In [3]:
```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
from sklearn.model_selection import train_test_split
from sklearn.neighbors import KNeighborsClassifier
from sklearn.metrics import accuracy_score
```

In [4]:
```
iris=pd.read_csv('Iris.csv')
```

In [5]:
```
iris
```

Out[5]:

	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

In [6]:
```
iris.shape
```

Out[6]:
```
(150, 6)
```

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

Out[7]:

	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 [8]:
```
iris.tail()
```

Out[8]:

	Id	SepalLengthCm	SepalWidthCm	PetalLengthCm	PetalWidthCm	Species
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

In [10]:
```
iris.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
```

In [11]:
```
iris.dtypes
```

Out[11]:
```
Id                int64
SepalLengthCm    float64
SepalWidthCm     float64
PetalLengthCm    float64
PetalWidthCm     float64
Species           object
dtype: object
```

In [13]:
```
iris.columns
```

Out[13]:
```
Index(['Id', 'SepalLengthCm', 'SepalWidthCm', 'PetalLengthCm', 'PetalWidthC
m',
       'Species'],
      dtype='object')
```

In [14]:
```
iris.isnull().sum()
```

Out[14]:
```
Id               0
SepalLengthCm    0
SepalWidthCm     0
PetalLengthCm    0
PetalWidthCm     0
Species          0
dtype: int64
```

In [30]:
```
iris.describe()
```

Out[30]:

	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

In [17]:
```
x=iris.drop(['Id','Species'],axis=1)
y=iris['Species']
```

In [18]:
```
xtrain,xtest,ytrain,ytest=train_test_split(x,y,test_size=0.2,random_state=42)
```

In [19]:
```
KNN=KNeighborsClassifier(n_neighbors=3)
KNN.fit(xtrain,ytrain)
```

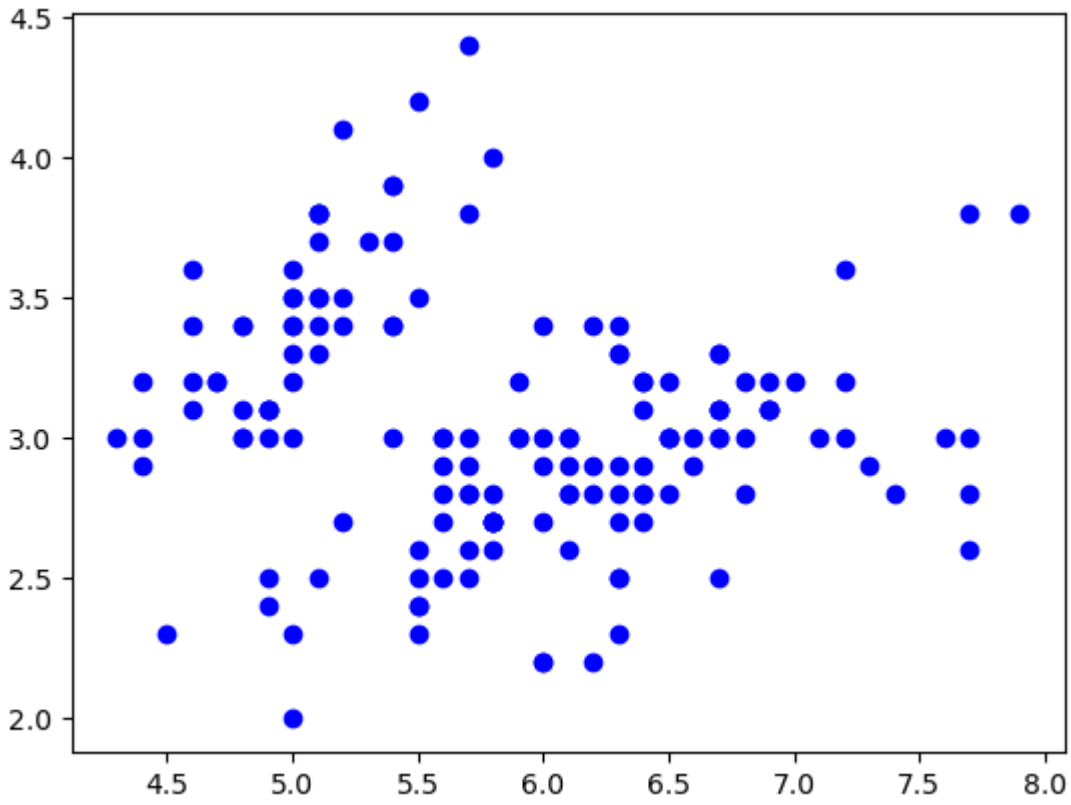
Out[19]:
```
KNeighborsClassifier(n_neighbors=3)
```
In a Jupyter environment, please rerun this cell to show the HTML representation or trust the notebook.
On GitHub, the HTML representation is unable to render, please try loading this page with nbviewer.org.

