MSDS 6306_Live Session Homework 13--Angela Horacek

1. CREATE A LIST NAMED my_list IN PYTHON WITH THE FOLLOWING DATA POINTS:

```
In [1]: my_list = [45.4, 44.2, 36.8, 35.1, 39.0, 60.0, 47.4, 41.1, 45.8, 35.6]
```

1.a. Print the 5th element in the list.

```
In [2]: my_list[4]
```

```
Out[2]: 39.0
```

1.b. Append 55.2 to my_list

```
In [3]: var1 = 55.2
        my_list.append(var1)
        print (my_list)
```

```
[45.4, 44.2, 36.8, 35.1, 39.0, 60.0, 47.4, 41.1, 45.8, 35.6, 55.2]
```

1.c. Remove the 6th element in the list.

```
In [4]: del my_list [5]
        print (my_list)
```

```
[45.4, 44.2, 36.8, 35.1, 39.0, 47.4, 41.1, 45.8, 35.6, 55.2]
```

1.d Iterate over the list to print data points greater than 45.

```
In [5]: for val in my_list:
            if val > 45:
                print (val)
```

```
45.4
47.4
45.8
55.2
```

2. INTRODUCTION TO NUMPY

2.a. Import the numpy library using the following command import numpy.

```
In [6]: import numpy
```

2.b. Declare numpy array with the same data points as in my_list using numpy.array()

In [7]:
```
array1 = numpy.array([45.4, 44.2, 36.8, 35.1, 39.0, 60.0, 47.4, 41.1, 45.8, 35.6])
print (array1)
```

```
[ 45.4  44.2  36.8  35.1  39.   60.   47.4  41.1  45.8  35.6]
```

2.c. Compute the mean and standard deviation using numpy.mean() and numpy.std() of the above array.

In [8]:
```
mean1 = numpy.mean(array1)
print ("Mean is", mean1)
sd1 = numpy.std(array1)
print ("Standard deviation is", sd1)
```

```
Mean is 43.04
Standard deviation is 7.06118970146
```

2.d. Use logical referencing to get only those values that are less than 45.

In [9]:
```
array1[numpy.where(array1<45)]
```

Out[9]:
```
array([ 44.2,  36.8,  35.1,  39. ,  41.1,  35.6])
```

2.e. Compute the max and min or the array using numpy.max() and numpy.min().

In [10]:
```
max1 = numpy.max(array1)
print ("Max is", max1)
min1 = numpy.min(array1)
print ("Min is", min1)
```

```
Max is 60.0
Min is 35.1
```

3. INTRODUCTION TO PANDAS

3.a. Import the pandas library-import pandas.

In [11]:
```
import pandas
```

3.b. Read the IRIS dataset into iris using pandas.read_csv(). Data file-

In [12]:
```
iris = pandas.read_csv("C:/Users/Angela/Anaconda3/Lib/site-packages/blaze/examples/
data/iris.csv")
```

3.c. Using iris.head(), display the head of the dataset. Note: I had to add an "id" column into the original file to show that I could drop the id column in 3.d.

In [13]:
```
iris.head()
```

Out[13]:

	id	sepal_length	sepal_width	petal_length	petal_width	species
0	1	5.1	3.5	1.4	0.2	Iris-setosa
1	2	4.9	3.0	1.4	0.2	Iris-setosa
2	3	4.7	3.2	1.3	0.2	Iris-setosa
3	4	4.6	3.1	1.5	0.2	Iris-setosa
4	5	5.0	3.6	1.4	0.2	Iris-setosa

3.d. Use DataFrame.drop() to drop the id column.

In [22]:
```
iris1=iris.drop(iris.columns[[0]], axis=1)
iris1
```

Out[22]:

	sepal_length	sepal_width	petal_length	petal_width	species
0	5.1	3.5	1.4	0.2	Iris-setosa
1	4.9	3.0	1.4	0.2	Iris-setosa
2	4.7	3.2	1.3	0.2	Iris-setosa
3	4.6	3.1	1.5	0.2	Iris-setosa
4	5.0	3.6	1.4	0.2	Iris-setosa
5	5.4	3.9	1.7	0.4	Iris-setosa
6	4.6	3.4	1.4	0.3	Iris-setosa
7	5.0	3.4	1.5	0.2	Iris-setosa
8	4.4	2.9	1.4	0.2	Iris-setosa
9	4.9	3.1	1.5	0.1	Iris-setosa
10	5.4	3.7	1.5	0.2	Iris-setosa
11	4.8	3.4	1.6	0.2	Iris-setosa
12	4.8	3.0	1.4	0.1	Iris-setosa
13	4.3	3.0	1.1	0.1	Iris-setosa
14	5.8	4.0	1.2	0.2	Iris-setosa
15	5.7	4.4	1.5	0.4	Iris-setosa
16	5.4	3.9	1.3	0.4	Iris-setosa
17	5.1	3.5	1.4	0.3	Iris-setosa
18	5.7	3.8	1.7	0.3	Iris-setosa
19	5.1	3.8	1.5	0.3	Iris-setosa
20	5.4	3.4	1.7	0.2	Iris-setosa
21	5.1	3.7	1.5	0.4	Iris-setosa
22	4.6	3.6	1.0	0.2	Iris-setosa
23	5.1	3.3	1.7	0.5	Iris-setosa
24	4.8	3.4	1.9	0.2	Iris-setosa
25	5.0	3.0	1.6	0.2	Iris-setosa
26	5.0	3.4	1.6	0.4	Iris-setosa
27	5.2	3.5	1.5	0.2	Iris-setosa
28	5.2	3.4	1.4	0.2	Iris-setosa
29	4.7	3.2	1.6	0.2	Iris-setosa
...	...	...	...	...	...
120	6.9	3.2	5.7	2.3	Iris-virginica
121	5.6	2.8	4.9	2.0	Iris-virginica
122	7.7	2.8	6.7	2.0	Iris-virginica
123	6.3	2.7	4.9	1.8	Iris-virginica
124	6.7	3.3	5.7	2.1	Iris-virginica
125	7.2	3.2	6.0	1.8	Iris-virginica

3.e. Subset dataframe to create a new data frame that includes only the measurements for the setosa species.

In [23]:
```
setosa_df = iris1[iris1.species == "Iris-setosa"]
setosa_df
```

Out[23]:

	sepal_length	sepal_width	petal_length	petal_width	species
0	5.1	3.5	1.4	0.2	Iris-setosa
1	4.9	3.0	1.4	0.2	Iris-setosa
2	4.7	3.2	1.3	0.2	Iris-setosa
3	4.6	3.1	1.5	0.2	Iris-setosa
4	5.0	3.6	1.4	0.2	Iris-setosa
5	5.4	3.9	1.7	0.4	Iris-setosa
6	4.6	3.4	1.4	0.3	Iris-setosa
7	5.0	3.4	1.5	0.2	Iris-setosa
8	4.4	2.9	1.4	0.2	Iris-setosa
9	4.9	3.1	1.5	0.1	Iris-setosa
10	5.4	3.7	1.5	0.2	Iris-setosa
11	4.8	3.4	1.6	0.2	Iris-setosa
12	4.8	3.0	1.4	0.1	Iris-setosa
13	4.3	3.0	1.1	0.1	Iris-setosa
14	5.8	4.0	1.2	0.2	Iris-setosa
15	5.7	4.4	1.5	0.4	Iris-setosa
16	5.4	3.9	1.3	0.4	Iris-setosa
17	5.1	3.5	1.4	0.3	Iris-setosa
18	5.7	3.8	1.7	0.3	Iris-setosa
19	5.1	3.8	1.5	0.3	Iris-setosa
20	5.4	3.4	1.7	0.2	Iris-setosa
21	5.1	3.7	1.5	0.4	Iris-setosa
22	4.6	3.6	1.0	0.2	Iris-setosa
23	5.1	3.3	1.7	0.5	Iris-setosa
24	4.8	3.4	1.9	0.2	Iris-setosa
25	5.0	3.0	1.6	0.2	Iris-setosa
26	5.0	3.4	1.6	0.4	Iris-setosa
27	5.2	3.5	1.5	0.2	Iris-setosa
28	5.2	3.4	1.4	0.2	Iris-setosa
29	4.7	3.2	1.6	0.2	Iris-setosa
30	4.8	3.1	1.6	0.2	Iris-setosa
31	5.4	3.4	1.5	0.4	Iris-setosa
32	5.2	4.1	1.5	0.1	Iris-setosa
33	5.5	4.2	1.4	0.2	Iris-setosa
34	4.9	3.1	1.5	0.2	Iris-setosa
35	5.0	3.2	1.2	0.2	Iris-setosa
36	5.5	3.5	1.3	0.2	Iris-setosa

