Excercise 2 - Pandas and Visualization

Open a Jupyter notebook and import pandas, NumPy, matplotlib, seaborn and Sklearn.

```
[39] import pandas as pd
     import numpy as np
     import matplotlib as plt
     import seaborn as sns
```

Load the inbuilt iris dataset.

```
ds = pd.read_csv('Iris.csv')
```

Peek into this data using head(), info() and glance over some statistics using describe().

```
[42] ds.head(10)
```

	Id	SepalLengthCm	SepalWidthCm	PetalLengthCm	PetalWidthCm	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
5	6	5.4	3.9	1.7	0.4	Iris-setosa
6	7	4.6	3.4	1.4	0.3	Iris-setosa
7	8	5.0	3.4	1.5	0.2	Iris-setosa
8	9	4.4	2.9	1.4	0.2	Iris-setosa
9	10	4.9	3.1	1.5	0.1	Iris-setosa

```
[43] ds.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 150 entries, 0 to 149
Data columns (total 6 columns):
 #   Column         Non-Null Count  Dtype  
---  ------         --------------  -----  
 0   Id             150 non-null    int64  
 1   SepalLengthCm  150 non-null    float64
 2   SepalWidthCm   150 non-null    float64
 3   PetalLengthCm  150 non-null    float64
 4   PetalWidthCm   150 non-null    float64
 5   Species        150 non-null    object 
dtypes: float64(4), int64(1), object(1)
memory usage: 7.2+ KB
```

```
ds.describe()
```

	Id	SepalLengthCm	SepalWidthCm	PetalLengthCm	PetalWidthCm
count	150.000000	150.000000	150.000000	150.000000	150.000000
mean	75.500000	5.843333	3.054000	3.758667	1.198667
std	43.445368	0.828066	0.433594	1.764420	0.763161
min	1.000000	4.300000	2.000000	1.000000	0.100000
25%	38.250000	5.100000	2.800000	1.600000	0.300000
50%	75.500000	5.800000	3.000000	4.350000	1.300000
75%	112.750000	6.400000	3.300000	5.100000	1.800000
max	150.000000	7.900000	4.400000	6.900000	2.500000

Plot the distribution of all numerical features and the categorical target using matplotlib and observe the plots.

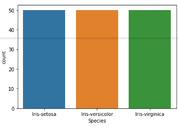
```
[45] numerical = [
         'Id', 'SepalLengthCm', 'SepalWidthCm', 'PetalLengthCm', 'PetalWidthCm']
     categorical = ['Species']

     ds = ds[numerical + categorical]
     ds.shape
```

```
(150, 6)
```

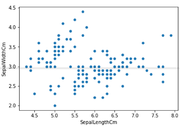
```
import warnings
warnings.filterwarnings("ignore")
```

```
[47] sns.countplot(ds['Species']);
```



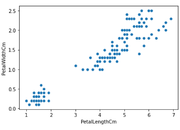
Plot a "feature pair-wise" scatter plot to see how the numerical features are correlated to each other and print out the pairwise correlation coefficients between the numerical features.

```
sns.scatterplot(x=ds['SepalLengthCm'], y=ds['SepalWidthCm']);
```



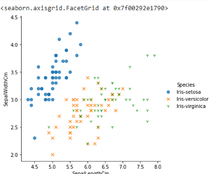

```
[48]
```

```
sns.scatterplot(x=ds['PetalLengthCm'], y=ds['PetalWidthCm']);
```




```
sns.lmplot( x="SepalLengthCm", y="SepalWidthCm", data=ds, fit_reg=False, hue='Species', legend=True, markers=["o", "x", "1"])
```

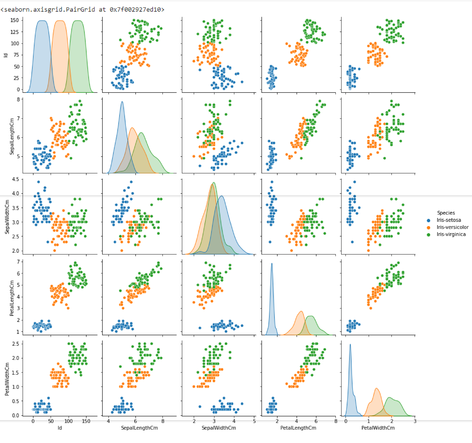
```
<seaborn.axisgrid.FacetGrid at 0x7f00292e1790>
```



Plot a "feature pair-wise" scatter plot to see how the numerical features are correlated to each other.

```
sns.pairplot(ds, hue="Species")
```

```
<seaborn.axisgrid.PairGrid at 0x7f002927ed10>
```



Print out the pairwise correlation coefficients between the numerical features

```
import pandas as pd
import scipy.stats as stats
```

```
[53] ds = pd.read_csv('Iris.csv')
```

```
corr = np.corrcoef(ds['SepalLengthCm'], ds['SepalWidthCm'])
print(corr)
```

```
[[ 1.         -0.10936925]
 [-0.10936925  1.        ]]
```

```
[55] corr = np.corrcoef(ds['PetalLengthCm'], ds['PetalLengthCm'])
     print(corr)
```

```
[[1. 1.]
 [1. 1.]]
```

```
[59] r = stats.pearsonr(ds['SepalLengthCm'], ds['SepalWidthCm'])
     print(r)
     print(r[0])

     (-0.10936924995064937, 0.1827652152713699)
     Correlation Coefficient= -0.10936924995064937
```

```
[60] r = stats.pearsonr(ds['PetalLengthCm'], ds['PetalLengthCm'])
     print(r)
     print(r[0])
```

```
[60] (1.0, 0.0)
     1.0
```