In [21]:
```
y_pred=KNN.predict(xtest)
```

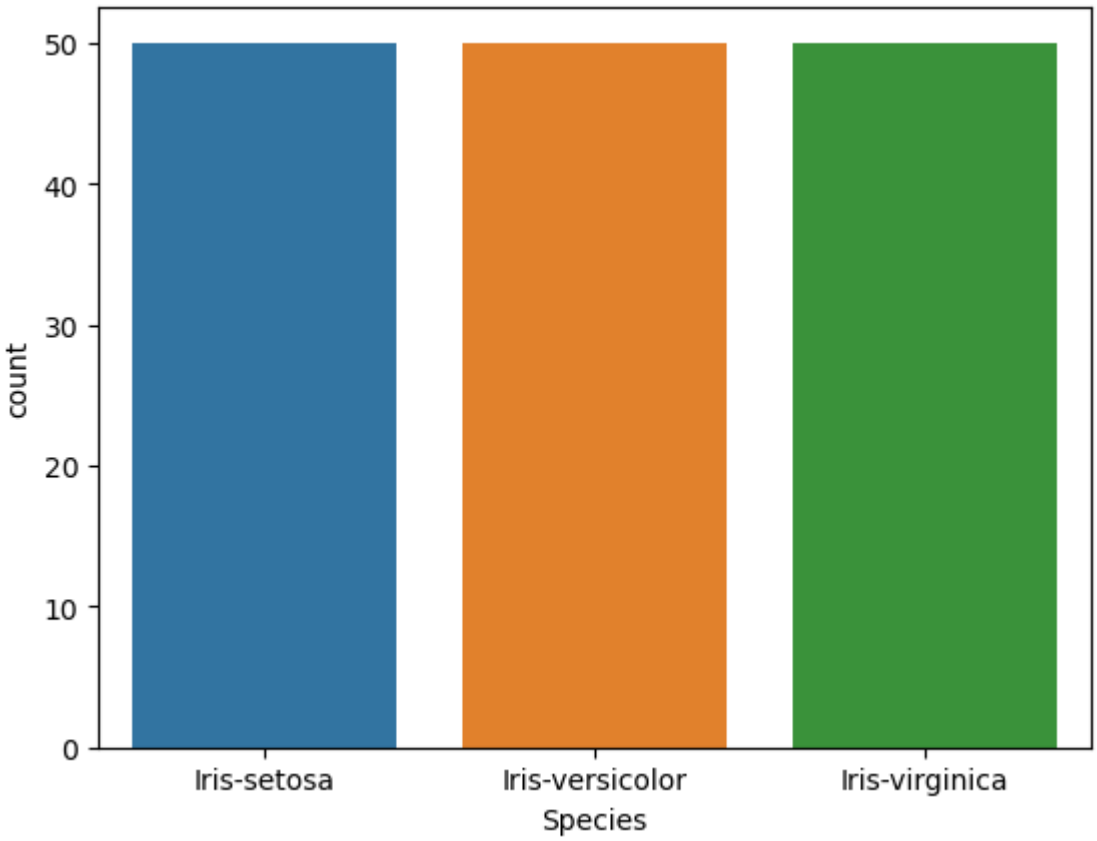
In [22]:
```
accuracy=accuracy_score(ytest,y_pred)
print("Accuracy is:",accuracy)
```

```
Accuracy is: 1.0
```

In [25]:
```
plt.scatter(iris["SepalLengthCm"],iris["SepalWidthCm"],color='b')
plt.ylabel=("Sepal Length(cm)")
plt.xlabel=("Sepal Width(cm)")
plt.show()
```

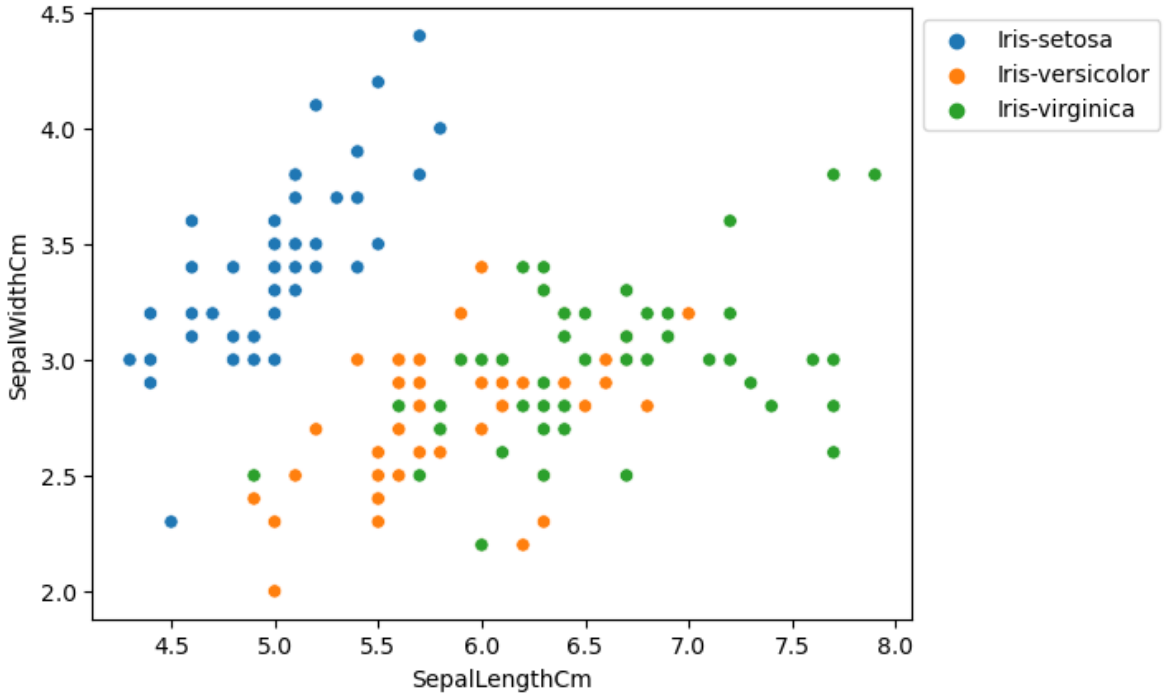


In [28]:
```
sns.countplot(x='Species', data=iris, )
plt.show()
