5.2    4.325  3.575  4.075  0.   ]
------------------
filename: inflammation-12.csv
mean : [ 6.525  5.45   5.425  6.1    5.5    5.875  6.175  6.475  6.625  6.2    6.35
  5.925  6.5    5.625  6.025  5.9    6.375  5.9    6.125  6.475  5.8    5.775
  6.2    5.8    5.625  6.5    5.9    6.725  5.525  6.825  5.375  7.2    6.7
  6.4    5.325  4.825  5.525  6.05   5.275  5.8    5.975  5.85   5.825  5.9
  6.025  6.225  5.975  6.5    6.375  6.725  6.425  5.35   6.05   5.95
  5.625  6.025  6.4    6.875  6.025  6.9  ]
```



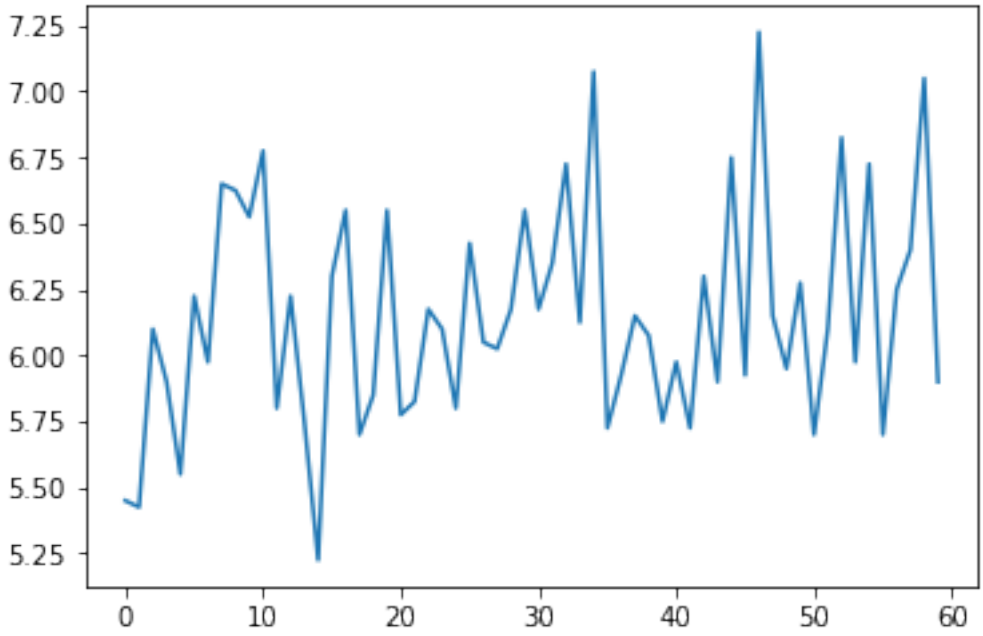

```
In [131]: filename= file_list[0]

          data = numpy.loadtxt(filename, delimiter=',')
          print ("------------------")
          print('filename:', filename)
          print('mean :',numpy.mean(data, axis=1))
          plt.plot(numpy.mean(data, axis=1))

------------------
filename: inflammation-01.csv
mean : [ 5.45   5.425  6.1    5.9    5.55   6.225  5.975  6.65   6.625  6.525
```

```
  6.775   5.8     6.225   5.75    5.225   6.3     6.55    5.7     5.85    6.55
  5.775   5.825   6.175   6.1     5.8     6.425   6.05    6.025   6.175   6.55
  6.175   6.35    6.725   6.125   7.075   5.725   5.925   6.15    6.075   5.75
  5.975   5.725   6.3     5.9     6.75    5.925   7.225   6.15    5.95    6.275   5.7
  6.1     6.825   5.975   6.725   5.7     6.25    6.4     7.05    5.9   ]
```

Out[131]: [<matplotlib.lines.Line2D at 0x11a7b9cf8>]




In [ ]: