Group A

Assignment No: 10

Title of the Assignment: Download the Iris flower dataset or any other dataset into a DataFrame. (e.g.,https://archive.ics.uci.edu/ml/datasets/Iris). Scan the dataset and give the inference as:
1. List down the features and their types (e.g., numeric, nominal) available in the dataset.
2. Create a histogram for each feature in the dataset to illustrate the feature distributions.
3. Create a boxplot for each feature in the dataset.
4. Compare distributions and identify outliers.

Download the Iris flower dataset or any other dataset into a DataFrame. (e.g., https://archive.ics.uci.edu/ml/datasets/Iris (https://archive.ics.uci.edu/ml/datasets/Iris)).

In [1]:

```
import pandas as pd
import numpy as np
csv_url = 'https://archive.ics.uci.edu/ml/machine-learning-databases/iris/iris.data'
col_names = ['Sepal_Length','Sepal_Width','Petal_Length','Petal_Width','Species']
```

In [2]:

```
iris = pd.read_csv(csv_url, names = col_names)
```

Q1. How many features are there and what are their types?

In [3]:

```
column = len(list(iris))
column
```

Out[3]:

```
5
```

Clearly, dataset has 5 column indicating 5 features about the data

In [4]:

```
iris.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 150 entries, 0 to 149
Data columns (total 5 columns):
 #   Column         Non-Null Count  Dtype  
---  ------         --------------  -----  
 0   Sepal_Length   150 non-null    float64
 1   Sepal_Width    150 non-null    float64
 2   Petal_Length   150 non-null    float64
 3   Petal_Width    150 non-null    float64
 4   Species        150 non-null    object 
dtypes: float64(4), object(1)
memory usage: 6.0+ KB
```

Hence the dataset contains 4 numerical columns and 1 object column

In [6]:

```
np.unique(iris["Species"])
```

Out[6]:

```
array(['Iris-setosa', 'Iris-versicolor', 'Iris-virginica'], dtype=object)
```

Q2. Compute and display summary statistics for each feature available in the dataset.

In [13]:

```
iris.describe()
```

Out[13]:

```
       Sepal_Length Sepal_Width  Petal_Length   Petal_Width
count    150.000000  150.000000    150.000000    150.000000
 mean      5.843333    3.054000      3.758667      1.198667
  std      0.828066    0.433594      1.764420      0.763161
  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
```

Q3. Data Visualization-Create a histogram for each feature in the dataset to illustrate the feature distributions Plot each histogram

Solution 1:

In [8]:

```
import seaborn as sns
import matplotlib
import matplotlib.pyplot as plt
%matplotlib inline
```

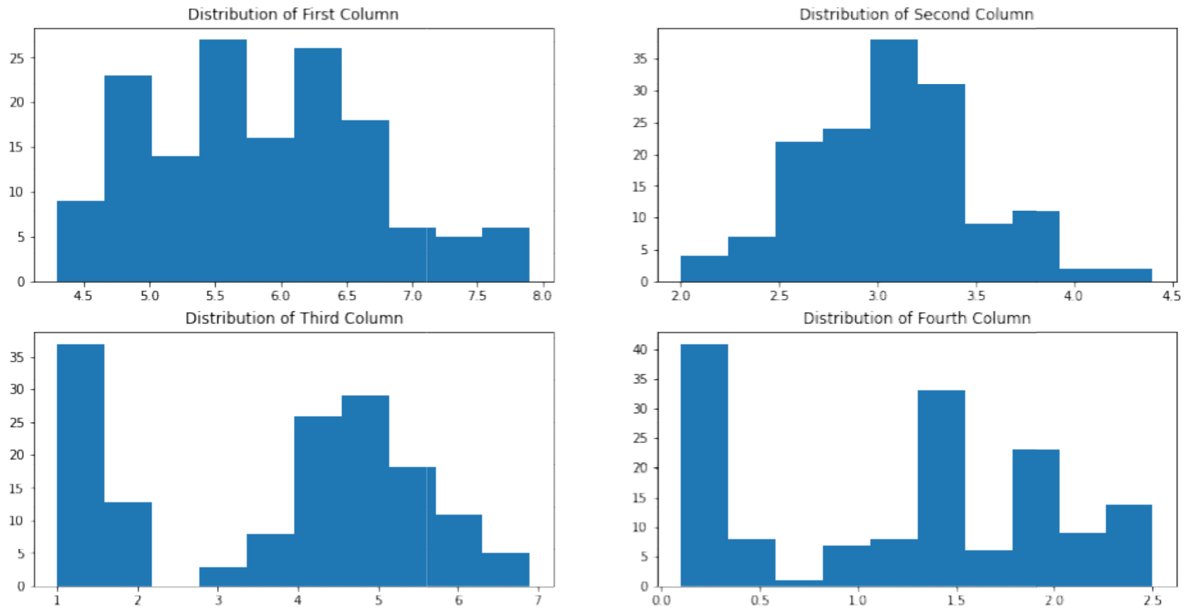
```
fig, axes = plt.subplots(2, 2, figsize = (16, 8))


axes[0,0].set_title("Distribution of First Column")
axes[0,0].hist(iris["Sepal_Length"]);

axes[0,1].set_title("Distribution of Second Column")
axes[0,1].hist(iris["Sepal_Width"]);

axes[1,0].set_title("Distribution of Third Column")
axes[1,0].hist(iris["Petal_Length"]);

axes[1,1].set_title("Distribution of Fourth Column")
axes[1,1].hist(iris["Petal_Width"]);
```