```

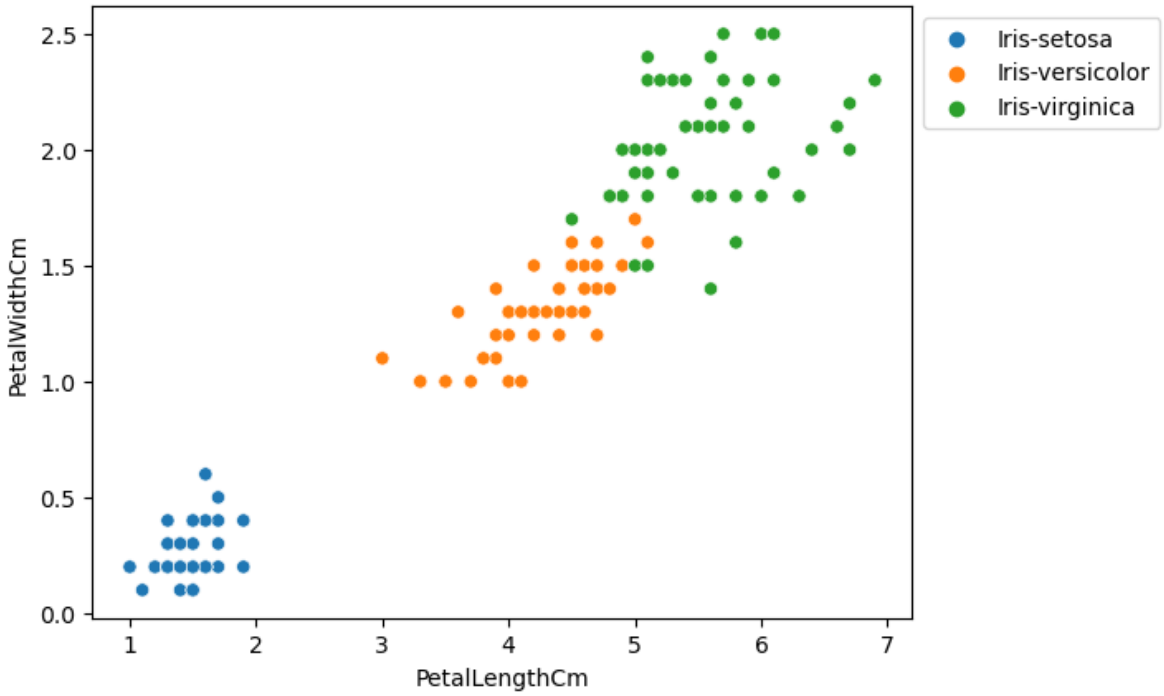


In [32]:

```
sns.scatterplot(x='SepalLengthCm', y='SepalWidthCm',
                hue='Species', data=iris, )

# Placing Legend outside the Figure
plt.legend(bbox_to_anchor=(1, 1), loc=2)

plt.show()
```