3.f. Use DataFrame.describe() to get the summary statistics.

In [24]:
```
iris1.describe()
```

Out[24]:

	sepal_length	sepal_width	petal_length	petal_width
count	150.000000	150.000000	150.000000	150.000000
mean	5.843333	3.057333	3.758000	1.199333
std	0.828066	0.435866	1.765298	0.762238
min	4.300000	2.000000	1.000000	0.100000
25%	5.100000	2.800000	1.600000	0.300000
50%	5.800000	3.000000	4.350000	1.300000
75%	6.400000	3.300000	5.100000	1.800000
max	7.900000	4.400000	6.900000	2.500000

4.g. Use DataFrame.grouby() to create grouped data frames by Species and compute summary statistics using DataFrame.describe()

In [25]:
```
species_group = iris1.groupby(['species']).describe()
species_group
```

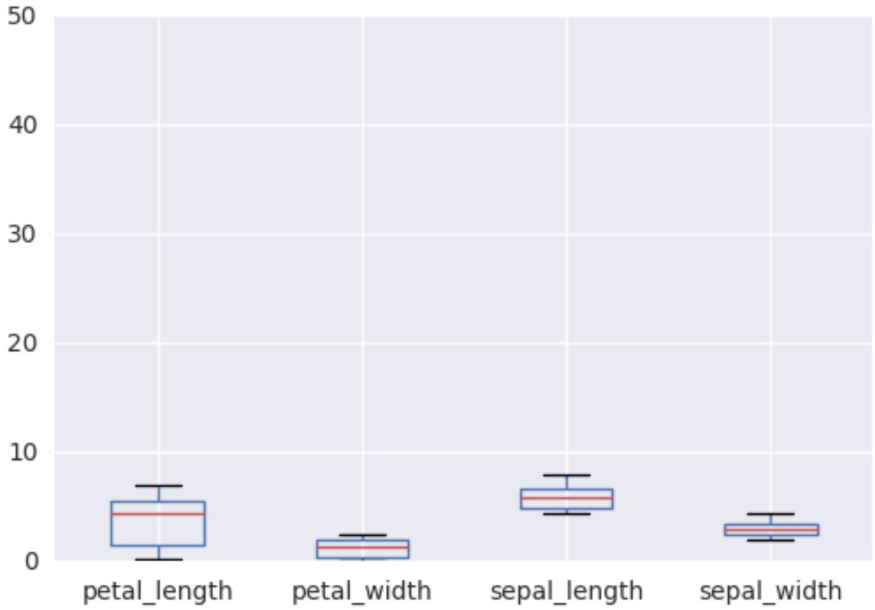
Out[25]:

		petal_length	petal_width	sepal_length	sepal_width
species					
Iris-setosa	**count**	50.000000	50.000000	50.000000	50.000000
	mean	1.462000	0.246000	5.006000	3.428000
	std	0.173664	0.105386	0.352490	0.379064
	min	1.000000	0.100000	4.300000	2.300000
	25%	1.400000	0.200000	4.800000	3.200000
	50%	1.500000	0.200000	5.000000	3.400000
	75%	1.575000	0.300000	5.200000	3.675000
	max	1.900000	0.600000	5.800000	4.400000
Iris-versicolor	**count**	50.000000	50.000000	50.000000	50.000000
	mean	4.260000	1.326000	5.936000	2.770000
	std	0.469911	0.197753	0.516171	0.313798
	min	3.000000	1.000000	4.900000	2.000000
	25%	4.000000	1.200000	5.600000	2.525000
	50%	4.350000	1.300000	5.900000	2.800000
	75%	4.600000	1.500000	6.300000	3.000000
	max	5.100000	1.800000	7.000000	3.400000
Iris-virginica	**count**	50.000000	50.000000	50.000000	50.000000
	mean	5.552000	2.026000	6.588000	2.974000
	std	0.551895	0.274650	0.635880	0.322497
	min	4.500000	1.400000	4.900000	2.200000
	25%	5.100000	1.800000	6.225000	2.800000
	50%	5.550000	2.000000	6.500000	3.000000
	75%	5.875000	2.300000	6.900000	3.175000
	max	6.900000	2.500000	7.900000	3.800000

3.h. Use DataFrame.boxplot() to plot boxplots by Species.

In [26]:
```
%matplotlib inline
species_group.boxplot(return_type='dict')
```

Out[26]:
```
{'boxes': [<matplotlib.lines.Line2D at 0x1357a1da9e8>,
  <matplotlib.lines.Line2D at 0x1357a1e92b0>,
  <matplotlib.lines.Line2D at 0x1357a1eff60>,
  <matplotlib.lines.Line2D at 0x1357a202550>],
 'caps': [<matplotlib.lines.Line2D at 0x1357a1e2e48>,
  <matplotlib.lines.Line2D at 0x1357a1e2f98>,
  <matplotlib.lines.Line2D at 0x1357a1ecb38>,
  <matplotlib.lines.Line2D at 0x1357a1ecc88>,
  <matplotlib.lines.Line2D at 0x1357a1f9ac8>,
  <matplotlib.lines.Line2D at 0x1357a1f9c88>,
  <matplotlib.lines.Line2D at 0x1357a206ef0>,
  <matplotlib.lines.Line2D at 0x1357a20ae10>],
 'fliers': [<matplotlib.lines.Line2D at 0x1357a1e5c88>,
  <matplotlib.lines.Line2D at 0x1357a1efe80>,
  <matplotlib.lines.Line2D at 0x1357a1fdd68>,
  <matplotlib.lines.Line2D at 0x1357a210ef0>],
 'means': [],
 'medians': [<matplotlib.lines.Line2D at 0x1357a1e5630>,
  <matplotlib.lines.Line2D at 0x1357a1ef320>,
  <matplotlib.lines.Line2D at 0x1357a1fd518>,
  <matplotlib.lines.Line2D at 0x1357a20afd0>],
 'whiskers': [<matplotlib.lines.Line2D at 0x1357a1dabe0>,
  <matplotlib.lines.Line2D at 0x1357a1e27f0>,
  <matplotlib.lines.Line2D at 0x1357a1e9e48>,
  <matplotlib.lines.Line2D at 0x1357a1e9f98>,
  <matplotlib.lines.Line2D at 0x1357a1f6b38>,
  <matplotlib.lines.Line2D at 0x1357a1f6c88>,
  <matplotlib.lines.Line2D at 0x1357a202e10>,
  <matplotlib.lines.Line2D at 0x1357a206d30>]}
```



3.i. Plot a scatter matrix plot using the seaborn library. Use the following to load and plot. a) import seaborn as sns (note: need to install first "conda install seaborn b) Seaborn.pairplot(dataframe, by='column_name')

In [19]:
```
import seaborn as sns
```

In [27]:
```
sns.pairplot(iris1, hue='species')
```

Out[27]:
```
<seaborn.axisgrid.PairGrid at 0x1357a49f4a8>
```