IRIS DATASET VISUALIZATION(SEABORN,MATPLOTLIB)

Import the libraries

In [1]:
```
import numpy as np # linear algebra
import pandas as pd
import seaborn as sns
import matplotlib.pyplot as plt
#plt.style.use('fivethirtyeight')
import warnings
warnings.filterwarnings('ignore')  #this will ignore the warnings.it wont display warnings in notebook
```

Import the dataset

In [2]:
```
iris=pd.read_csv(r'C:\Users\ADMIN\Desktop\DATA SCIENCE NOTES\NOVEMBER MONTH\27TH NOV\25th, 26th- Advanced EDA project
```

In [3]:
```
iris
```

Out[3]:

	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
...	...	...	...	...	...	...
145	146	6.7	3.0	5.2	2.3	Iris-virginica
146	147	6.3	2.5	5.0	1.9	Iris-virginica
147	148	6.5	3.0	5.2	2.0	Iris-virginica
148	149	6.2	3.4	5.4	2.3	Iris-virginica
149	150	5.9	3.0	5.1	1.8	Iris-virginica

150 rows × 6 columns

Displaying the data

In [4]:
```
iris.head()
```

Out[4]:

	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

In [5]:
```
iris.drop('Id',axis=1,inplace=True)
```

In [6]:
```
iris.head()
```

Out[6]:

	SepalLengthCm	SepalWidthCm	PetalLengthCm	PetalWidthCm	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

checking if there are any missing values

In [7]:
```
iris.info()
```

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

In [8]:
```
iris['Species'].value_counts()
```

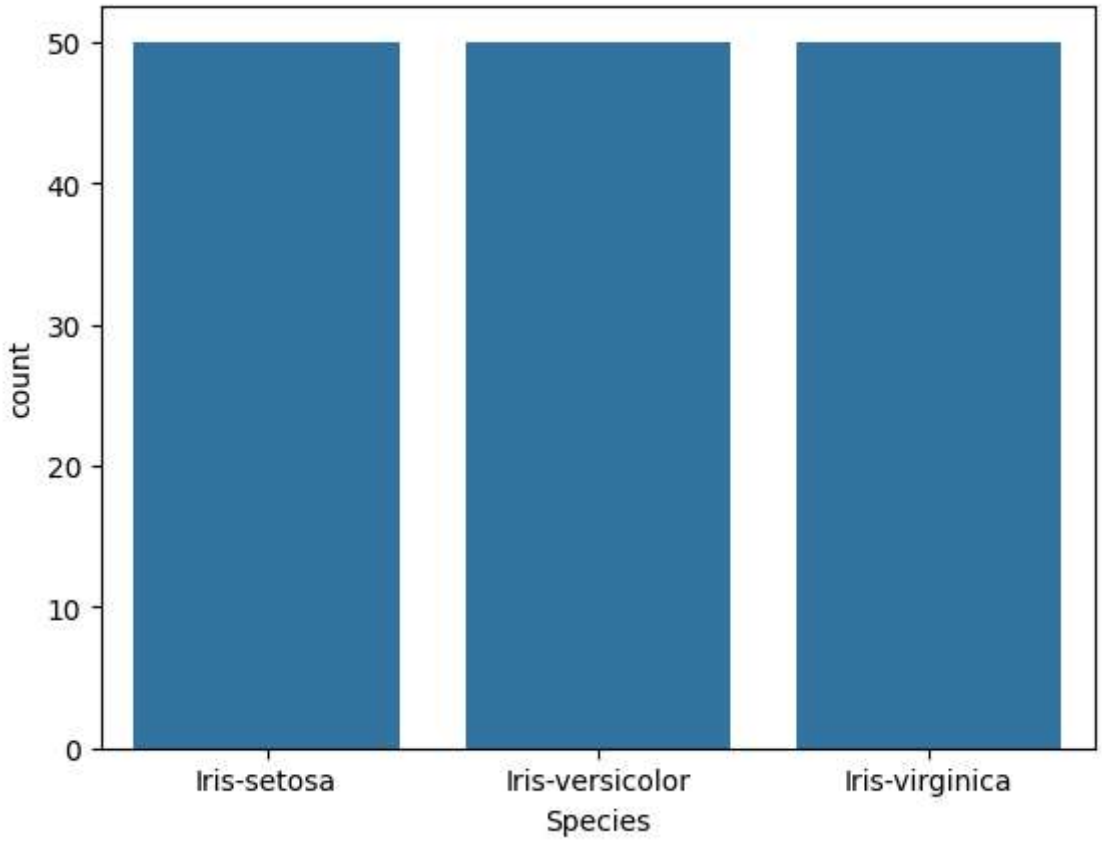
Out[8]:
```
Species
Iris-setosa        50
Iris-versicolor    50
Iris-virginica     50
Name: count, dtype: int64
```

This data set has three varities of Iris plant.

Bar Plot :

- Here the frequency of the observation is plotted.In this case we are plotting the frequency of the three species in the Iris Dataset

In [9]:
```
sns.countplot(x='Species',data=iris)
plt.show()
```



** Joint plot: **

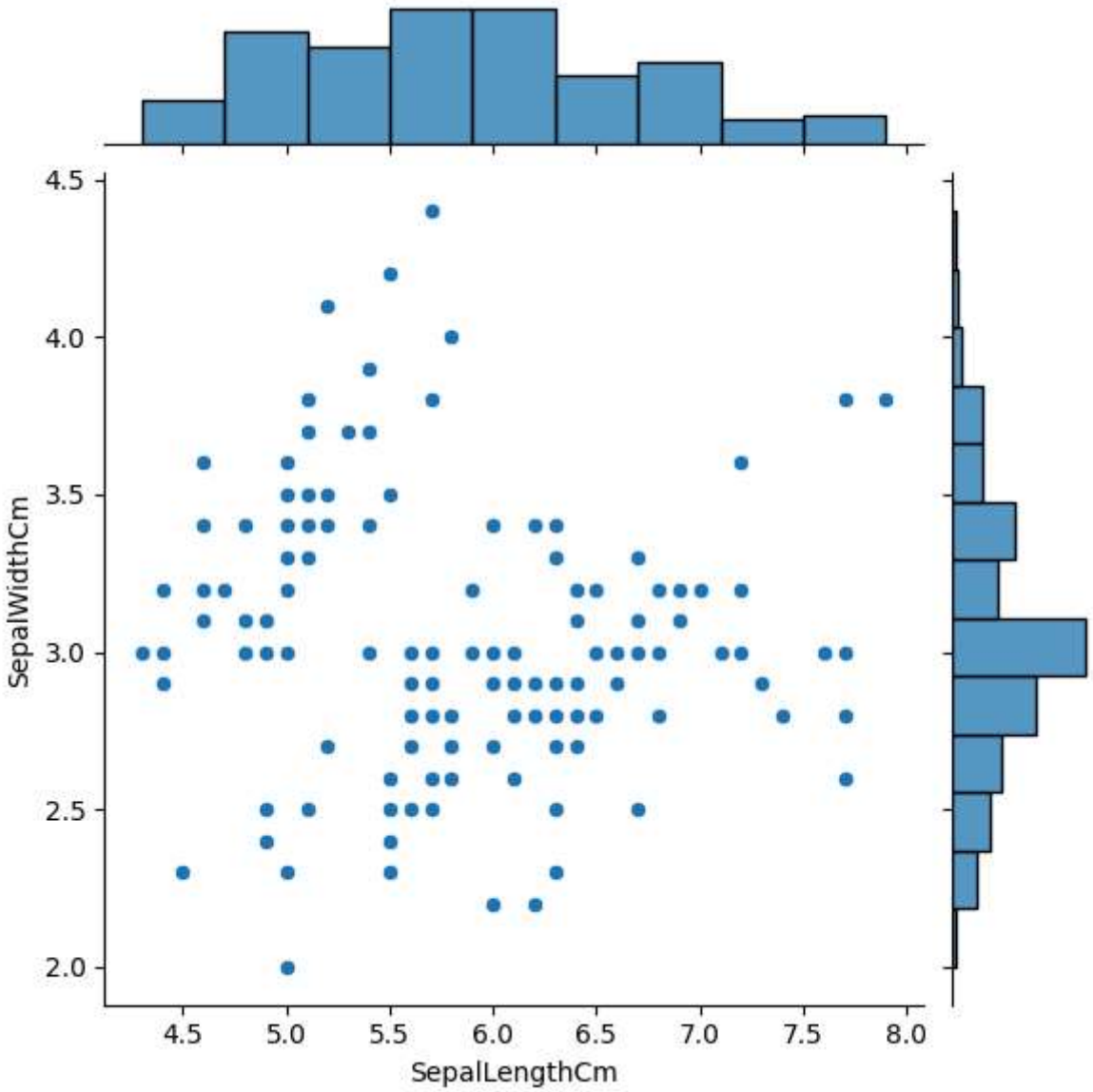
- Jointplot is seaborn library specific and can be used to quickly visualize and analyze the relationship between two variables and describe their individual distributions on the same plot.

In [10]:
```
iris.head()
```

Out[10]:

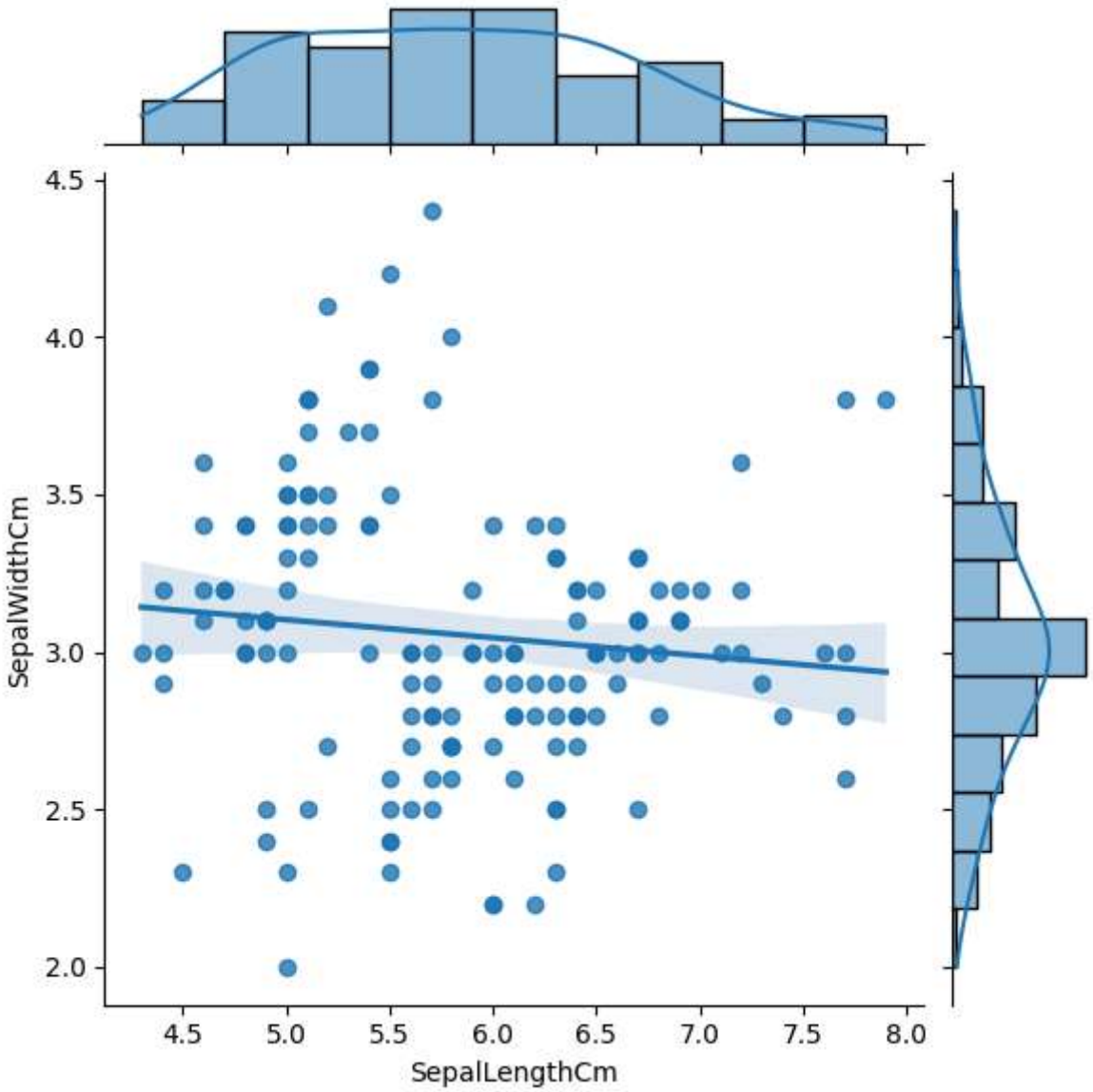
	SepalLengthCm	SepalWidthCm	PetalLengthCm	PetalWidthCm	Species
0	5.1	3.5	1.4	0.2	Iris-setosa
1	4.9	3.0	1.4	0.2	Iris-setosa
2	4.7	3.2	1.3	0.2	Iris-setosa
3	4.6	3.1	1.5	0.2	Iris-setosa
4	5.0	3.6	1.4	0.2	Iris-setosa