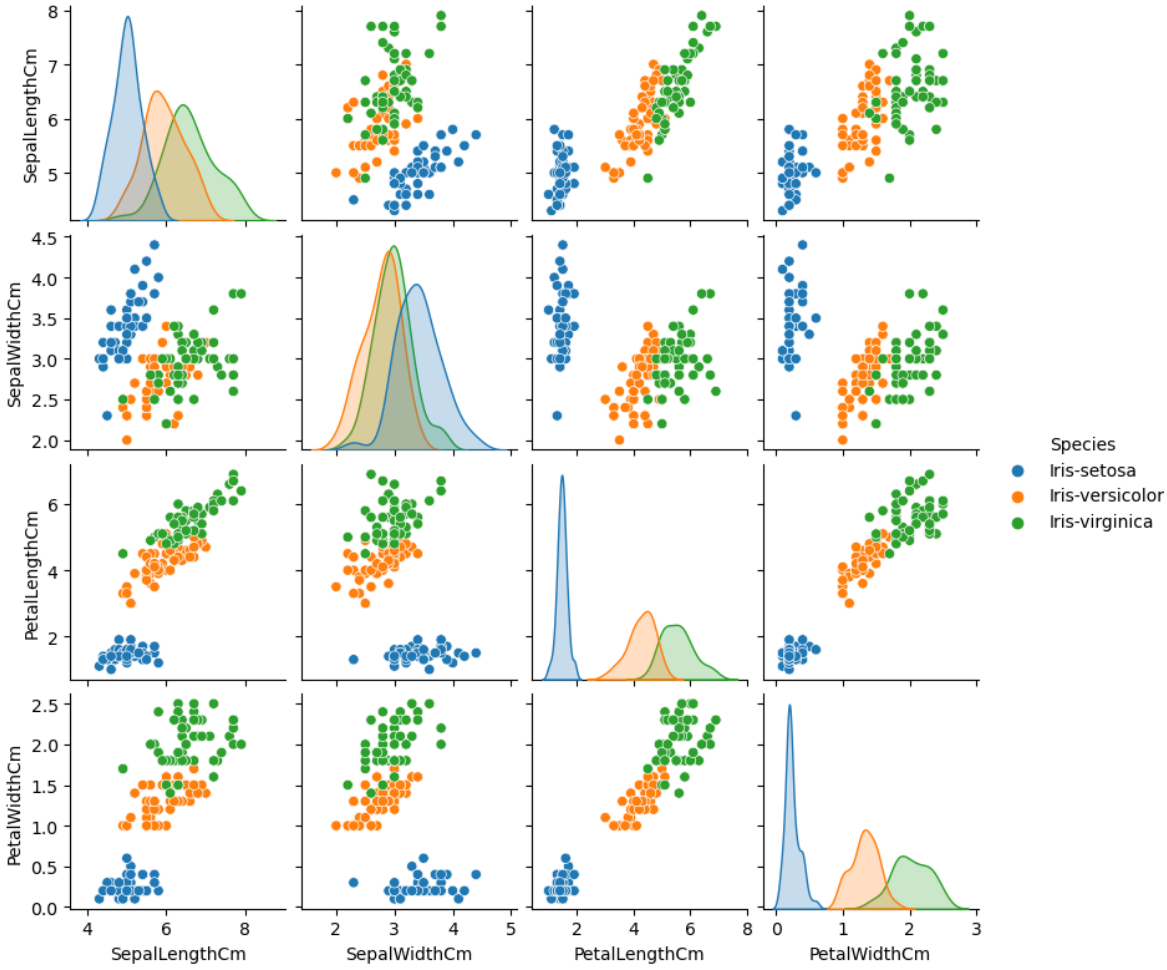
In [33]:
```
sns.scatterplot(x='PetalLengthCm', y='PetalWidthCm',
                hue='Species', data=iris, )
plt.legend(bbox_to_anchor=(1, 1), loc=2)

plt.show()
```