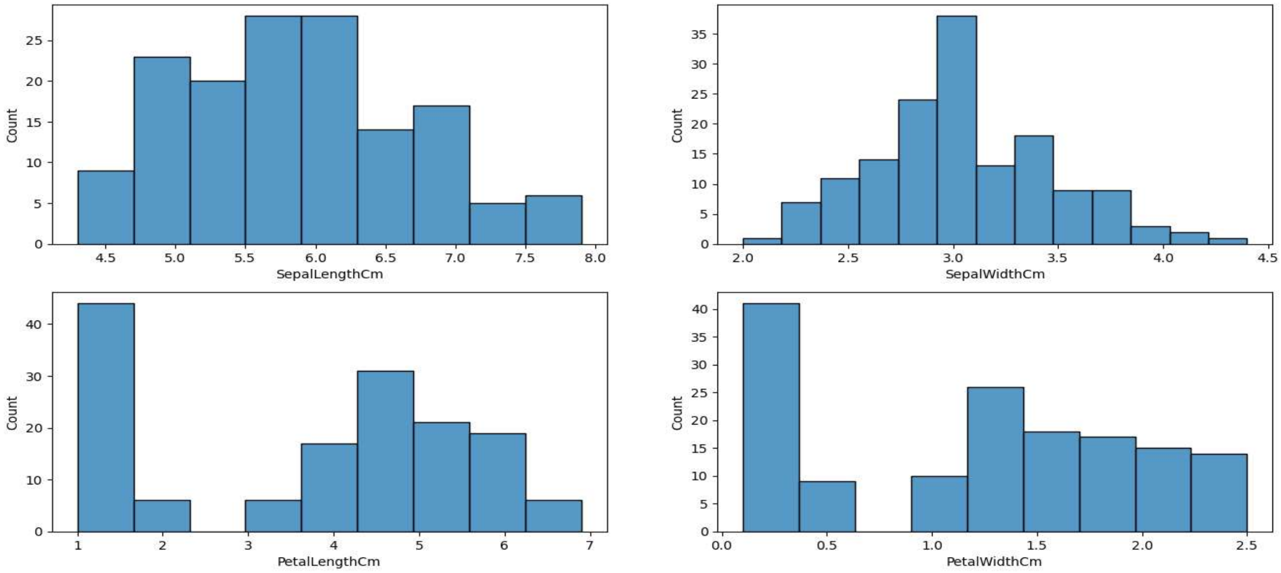


OR

Solution 2:

```
import matplotlib.pyplot as plt

fig, axes = plt.subplots(2, 2, figsize = (16, 8))
sns.histplot (iris['SepalLengthCm'], ax = axes[0,0])
sns.histplot (iris['SepalWidthCm'], ax = axes[0,1])
sns.histplot (iris['PetalLengthCm'], ax = axes[1,0])
sns.histplot (iris['PetalWidthCm'], ax = axes[1,1])
```



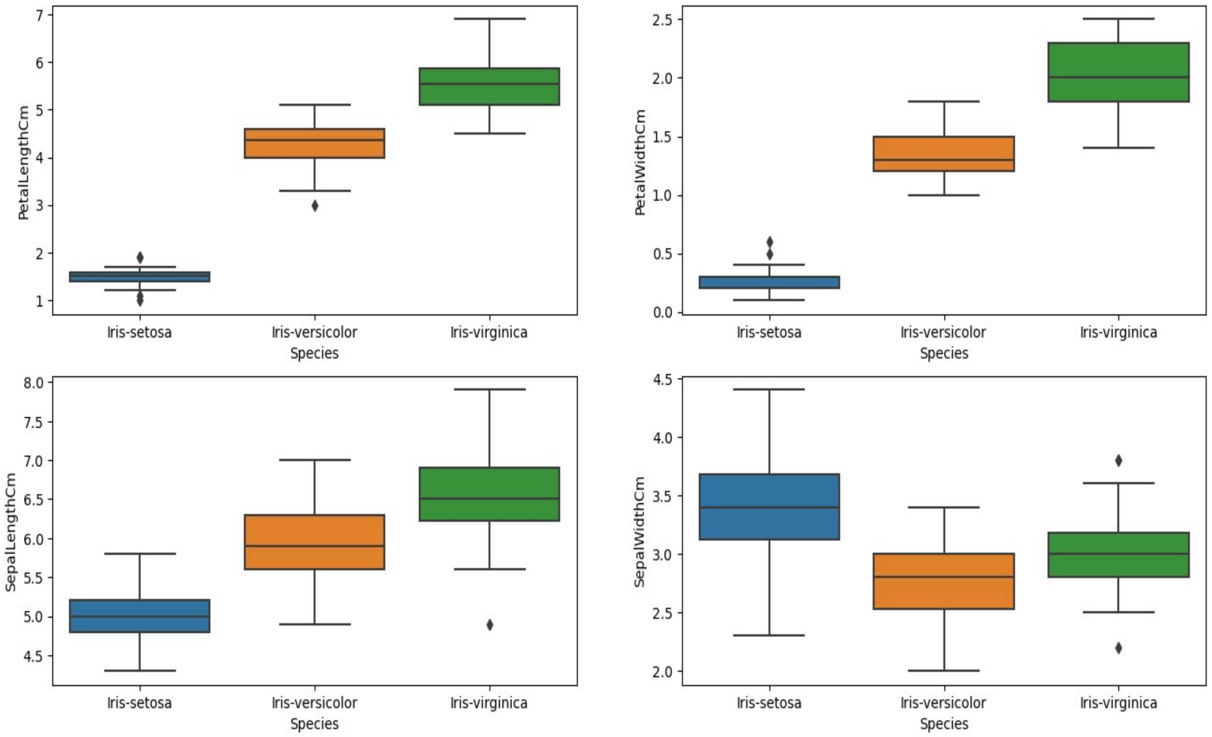
Q4. Create a boxplot for each feature in the dataset. All of the boxplots should be combined into a single plot. Compare distributions and identify outliers.

```
In [12]:
```

```
import matplotlib.pyplot as plt

fig, axes = plt.subplots(2, 2, figsize = (16, 8))
sns.boxplot(y='PetalLengthCm', x='Species', data = iris,ax = axes[0,0])
sns.boxplot(y='PetalWidthCm', x='Species', data = iris,ax = axes[0,1])
sns.boxplot(y='SepalLengthCm', x='Species', data = iris,ax = axes[1,0])
sns.boxplot(y='SepalWidthCm', x='Species', data = iris,ax = axes[1,1])
```

```
Out[8]:
<AxesSubplot:xlabel='Species', ylabel=SepalWidthCm'>
```



If we observe closely for the box 2, interquartile distance is roughly around 0.75 hence the values lying beyond this range of (third quartile + interquartile distance) i.e. roughly around 4.05 will be considered as outliers.

Similarly outliers with other boxplots can be found.