In [11]:
```
fig=sns.jointplot(x='SepalLengthCm',y='SepalWidthCm',data=iris)
```

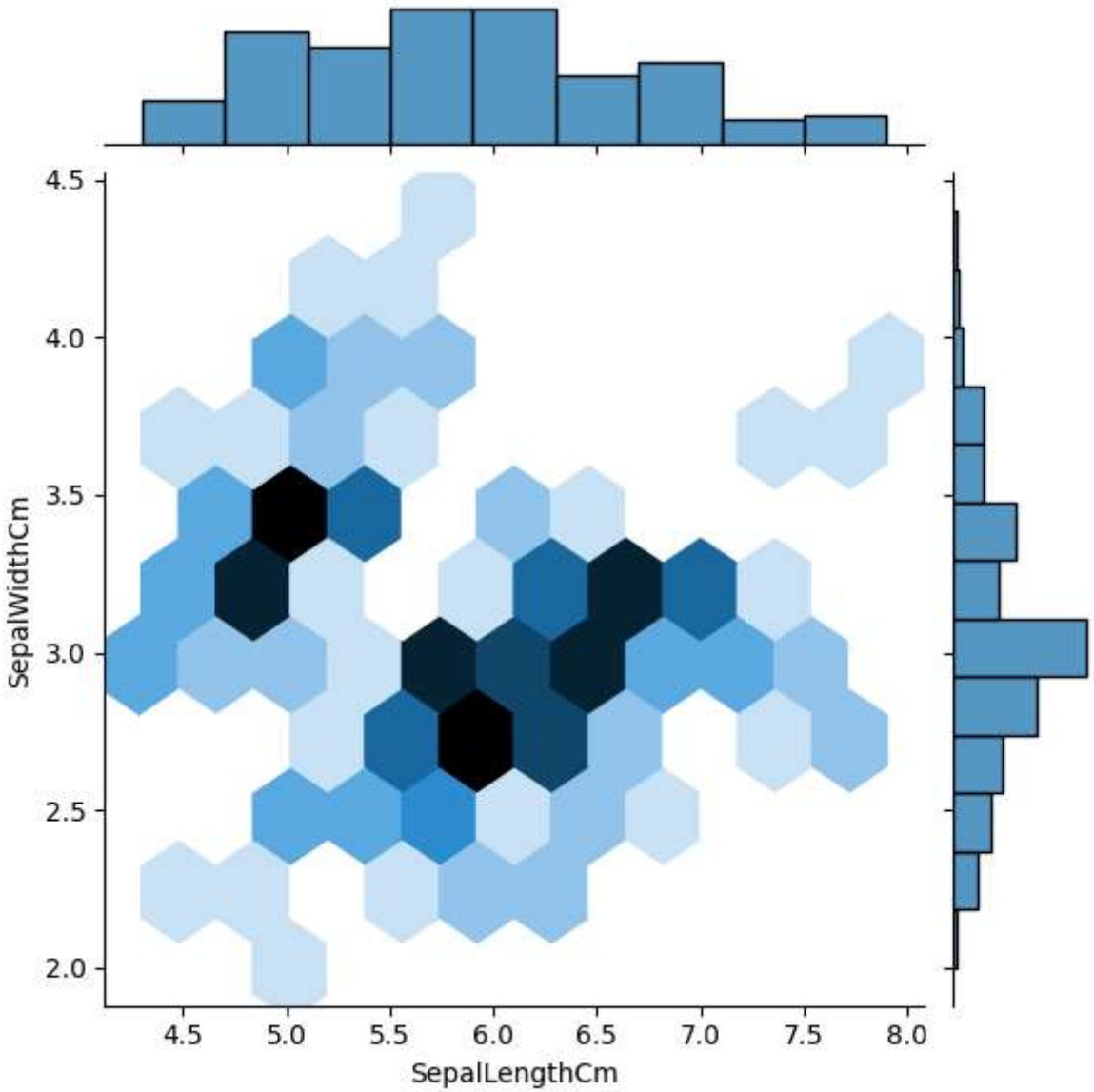


In [12]:
```
sns.jointplot(x="SepalLengthCm", y="SepalWidthCm", data=iris, kind="reg")
```

Out[12]: <seaborn.axisgrid.JointGrid at 0x15e67c0e690>



In [13]:
```
fig=sns.jointplot(x='SepalLengthCm',y='SepalWidthCm',kind='hex',data=iris)
```

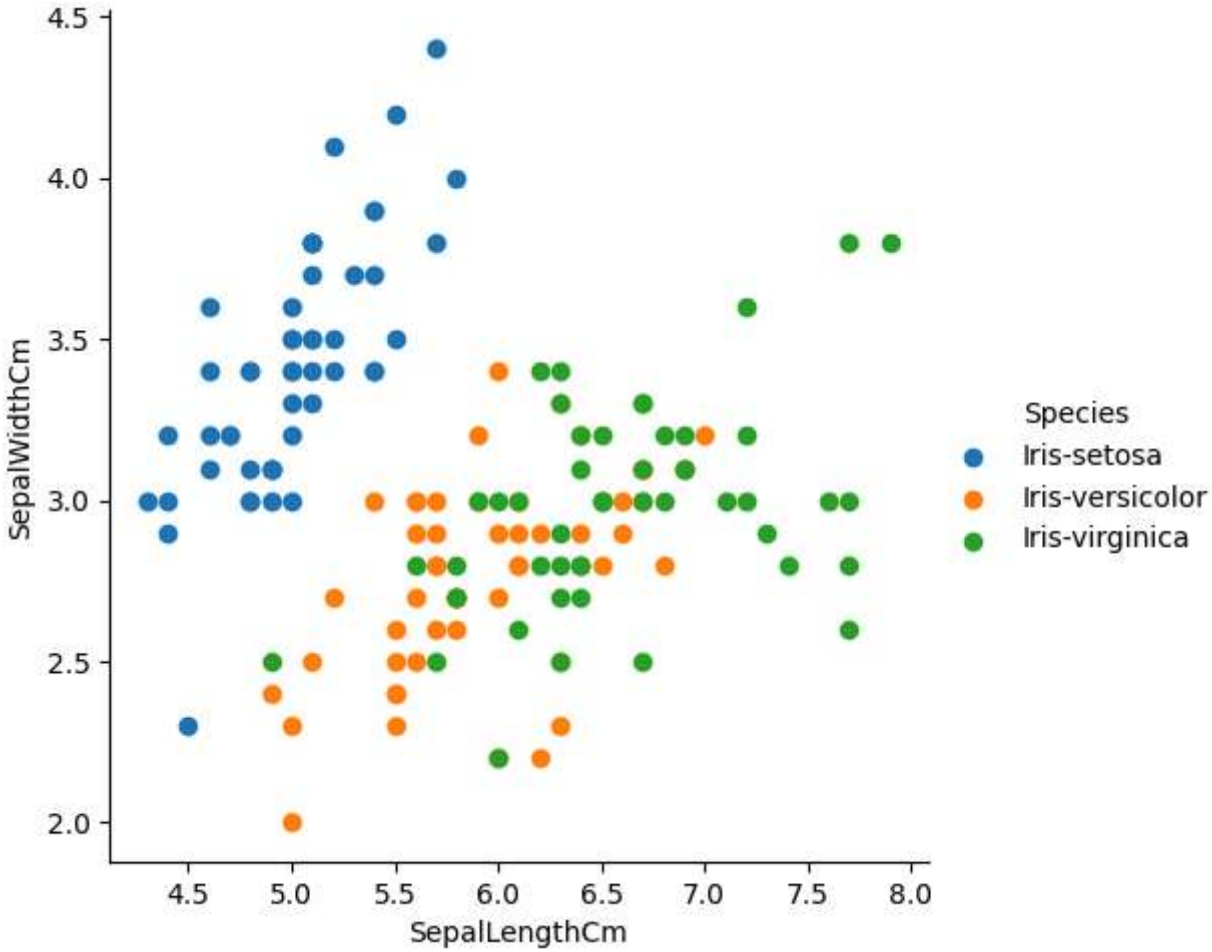


FacetGrid Plot

In [14]:
```
import matplotlib.pyplot as plt
%matplotlib inline
```

```
sns.FacetGrid(data=iris,hue='Species',height=5)\
.map(plt.scatter,'SepalLengthCm','SepalWidthCm')\
.add_legend()
```

Out[14]: <seaborn.axisgrid.FacetGrid at 0x15e67bd3140>



Boxplot or Whisker plot

- Box plot give a statical summary of the features being plotted.Top line represent the max value,top edge of box is third Quartile, middle edge represents the median,bottom edge represents the first quartile value.The bottom most line respresent

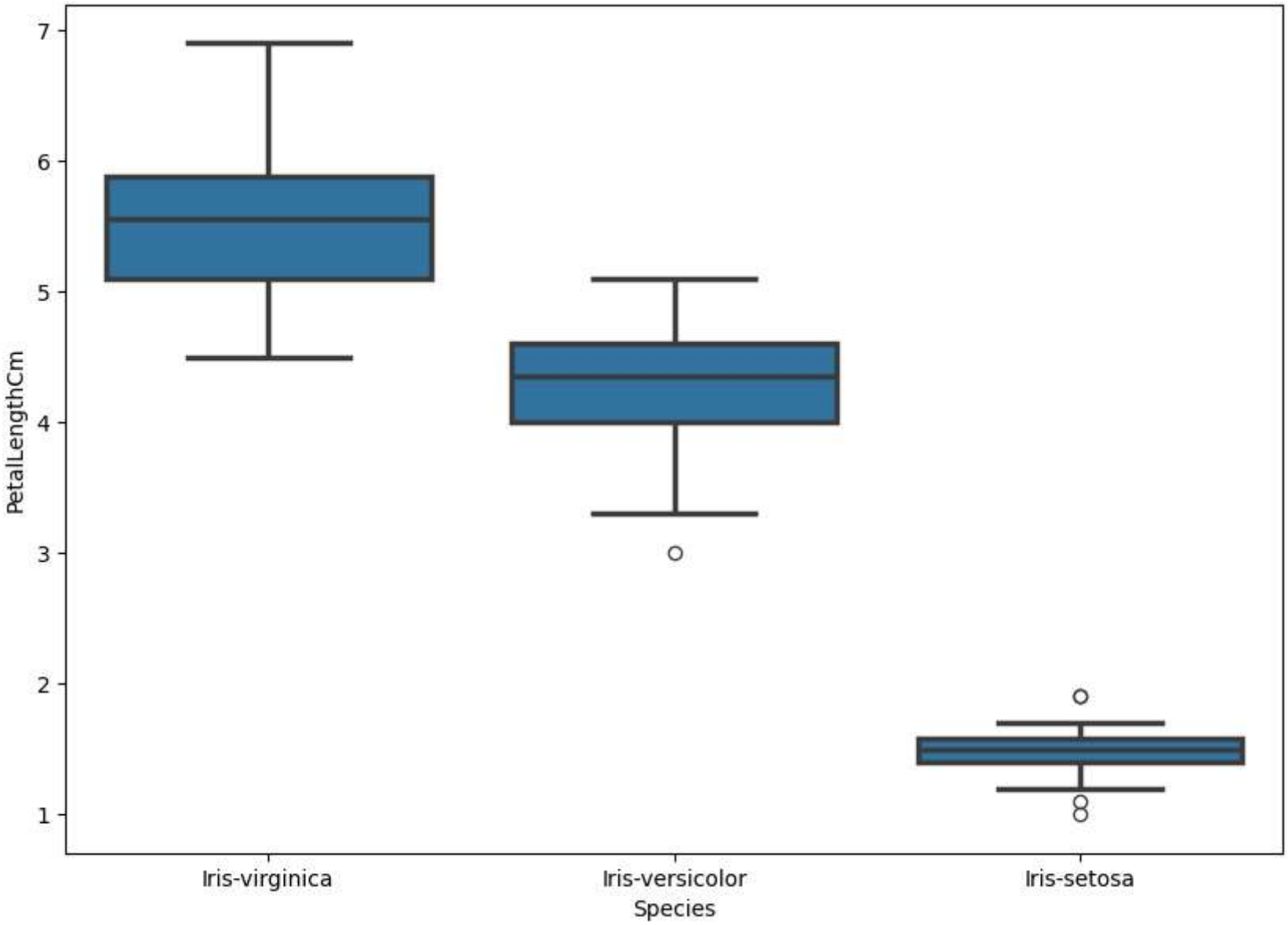
the minimum value of the feature.The height of the box is called as Interquartile range.The black dots on the plot represent the outlier values in the data.