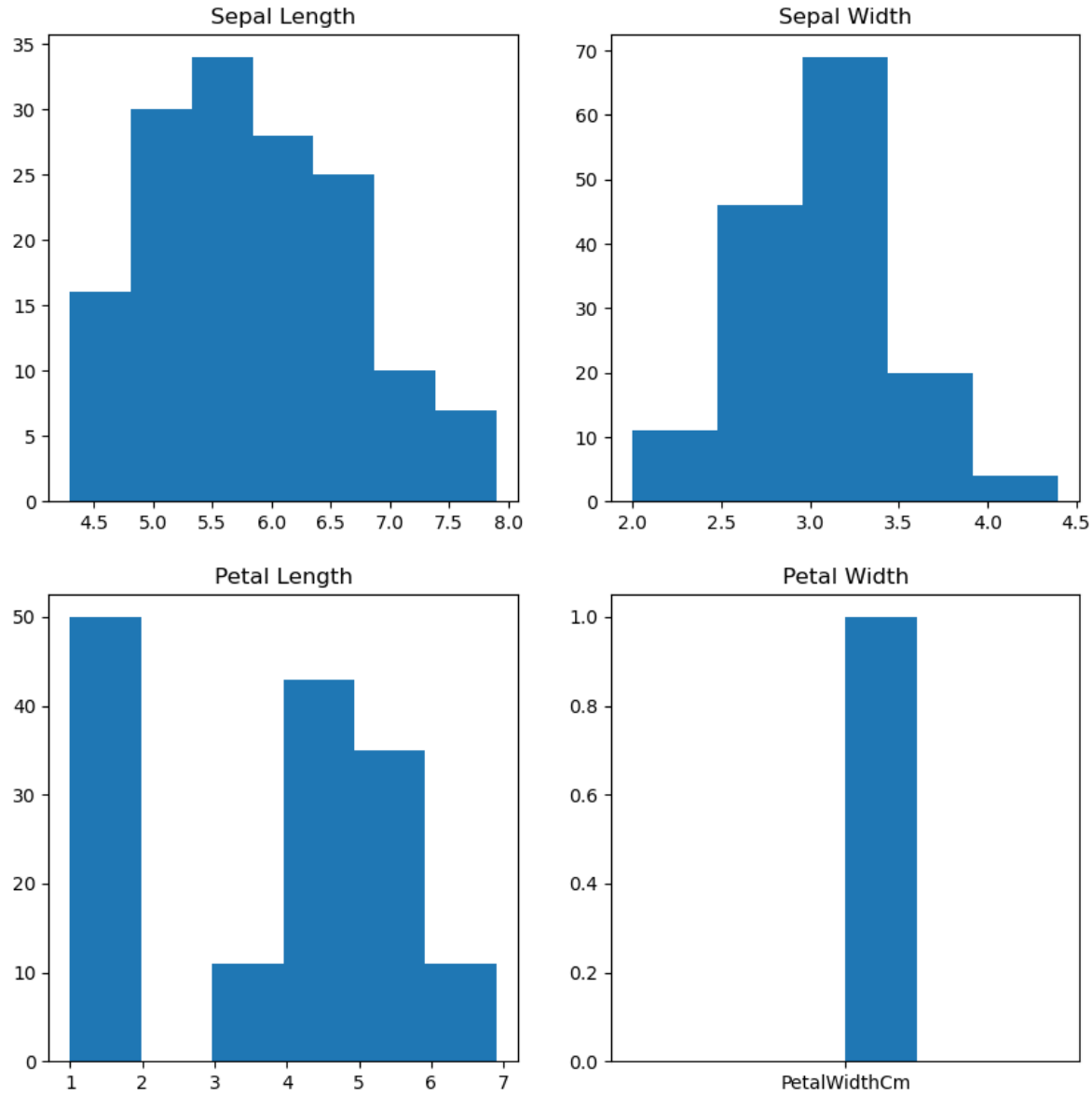
In [35]:

```
import seaborn as sns
import matplotlib.pyplot as plt
sns.pairplot(iris.drop(['Id'], axis = 1),
             hue='Species', height=2)
```

Out[35]: <seaborn.axisgrid.PairGrid at 0x1dff58b3a60>



In [36]:
```
# importing packages
import seaborn as sns
import matplotlib.pyplot as plt


fig, axes = plt.subplots(2, 2, figsize=(10,10))

axes[0,0].set_title("Sepal Length")
axes[0,0].hist(iris['SepalLengthCm'], bins=7)

axes[0,1].set_title("Sepal Width")
axes[0,1].hist(iris['SepalWidthCm'], bins=5);

axes[1,0].set_title("Petal Length")
axes[1,0].hist(iris['PetalLengthCm'], bins=6);

axes[1,1].set_title("Petal Width")
axes[1,1].hist(['PetalWidthCm'], bins=6);
```