In [15]:
```
iris.head()
```

Out[15]:

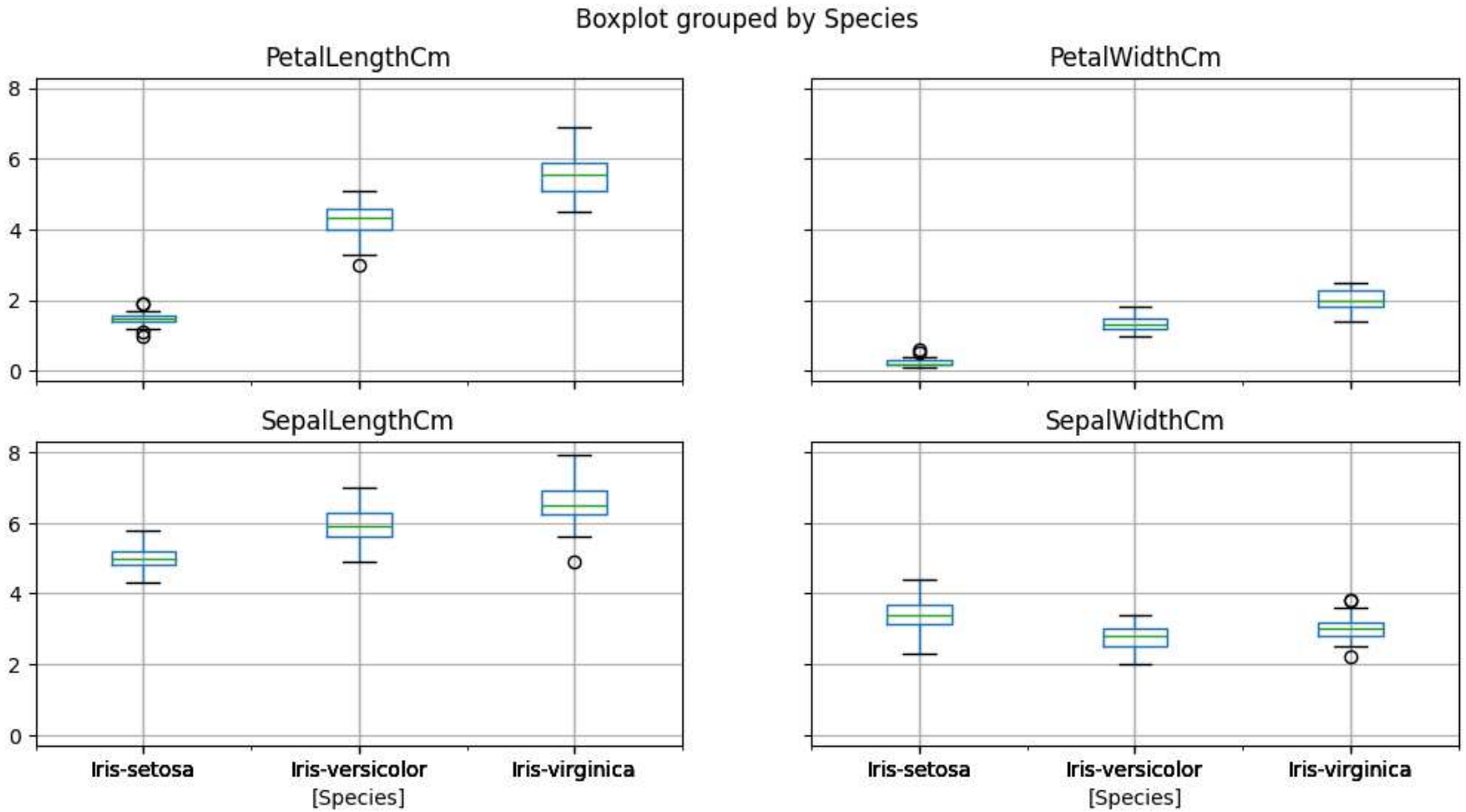
	SepalLengthCm	SepalWidthCm	PetalLengthCm	PetalWidthCm	Species
0	5.1	3.5	1.4	0.2	Iris-setosa
1	4.9	3.0	1.4	0.2	Iris-setosa
2	4.7	3.2	1.3	0.2	Iris-setosa
3	4.6	3.1	1.5	0.2	Iris-setosa
4	5.0	3.6	1.4	0.2	Iris-setosa

In [16]:
```
fig=plt.gcf()
fig.set_size_inches(10,7)
fig=sns.boxplot(x='Species',y='PetalLengthCm',data=iris,order=['Iris-virginica','Iris-versicolor','Iris-setosa'],line
```



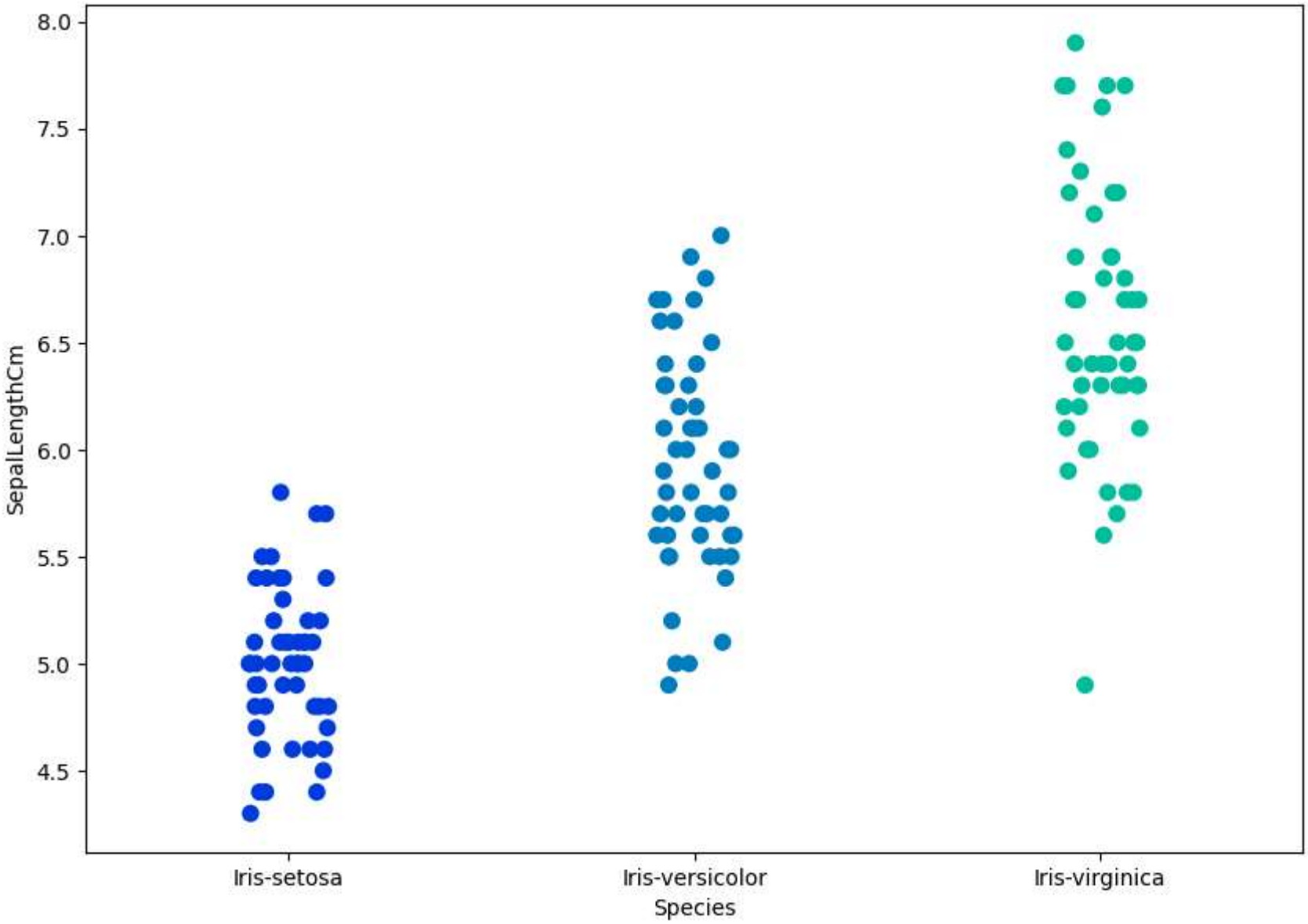
In [17]:
```
#iris.drop("Id", axis=1).boxplot(by="Species", figsize=(12, 6))
iris.boxplot(by="Species", figsize=(12, 6))
```

Out[17]:
```
array([[<Axes: title={'center': 'PetalLengthCm'}, xlabel='[Species]'>,
        <Axes: title={'center': 'PetalWidthCm'}, xlabel='[Species]'>],
       [<Axes: title={'center': 'SepalLengthCm'}, xlabel='[Species]'>,
        <Axes: title={'center': 'SepalWidthCm'}, xlabel='[Species]'>]],
      dtype=object)
```



Strip plot

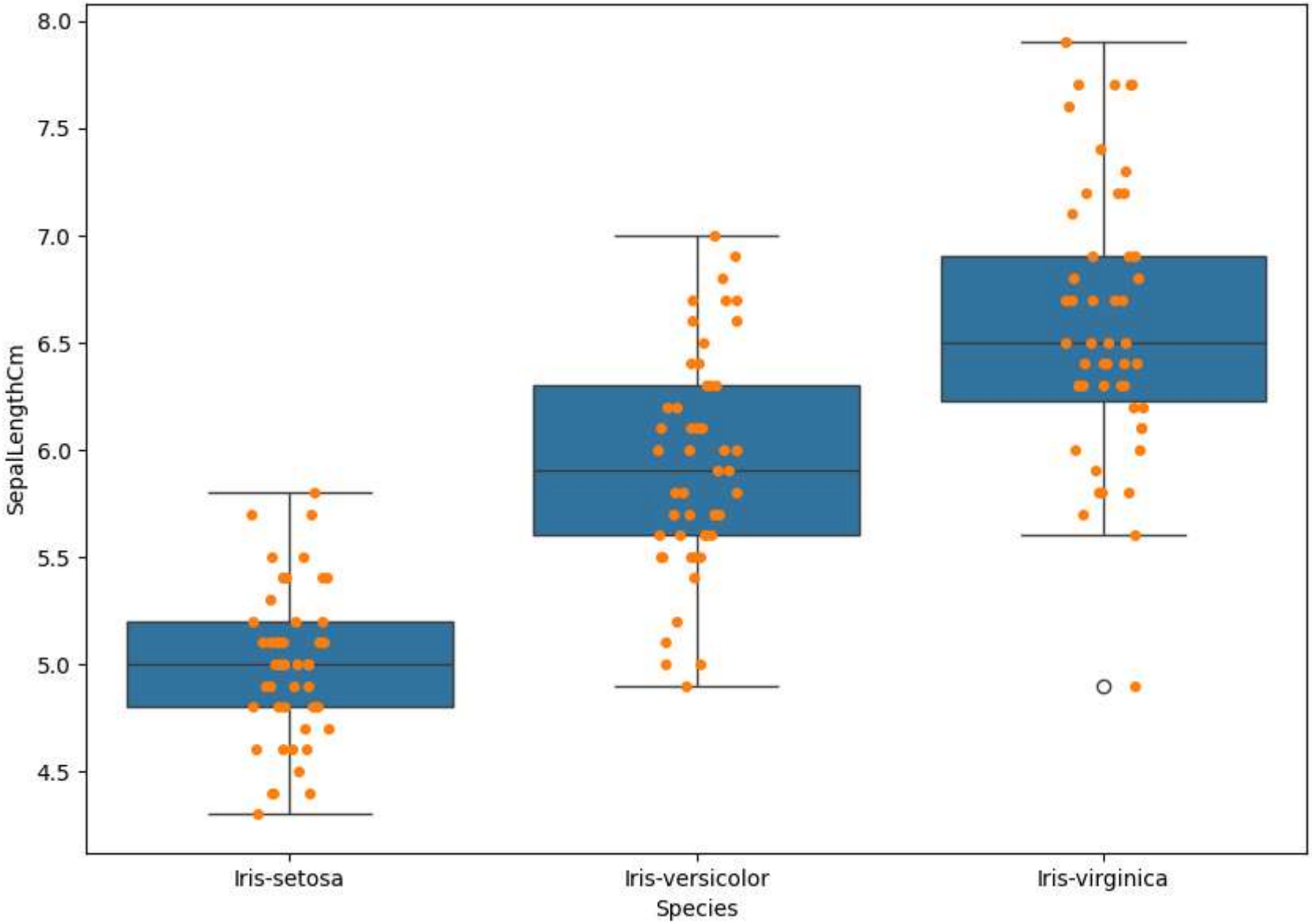
In [18]:
```
fig=plt.gcf()
fig.set_size_inches(10,7)
fig=sns.stripplot(x='Species',y='SepalLengthCm',data=iris,jitter=True,edgecolor='gray',size=8,palette='winter',orient
```



combining Box and Strip Plots

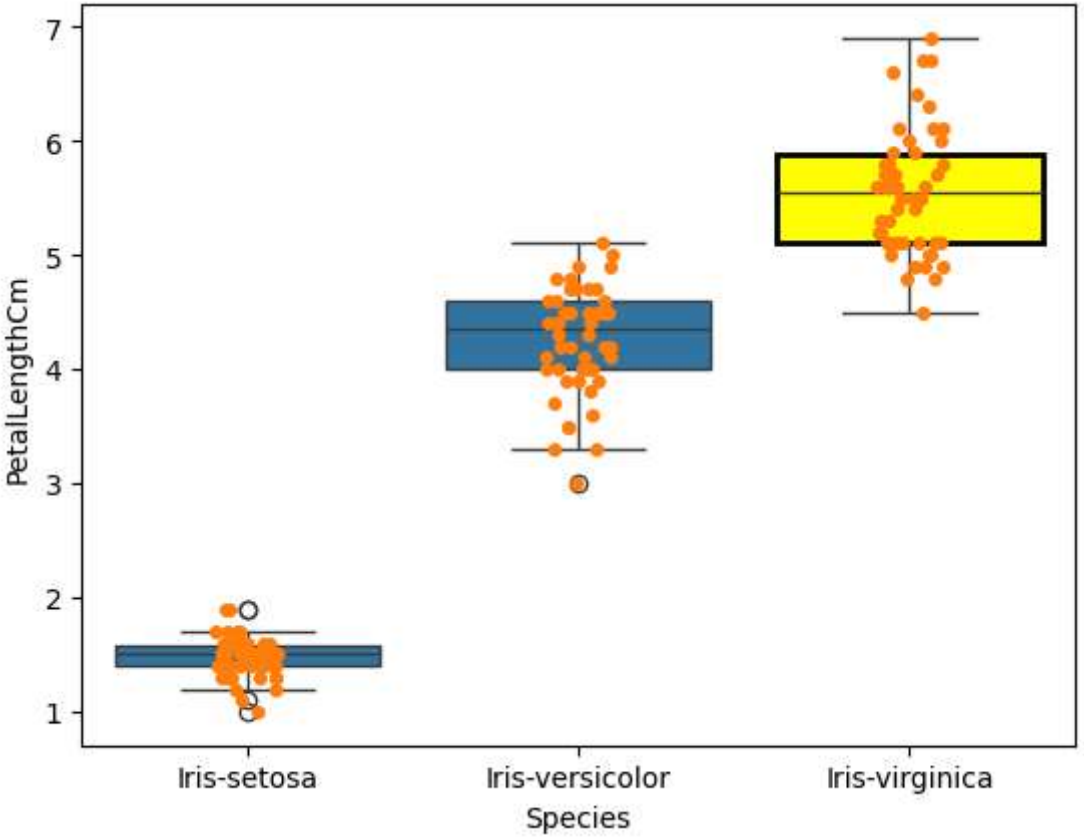
In [19]:
```
fig=plt.gcf()
fig.set_size_inches(10,7)
```

```
fig=sns.boxplot(x='Species',y='SepalLengthCm',data=iris)
fig=sns.stripplot(x='Species',y='SepalLengthCm',data=iris,jitter=True,edgecolor='gray')
```



In [20]:
```
import seaborn as sns
import matplotlib.pyplot as plt
```

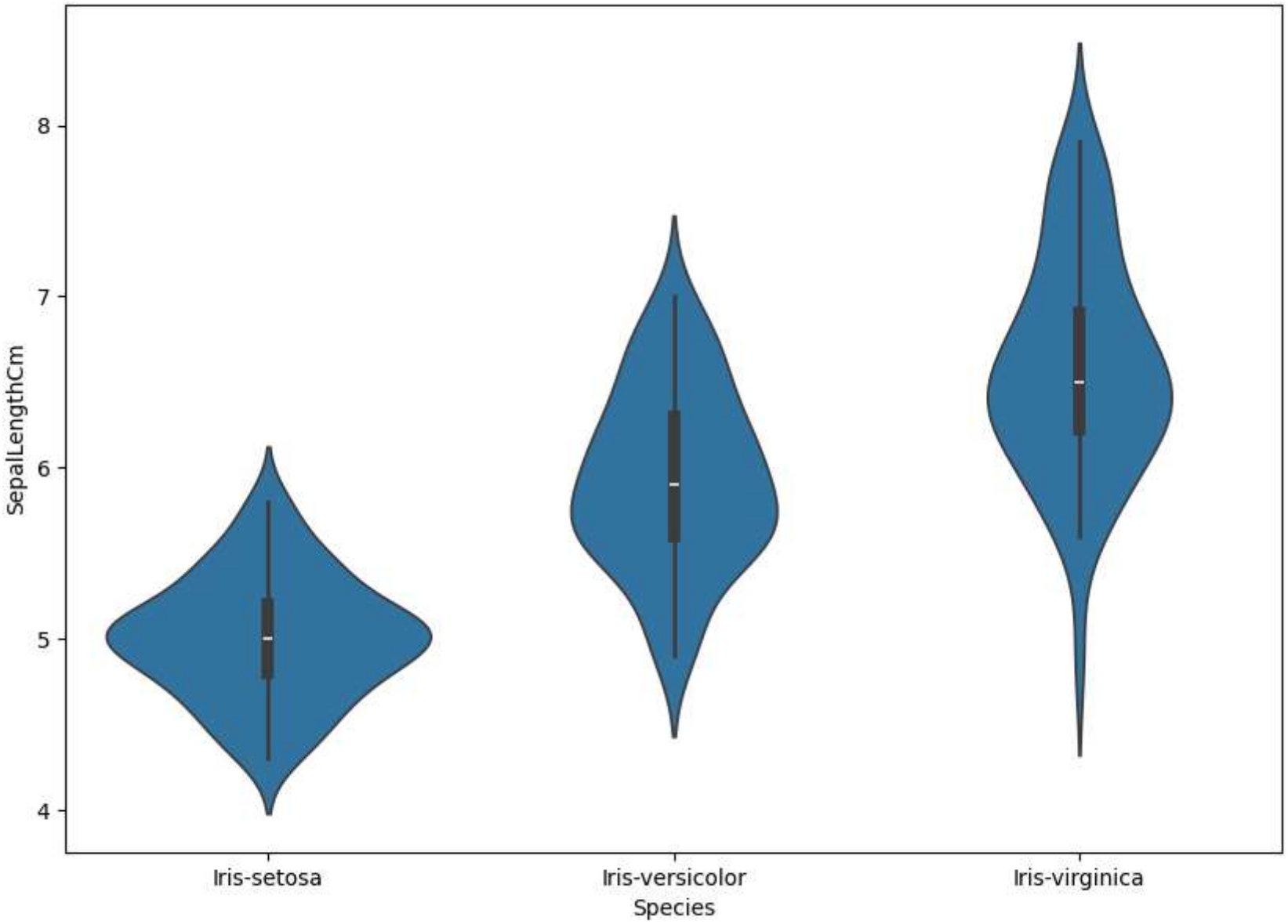
```
ax = sns.boxplot(x="Species", y="PetalLengthCm", data=iris)
ax = sns.stripplot(x="Species", y="PetalLengthCm", data=iris, jitter=True, edgecolor="gray")

# Change box color
boxes = ax.patches  # box objects

# Example: change the 3rd box color (index 2)
boxes[2].set_facecolor('yellow')
boxes[2].set_edgecolor('black')
boxes[2].set_linewidth(2)

plt.show()
```



Violin Plot

- It is used to visualize the distribution of data and its probability distribution.This chart is a combination of a Box Plot and a Density Plot that is rotated and placed on each side, to show the distribution shape of the data. The thick black bar in the centre represents the interquartile range, the thin black line extended from it represents the 95% confidence intervals, and the white dot is the median.Box Plots are limited in their display of the data, as their visual simplicity tends to hide significant details about how values in the data are distributed

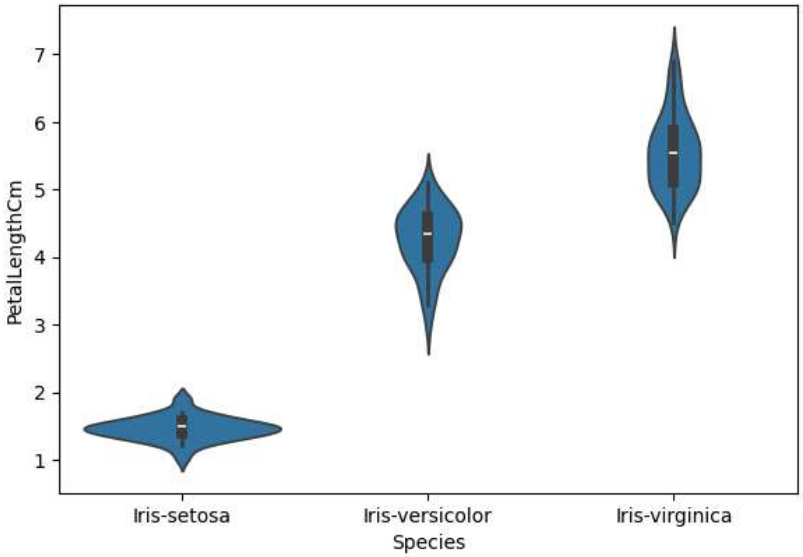
In [21]:
```
fig=plt.gcf()
fig.set_size_inches(10,7)
fig=sns.violinplot(x='Species',y='SepalLengthCm',data=iris)
```

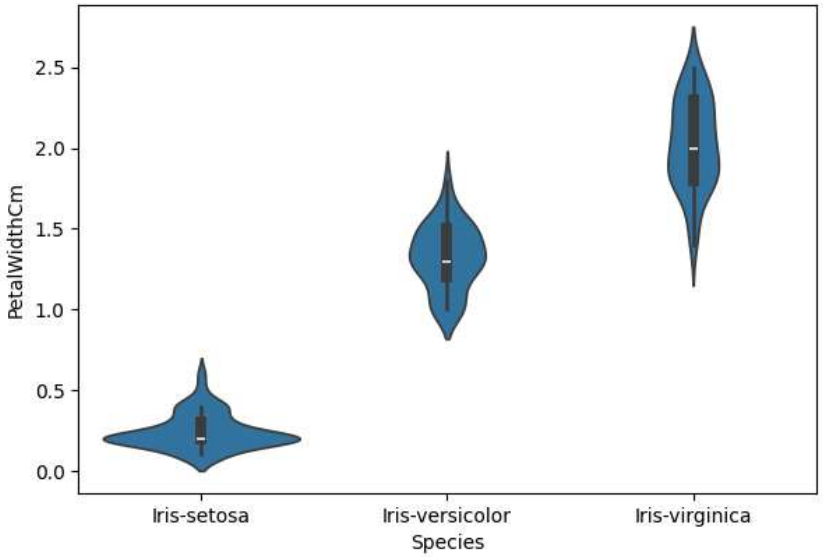


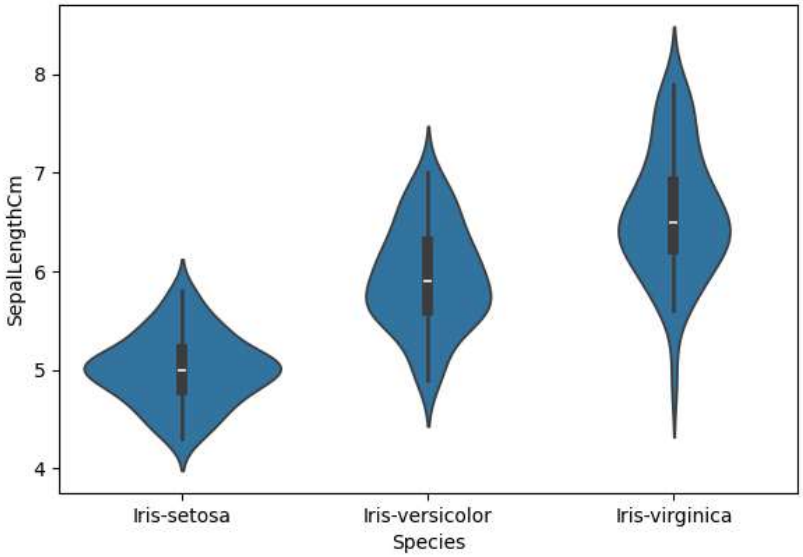
In [22]:
```
plt.figure(figsize=(15,10))
plt.subplot(2,2,1)
sns.violinplot(x='Species',y='PetalLengthCm',data=iris)
plt.subplot(2,2,2)
sns.violinplot(x='Species',y='PetalWidthCm',data=iris)
```

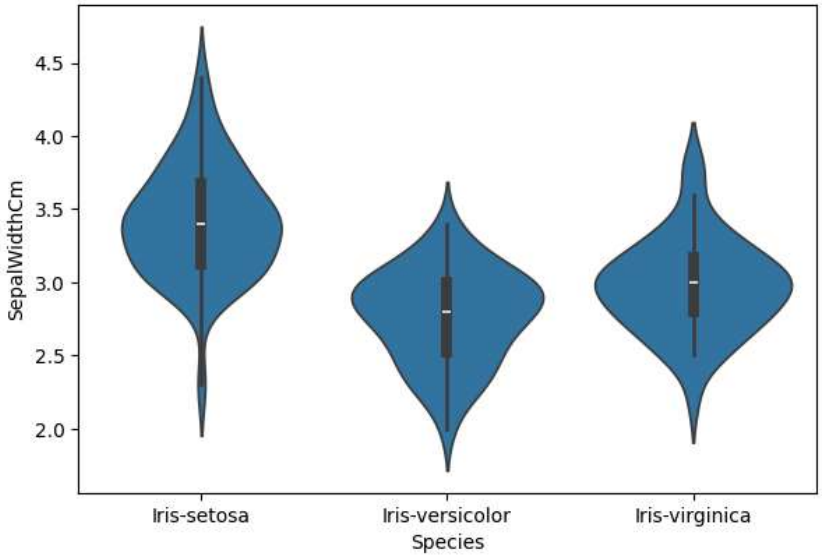
```
plt.subplot(2,2,3)
sns.violinplot(x='Species',y='SepalLengthCm',data=iris)
plt.subplot(2,2,4)
sns.violinplot(x='Species',y='SepalWidthCm',data=iris)
```

Out[22]: <Axes: xlabel='Species', ylabel='SepalWidthCm'>





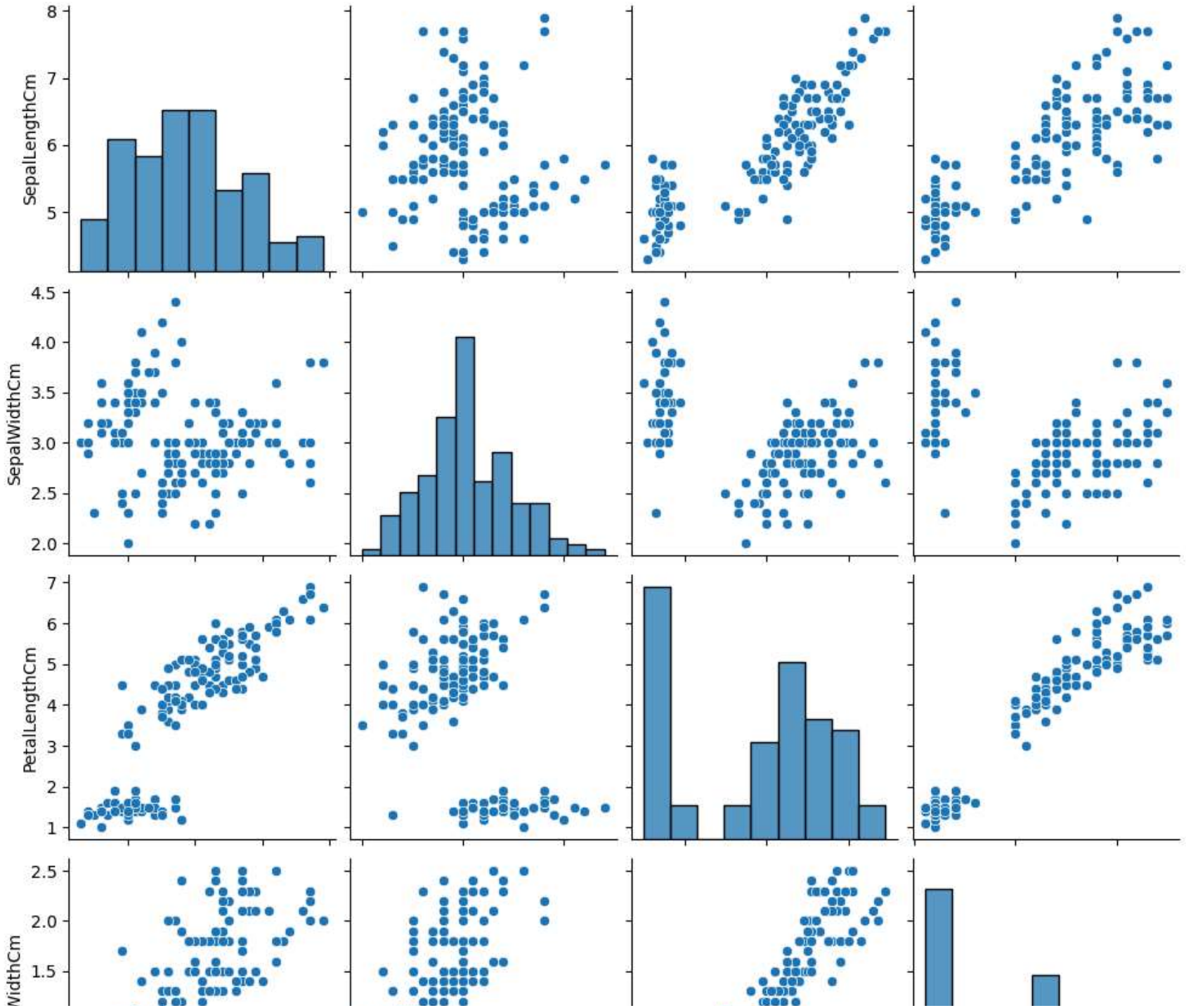


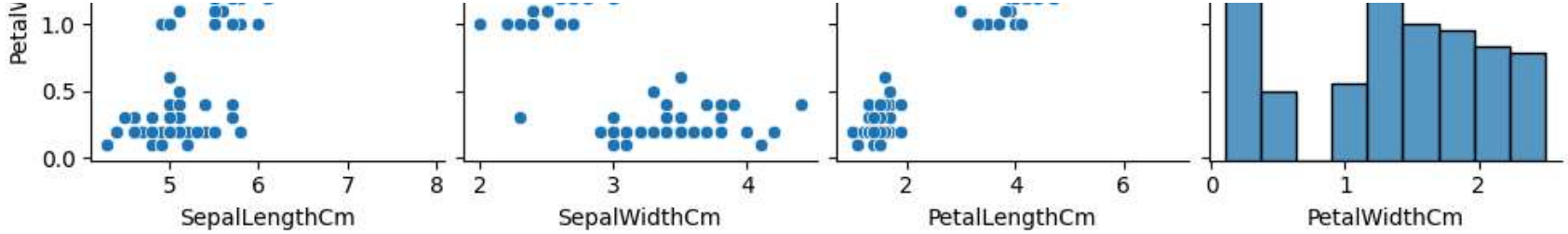


Pair plot

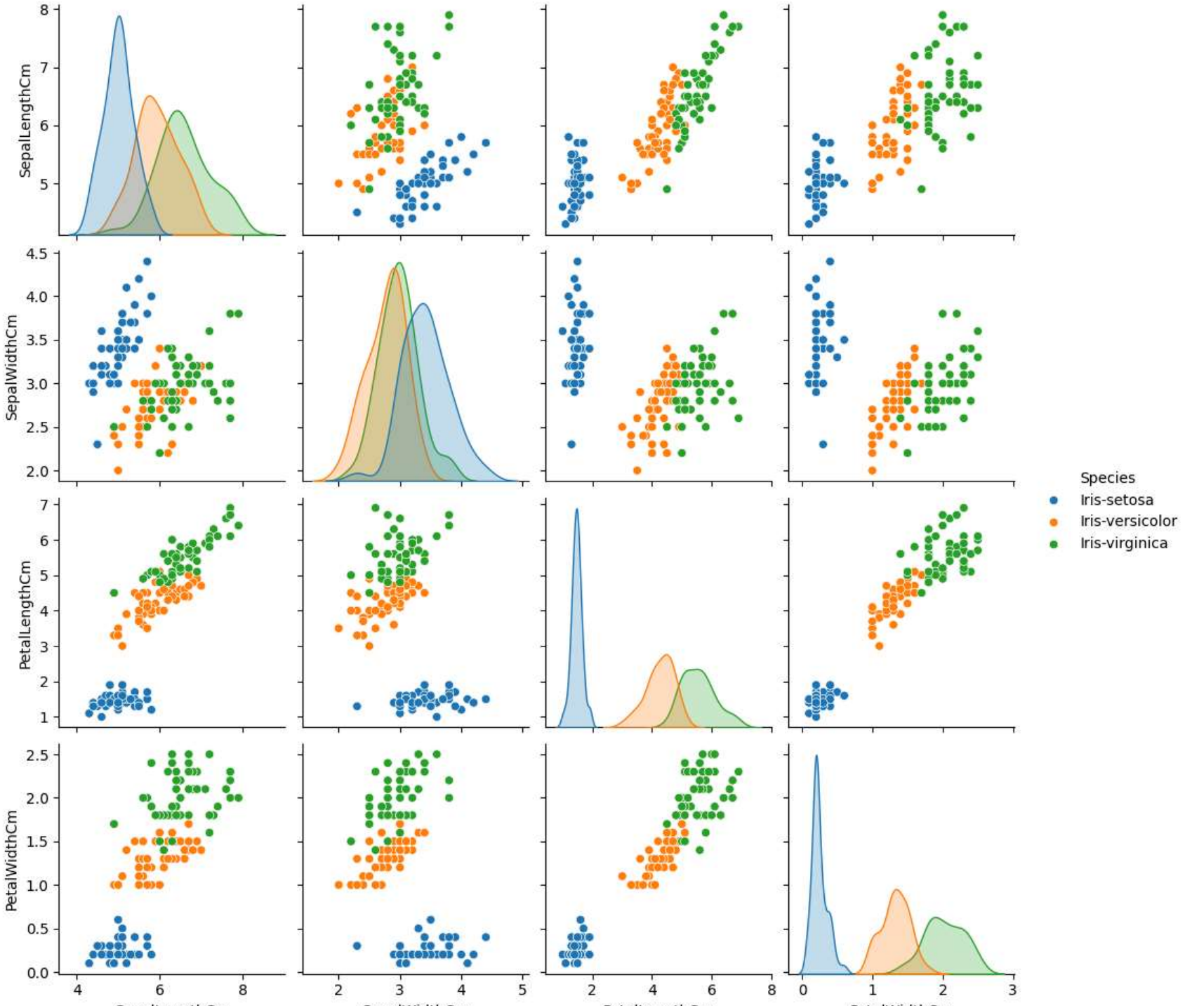
- A “pairs plot” is also known as a scatterplot, in which one variable in the same data row is matched with another variable's value, like this: Pairs plots are just elaborations on this, showing all variables paired with all the other variables.

In [23]:
```
sns.pairplot(data=iris,kind='scatter');
```


SepalLengthCm
SepalWidthCm
PetalLengthCm
WidthCm



In [24]:
```
sns.pairplot(iris,hue='Species');
```

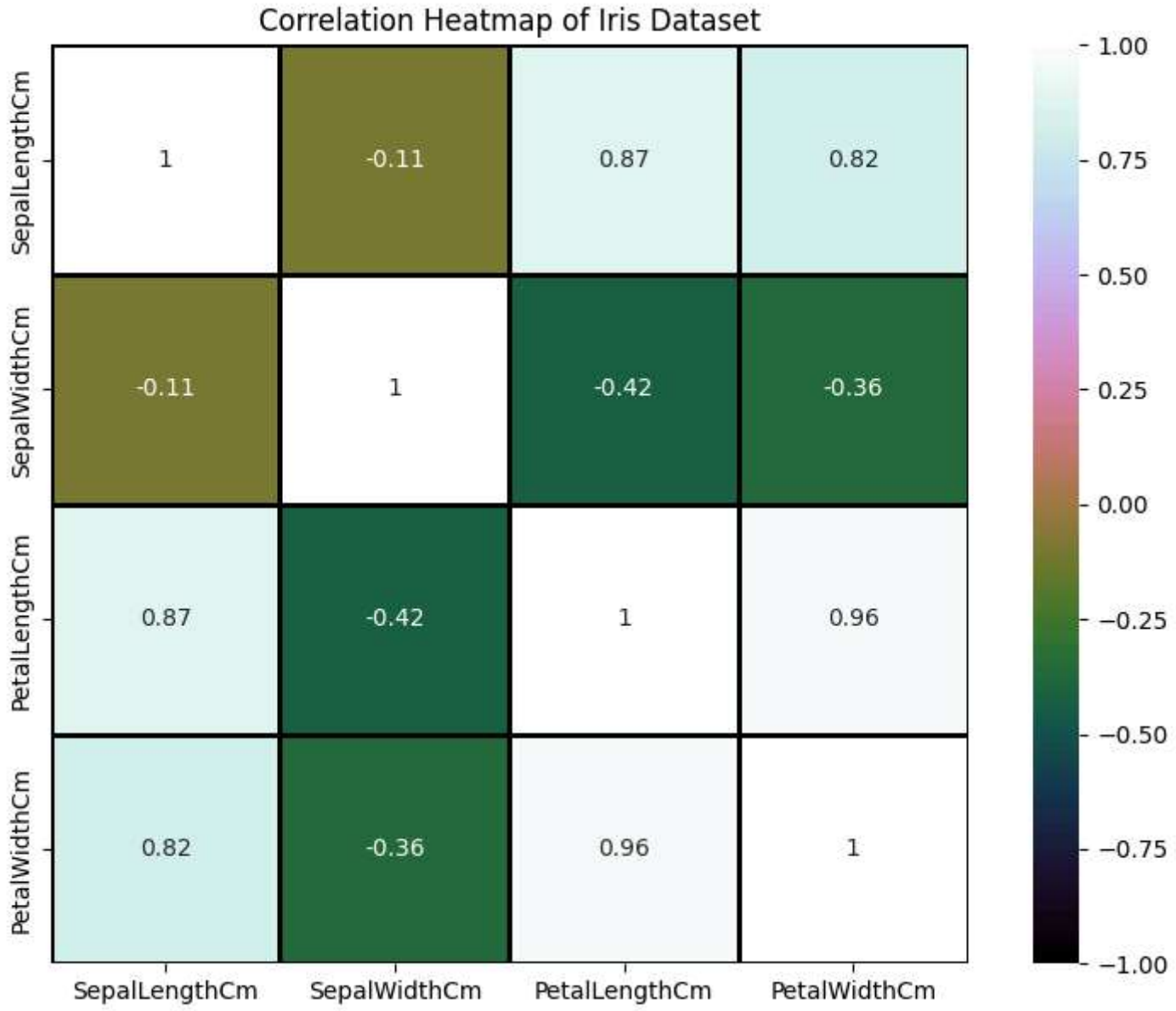

SepalLengthCm
SepalWidthCm
PetalLengthCm
PetalWidthCm
Species
Iris-setosa
Iris-versicolor
Iris-virginica

SepalLengthCm SepalWidthCm PetalLengthCm PetalWidthCm

Heat Map

- Heat map is used to find out the correlation between different features in the dataset.High positive or negative value shows that the features have high correlation.This helps us to select the parmeters for machine learning.

In [25]:
```
import seaborn as sns
import matplotlib.pyplot as plt

fig = plt.gcf()
fig.set_size_inches(10, 7)

numeric_iris = iris.select_dtypes(include=['float64', 'int64'])   # Only numeric columns

sns.heatmap(
    numeric_iris.corr(),
    annot=True,
    cmap='cubehelix',
    linewidths=1,
    linecolor='k',
    square=True,
    vmin=-1,
    vmax=1,
    cbar_kws={"orientation": "vertical"}
)

plt.title("Correlation Heatmap of Iris Dataset")
plt.show()
```

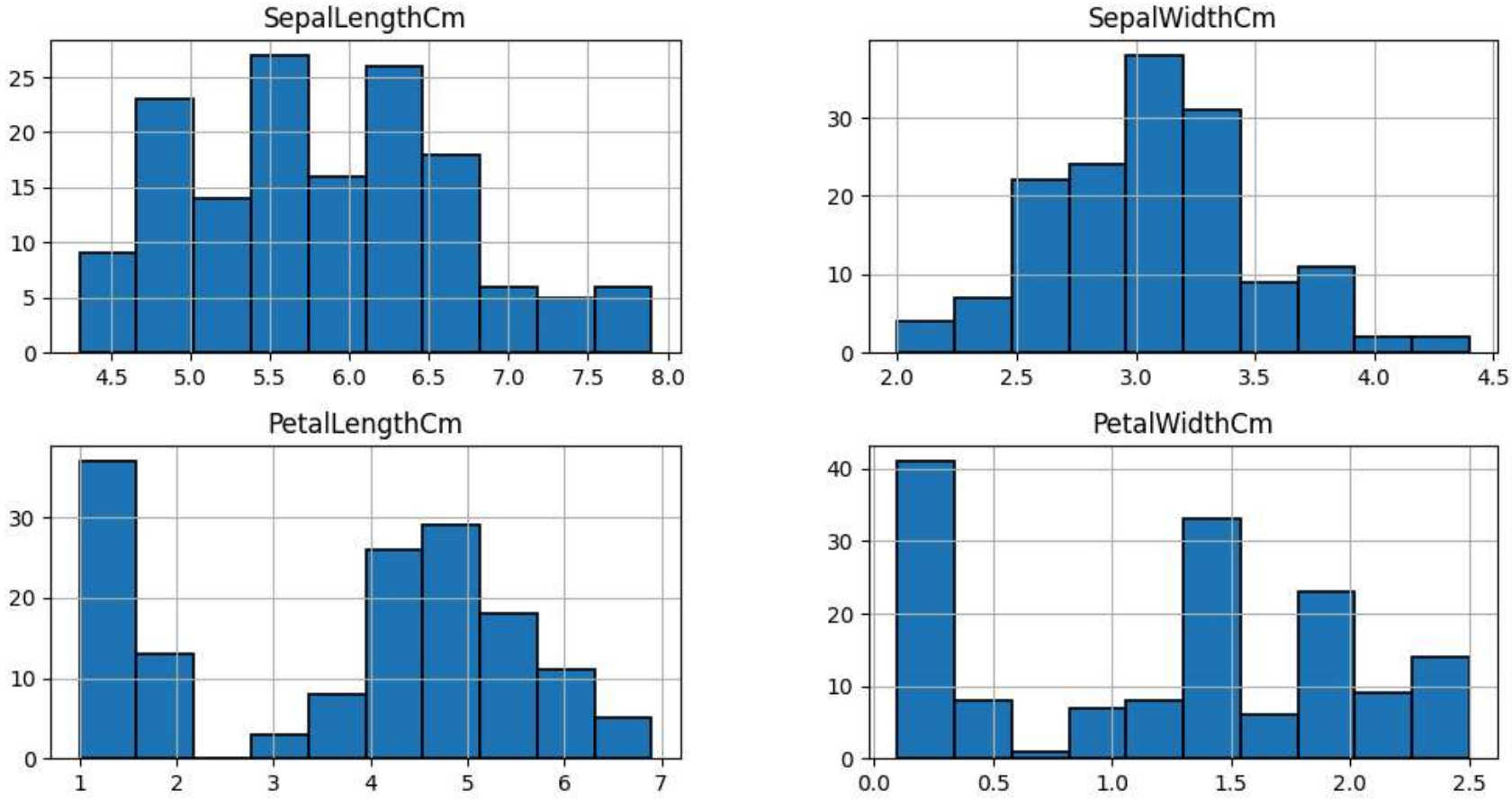


Distribution plot

- The distribution plot is suitable for comparing range and distribution for groups of numerical data. Data is plotted as value points along an axis. You can choose to display only the value points to see the distribution of values, a bounding box to see

the range of values, or a combination of both as shown here.The distribution plot is not relevant for detailed analysis of the data as it deals with a summary of the data distribution

In [26]:
```
iris.hist(edgecolor='black', linewidth=1.2)
fig=plt.gcf()
fig.set_size_inches(12,6)
```

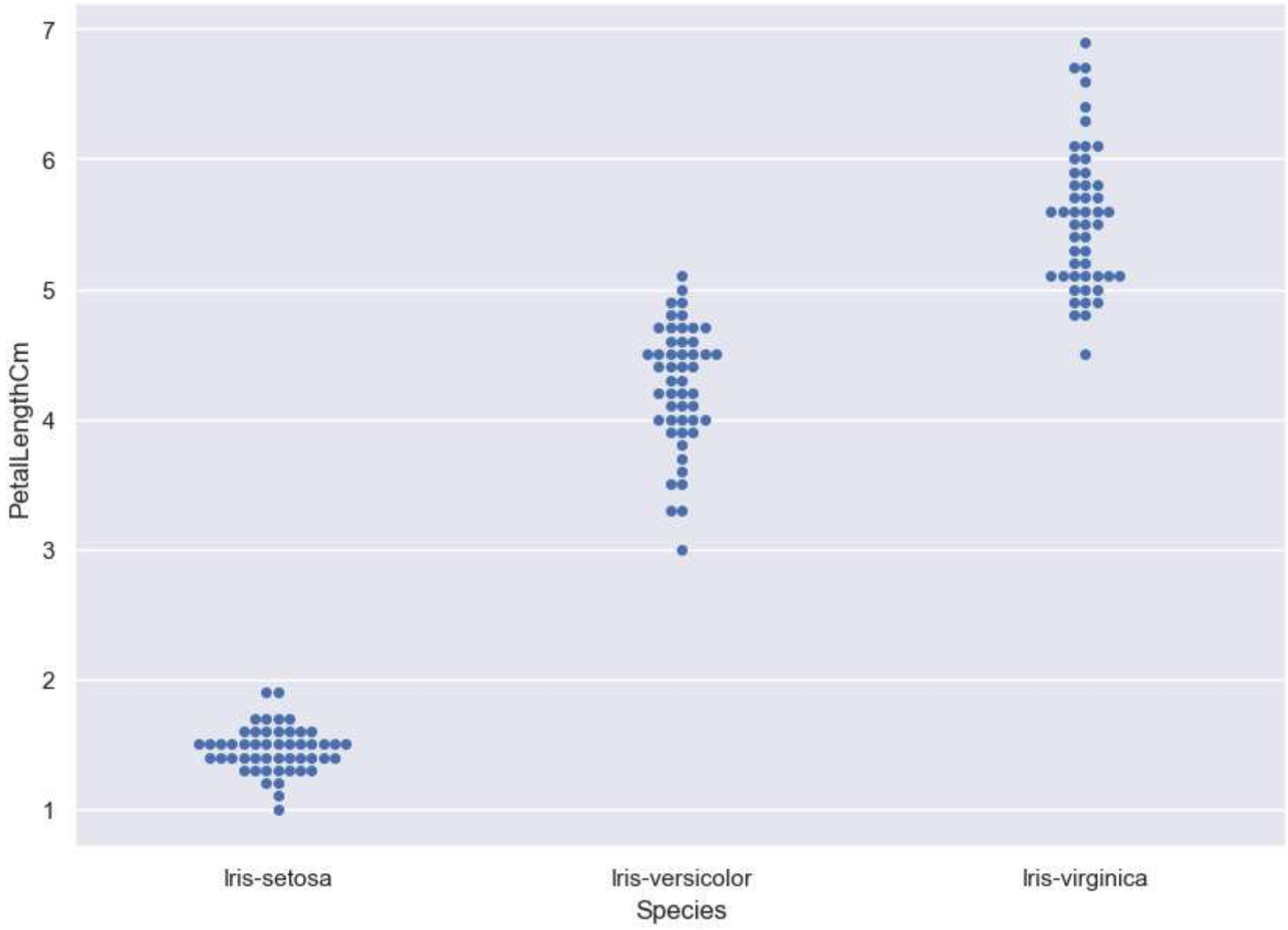


Swarm plot

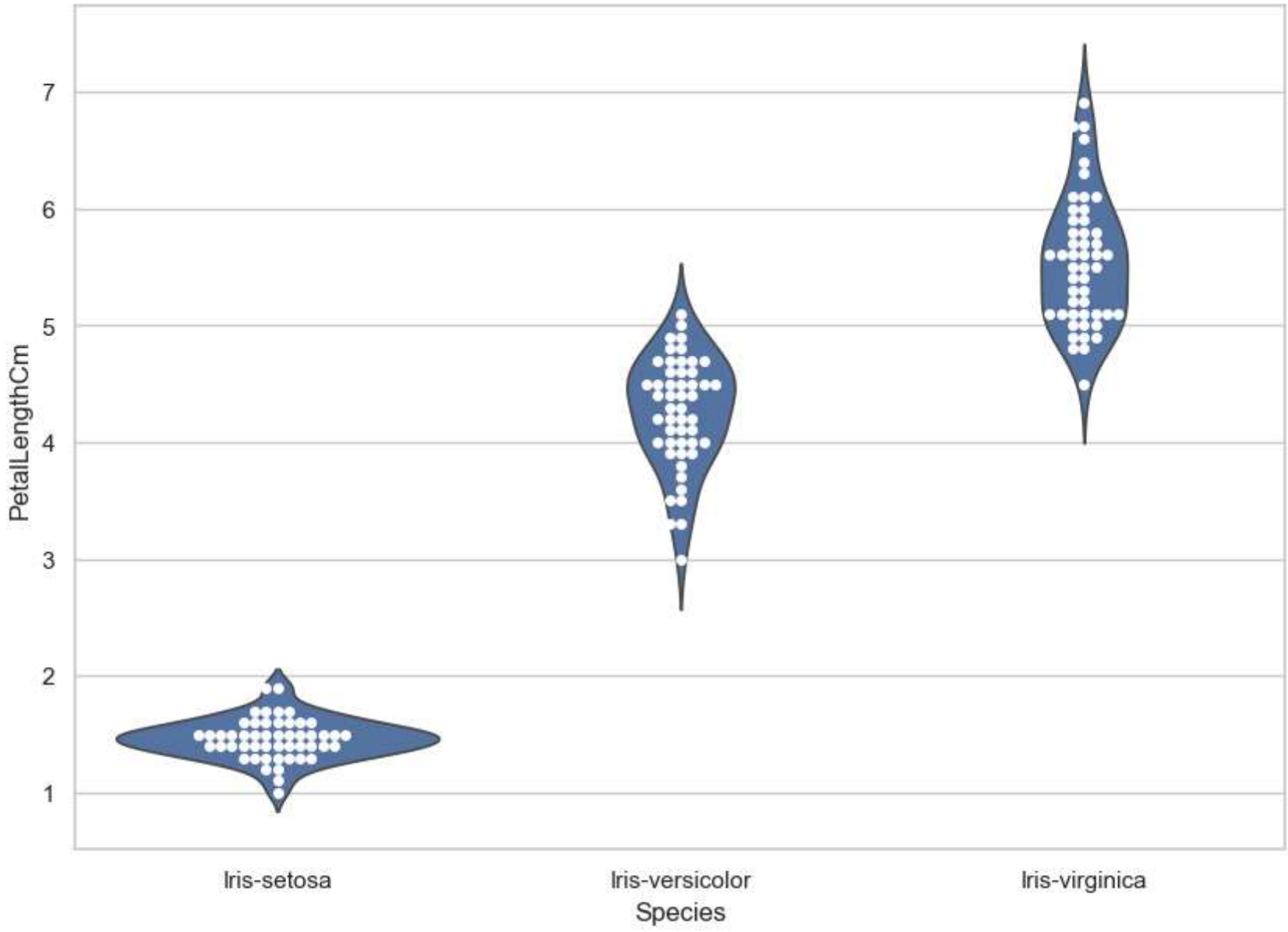
- It looks a bit like a friendly swarm of bees buzzing about their hive. More importantly, each data point is clearly visible and no data are obscured by overplotting.A beeswarm plot improves upon the random jittering approach to move data points the

minimum distance away from one another to avoid overlays. The result is a plot where you can see each distinct data point, like shown in below plot

In [27]:
```
sns.set(style="darkgrid")
fig=plt.gcf()
fig.set_size_inches(10,7)
fig = sns.swarmplot(x="Species", y="PetalLengthCm", data=iris)
```

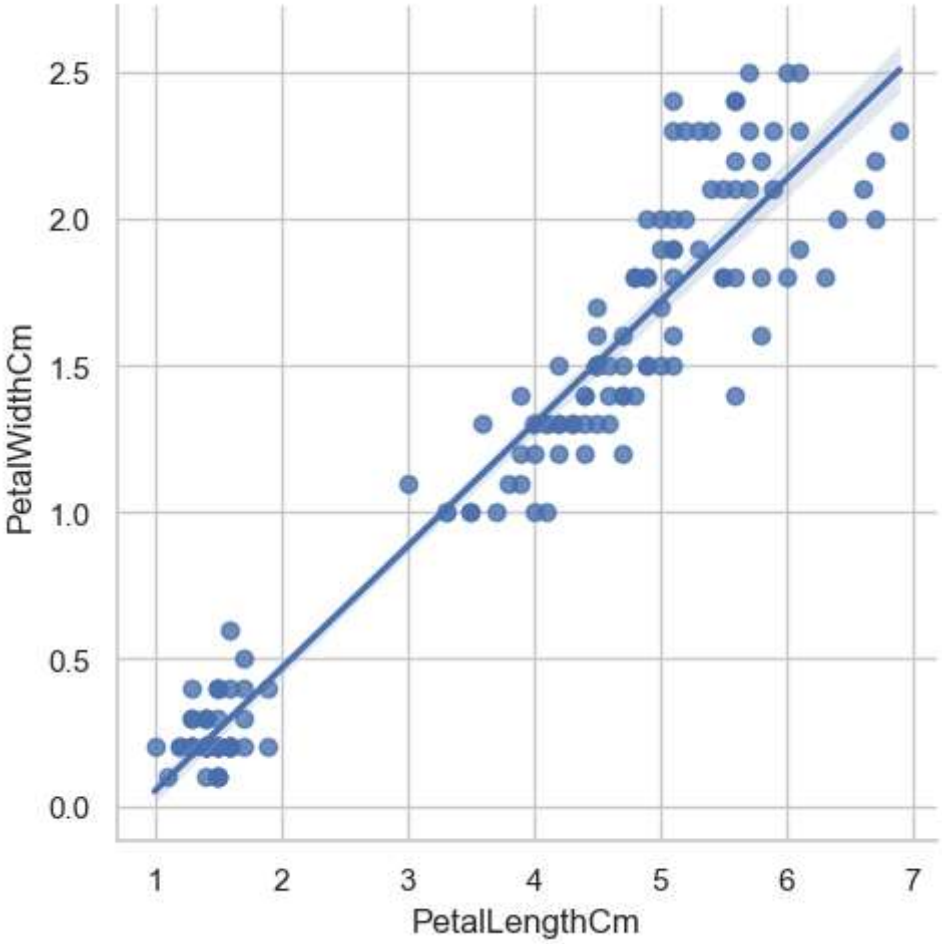


In [28]:
```
sns.set(style="whitegrid")
fig=plt.gcf()
fig.set_size_inches(10,7)
ax = sns.violinplot(x="Species", y="PetalLengthCm", data=iris, inner=None)
ax = sns.swarmplot(x="Species", y="PetalLengthCm", data=iris,color="white", edgecolor="black")
```



Lmplot

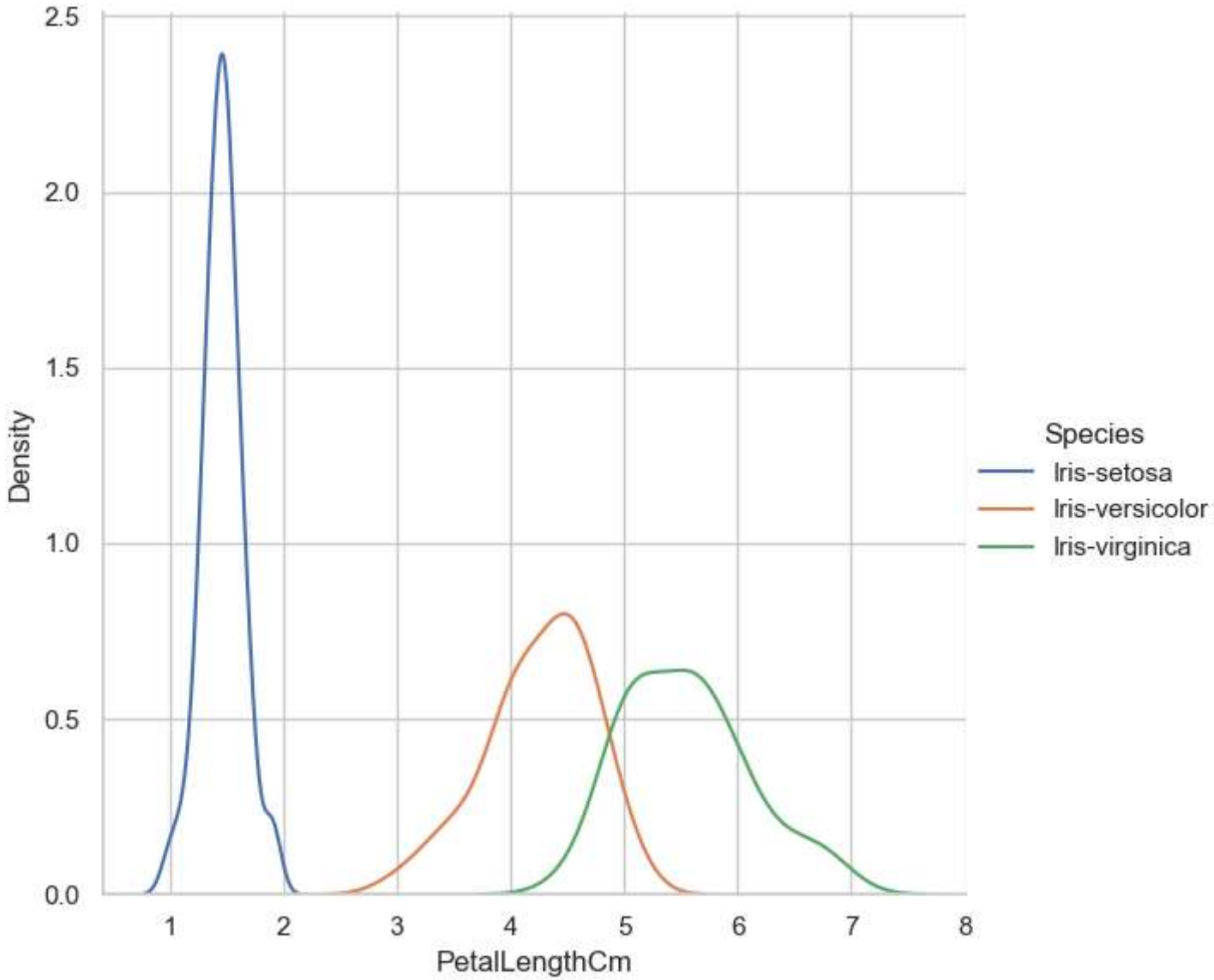
In [29]:
```
fig=sns.lmplot(x="PetalLengthCm", y="PetalWidthCm",data=iris)
```



FacetGrid

In [30]:
```
sns.FacetGrid(iris, hue="Species", height=6) \
   .map(sns.kdeplot, "PetalLengthCm") \
   .add_legend()
plt.ioff()
```

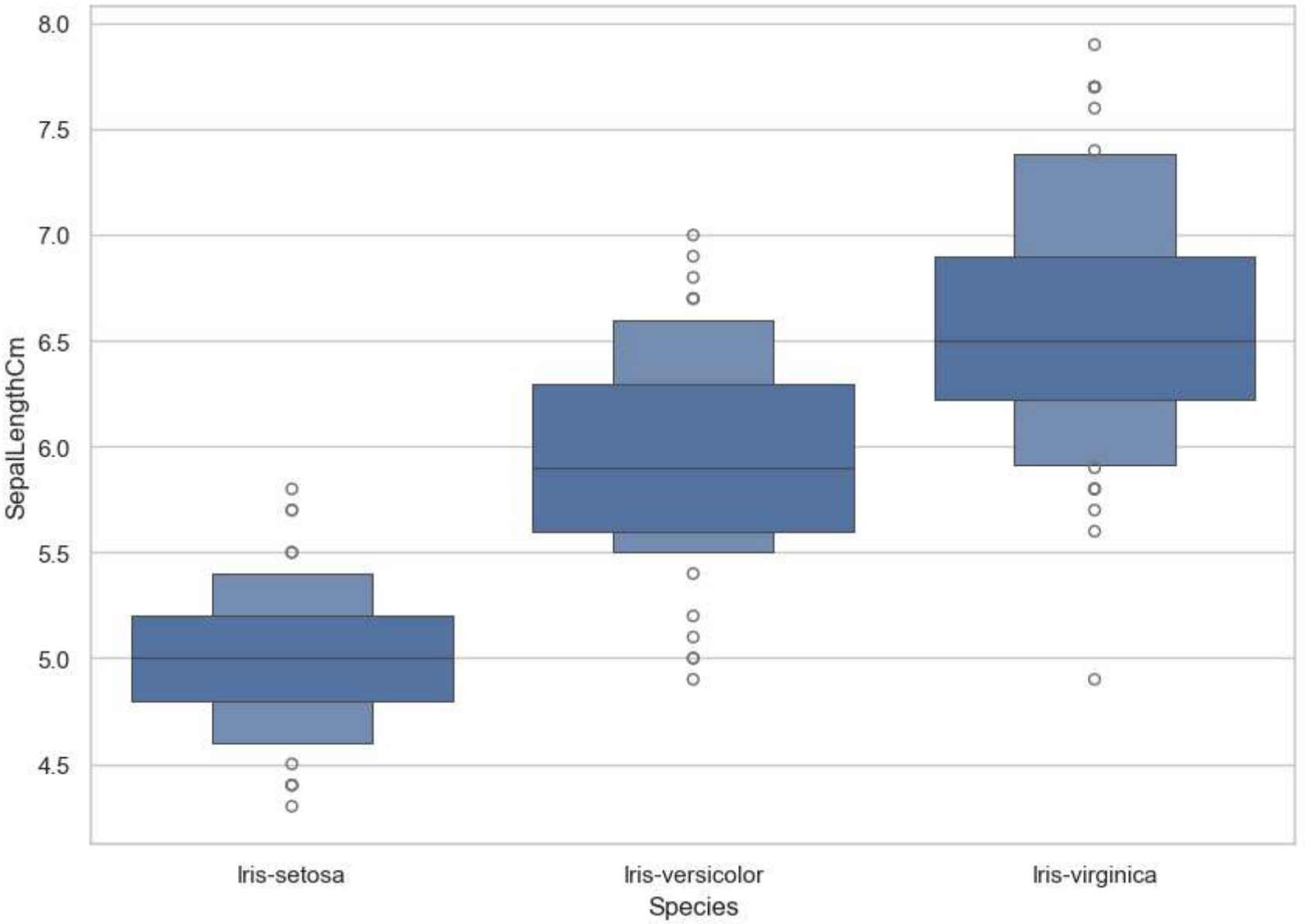
Out[30]: <contextlib.ExitStack at 0x15e67eaec00>



Boxen Plot

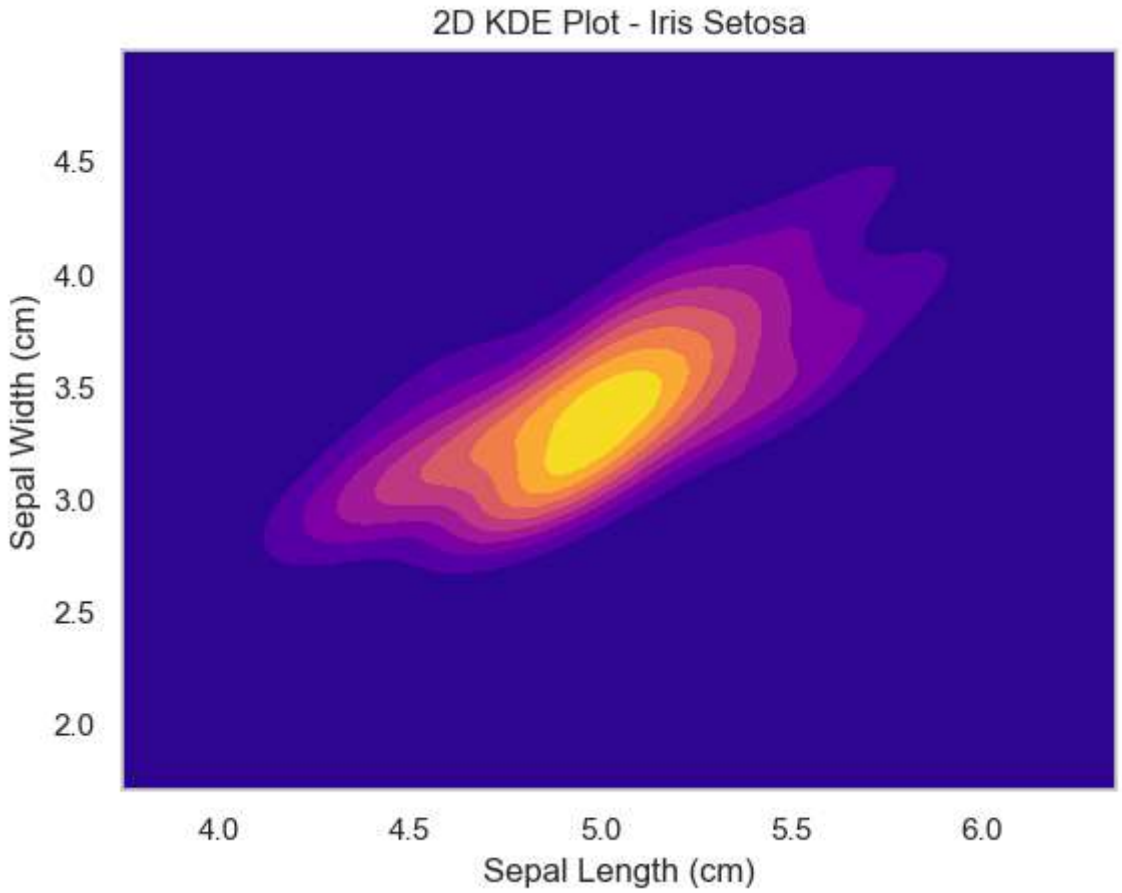
In [31]:
```
fig=plt.gcf()
fig.set_size_inches(10,7)
```

```
fig=sns.boxenplot(x='Species',y='SepalLengthCm',data=iris)
plt.show()
```



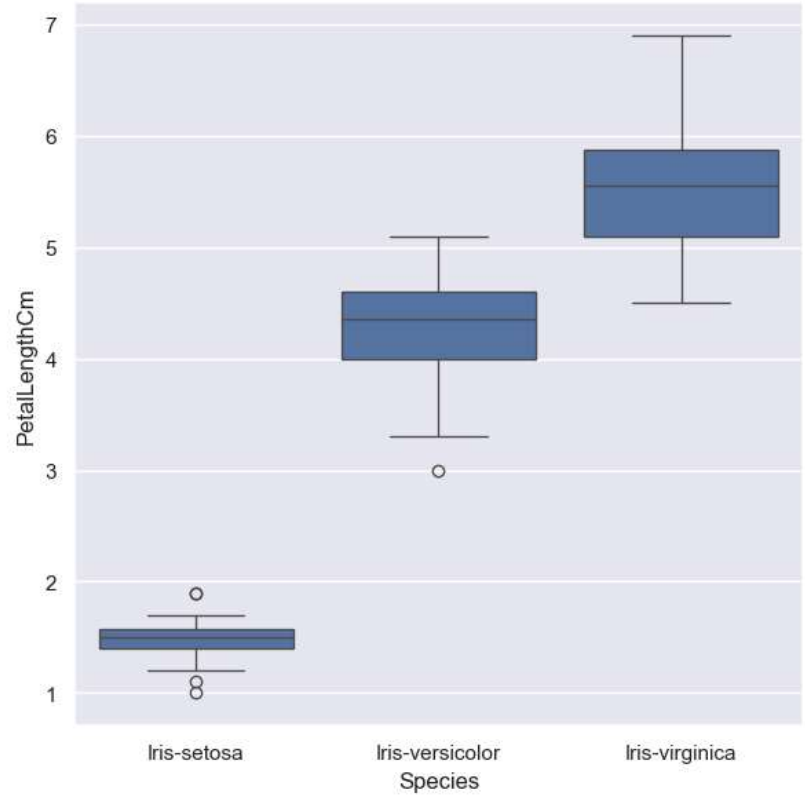
KDE Plot

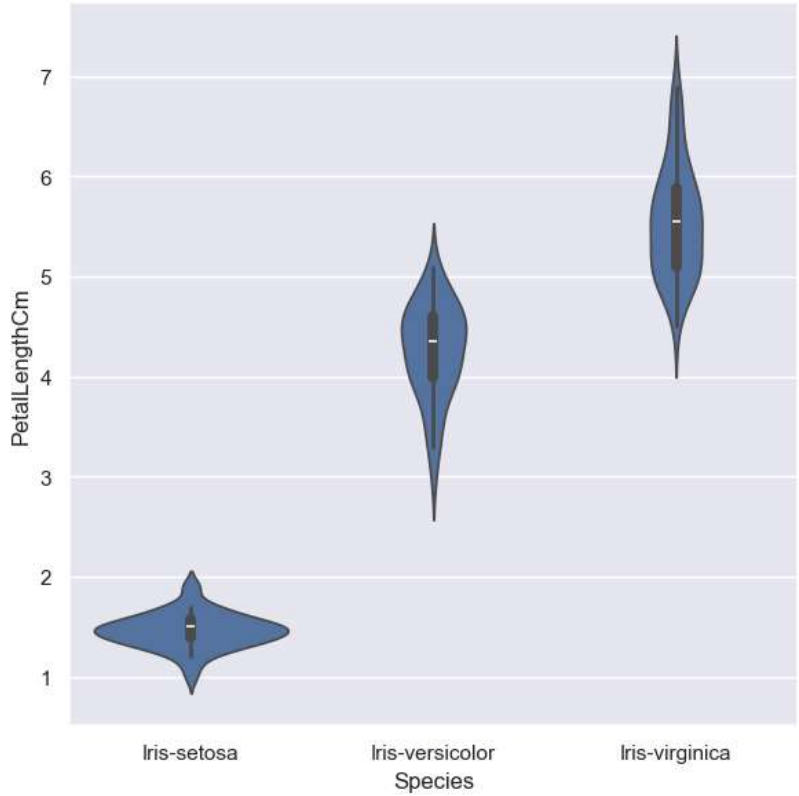
In [32]:
```
sub = iris[iris['Species'] == 'Iris-setosa']

sns.kdeplot(
    x=sub['SepalLengthCm'],
    y=sub['SepalWidthCm'],
    cmap="plasma",
    fill=True,
    thresh=0,
)
plt.title("2D KDE Plot - Iris Setosa")
plt.xlabel("Sepal Length (cm)")
plt.ylabel("Sepal Width (cm)")
plt.show()
```