In [38]:
```
iris.corr(method='pearson')
```

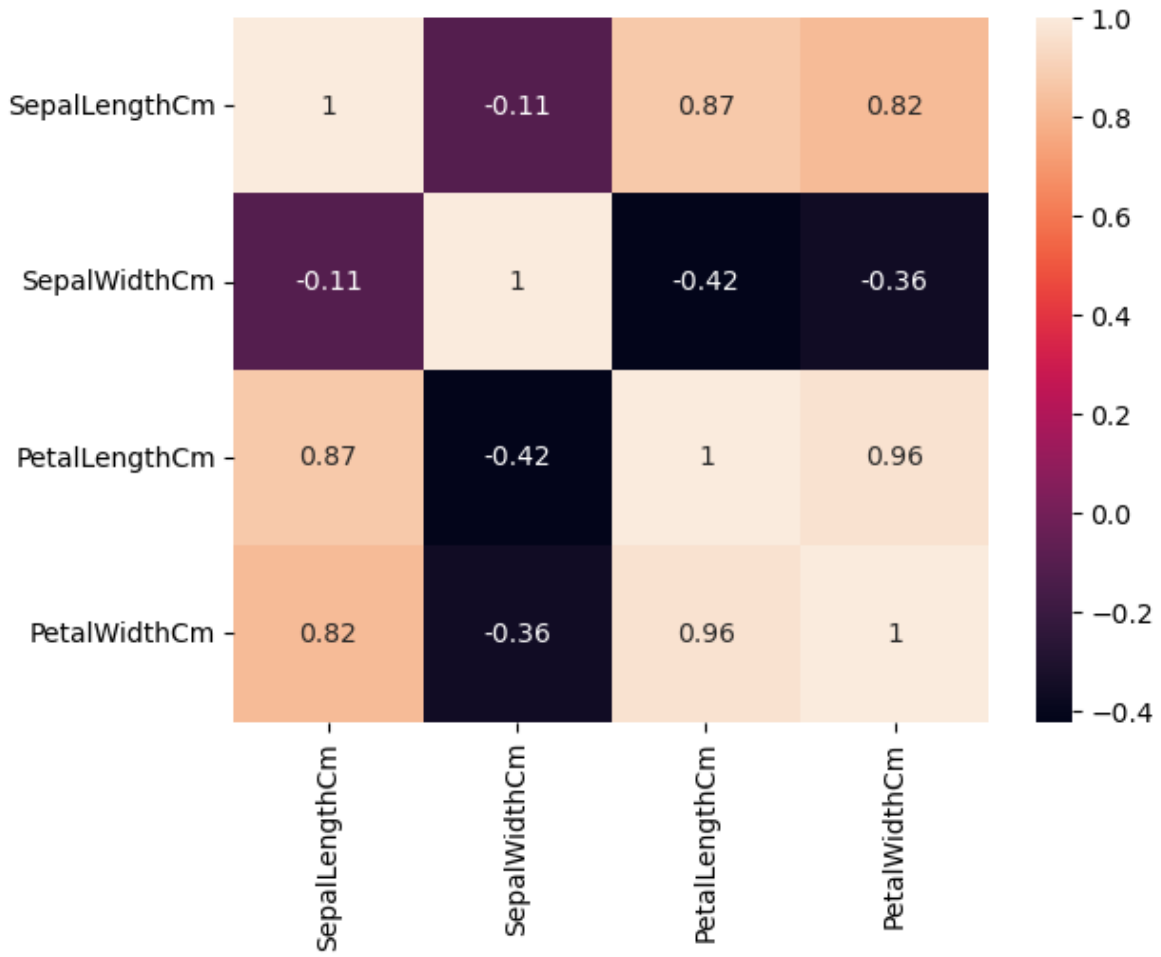
```
C:\Users\zua20\AppData\Local\Temp\ipykernel_11648\2699039571.py:1: FutureWarn
ing: The default value of numeric_only in DataFrame.corr is deprecated. In a
future version, it will default to False. Select only valid columns or specif
y the value of numeric_only to silence this warning.
  iris.corr(method='pearson')
```

Out[38]:

	Id	SepalLengthCm	SepalWidthCm	PetalLengthCm	PetalWidthCm
Id	1.000000	0.716676	-0.397729	0.882747	0.899759
SepalLengthCm	0.716676	1.000000	-0.109369	0.871754	0.817954
SepalWidthCm	-0.397729	-0.109369	1.000000	-0.420516	-0.356544
PetalLengthCm	0.882747	0.871754	-0.420516	1.000000	0.962757
PetalWidthCm	0.899759	0.817954	-0.356544	0.962757	1.000000