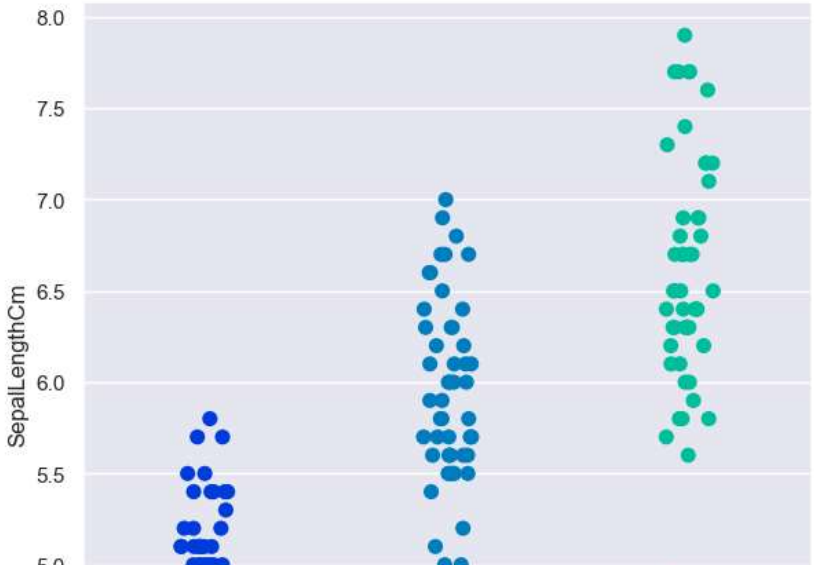


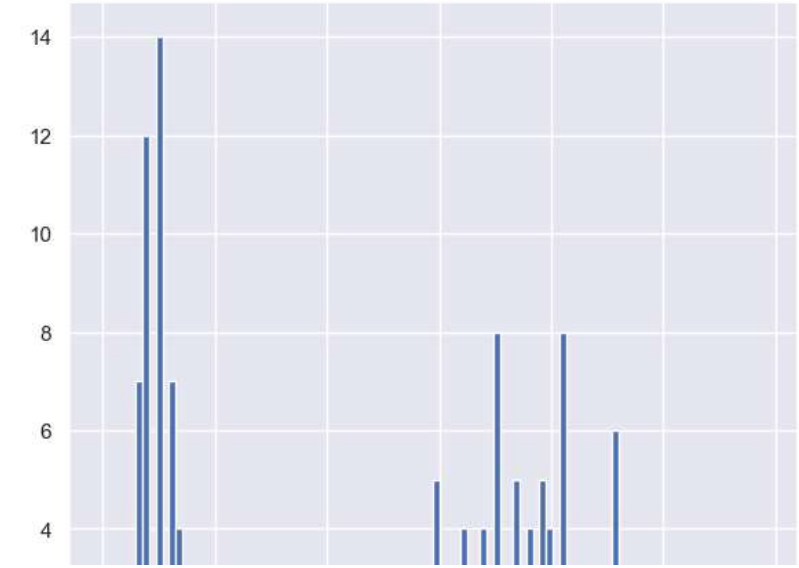
Dashboard

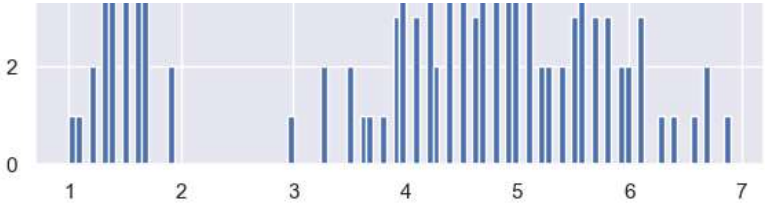
In [33]:
```
sns.set_style('darkgrid')
f,axes=plt.subplots(2,2,figsize=(15,15))

k1=sns.boxplot(x="Species", y="PetalLengthCm", data=iris,ax=axes[0,0])
k2=sns.violinplot(x='Species',y='PetalLengthCm',data=iris,ax=axes[0,1])
k3=sns.stripplot(x='Species',y='SepalLengthCm',data=iris,jitter=True,edgecolor='gray',size=8,palette='winter',orient=
#axes[1,1].hist(iris.hist,bin=10)
axes[1,1].hist(iris.PetalLengthCm,bins=100)
#k2.set(xlim=(-1,0.8))
plt.show()
```


PetalLengthCm
7
6
5
4
3
2
1
Iris-setosa
Iris-versicolor
Iris-virginica
Species


PetalLengthCm
7
6
5
4
3
2
1
Iris-setosa
Iris-versicolor
Iris-virginica
Species


SepalLengthCm
8.0
7.5
7.0
6.5
6.0
5.5


14
12
10
8
6
4



In the dashboard we have shown how to create multiple plots to foam a dashboard using Python.In this plot we have demonstrated how to plot Seaborn and Matplotlib plots on the same Dashboard.

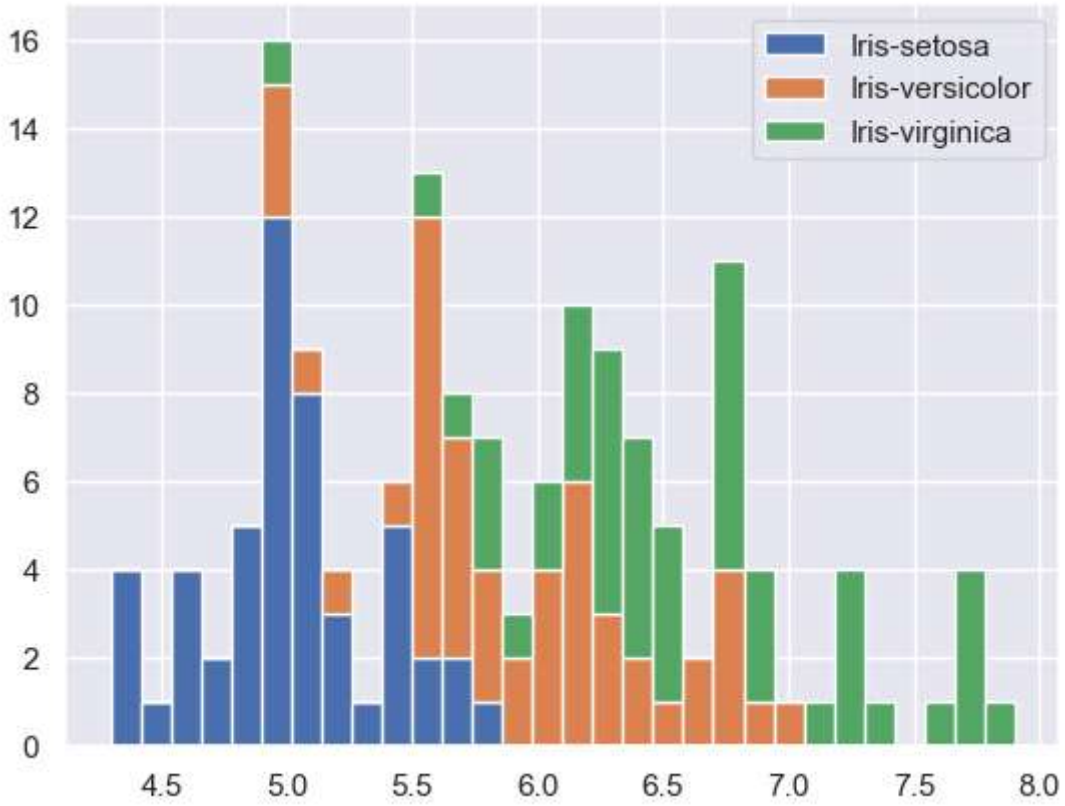
Stacked Histogram

In [34]:
```
iris['Species'] = iris['Species'].astype('category')
iris.head()
```

Out[34]:

	SepalLengthCm	SepalWidthCm	PetalLengthCm	PetalWidthCm	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

In [35]:
```
list1=list()
mylabels=list()
for gen in iris.Species.cat.categories:
    list1.append(iris[iris.Species==gen].SepalLengthCm)
    mylabels.append(gen)

h=plt.hist(list1,bins=30,stacked=True,rwidth=1,label=mylabels)
plt.legend()
plt.show()
```



Area Plot:

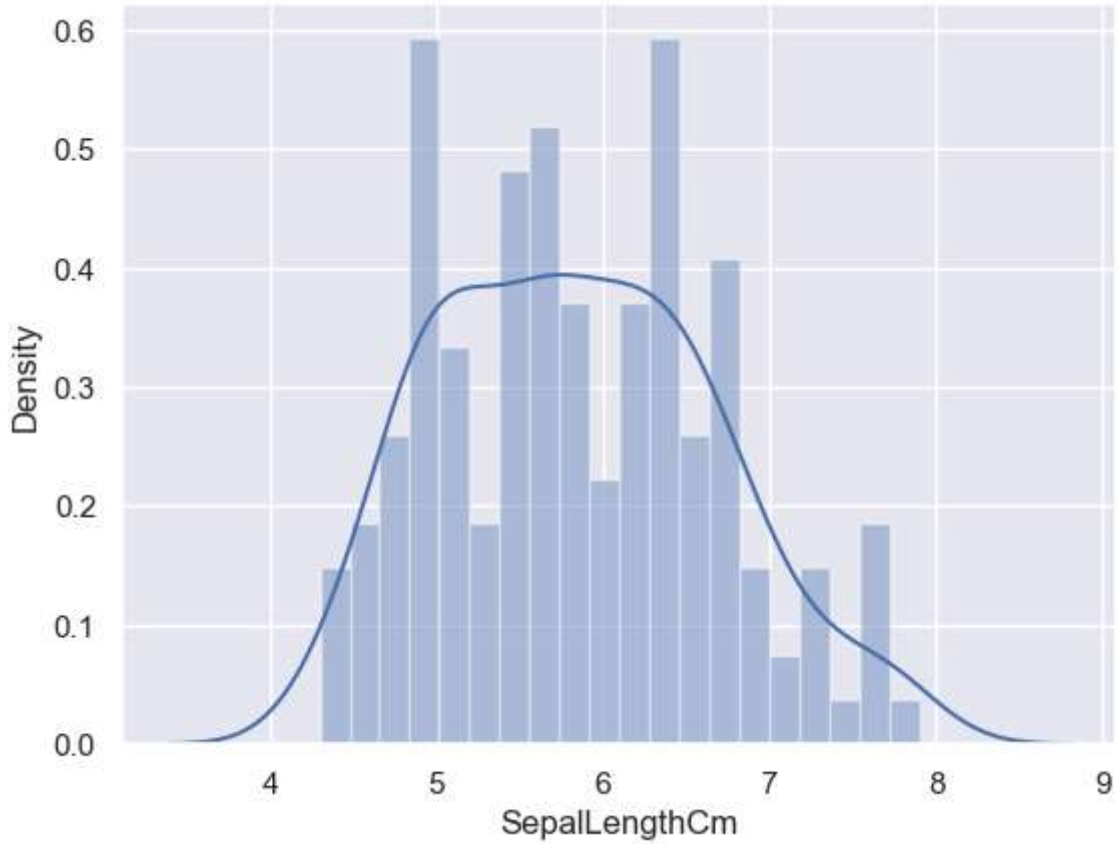
Area Plot gives us a visual representation of Various dimensions of Iris flower and their range in dataset.

In [36]:
```
iris.plot.area(y=['SepalLengthCm','SepalWidthCm','PetalLengthCm','PetalWidthCm'],alpha=0.4,figsize=(12, 6));
plt.show()
```

Distplot:

It helps us to look at the distribution of a single variable.Kde shows the density of the distribution

In [37]:
```
sns.distplot(iris['SepalLengthCm'],kde=True,bins=20);
plt.show()
```


0.6
0.5
0.4
0.3
0.2
0.1
0.0
Density
4
5
6
7
8
9
SepalLengthCm