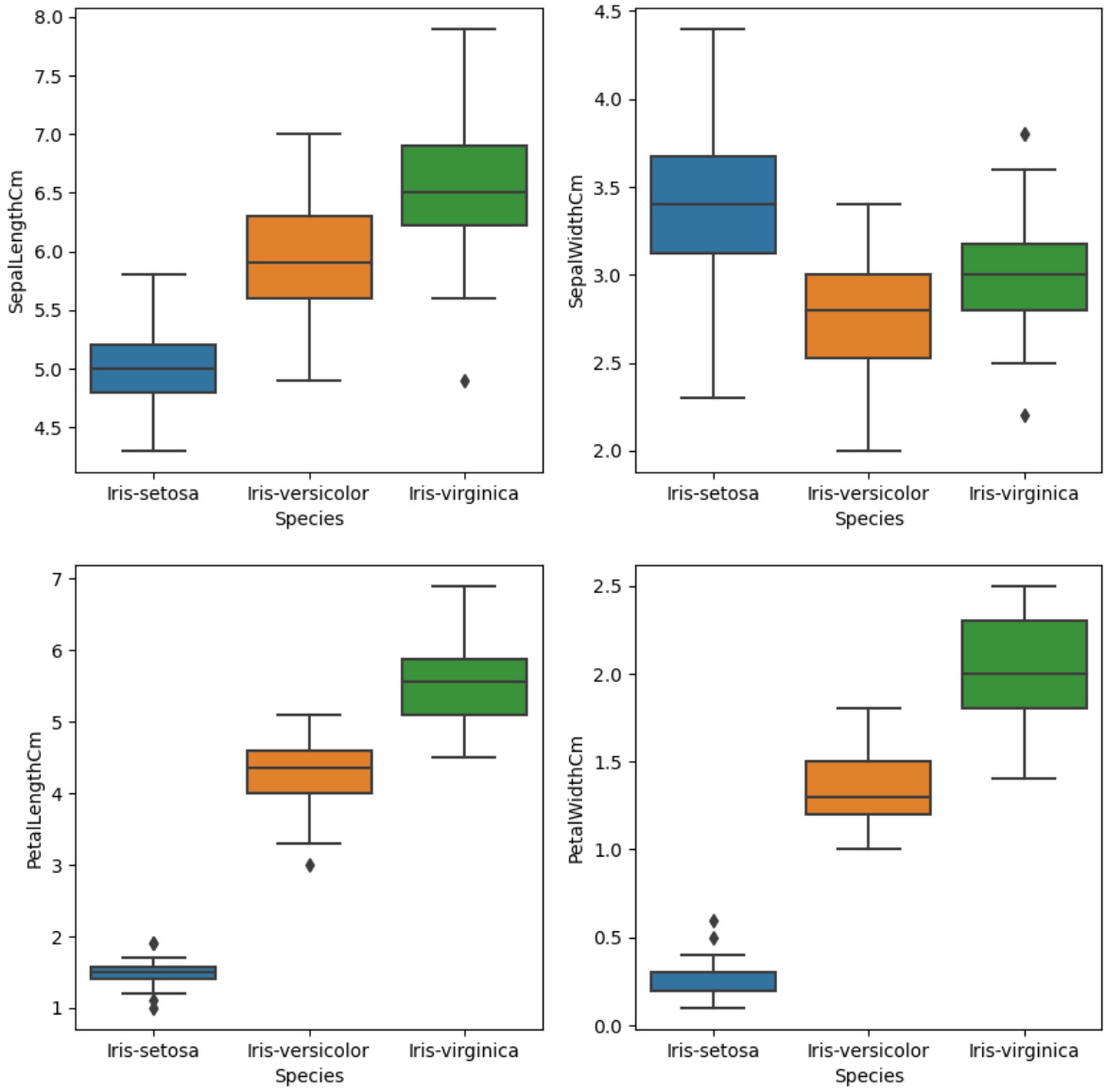
In [39]:
```
sns.heatmap(iris.corr(method='pearson').drop(
['Id'], axis=1).drop(['Id'], axis=0),
            annot = True);

plt.show()
```

```
C:\Users\zua20\AppData\Local\Temp\ipykernel_11648\353172146.py:1: FutureWarni
ng: The default value of numeric_only in DataFrame.corr is deprecated. In a f
uture version, it will default to False. Select only valid columns or specify
the value of numeric_only to silence this warning.
  sns.heatmap(iris.corr(method='pearson').drop(
```



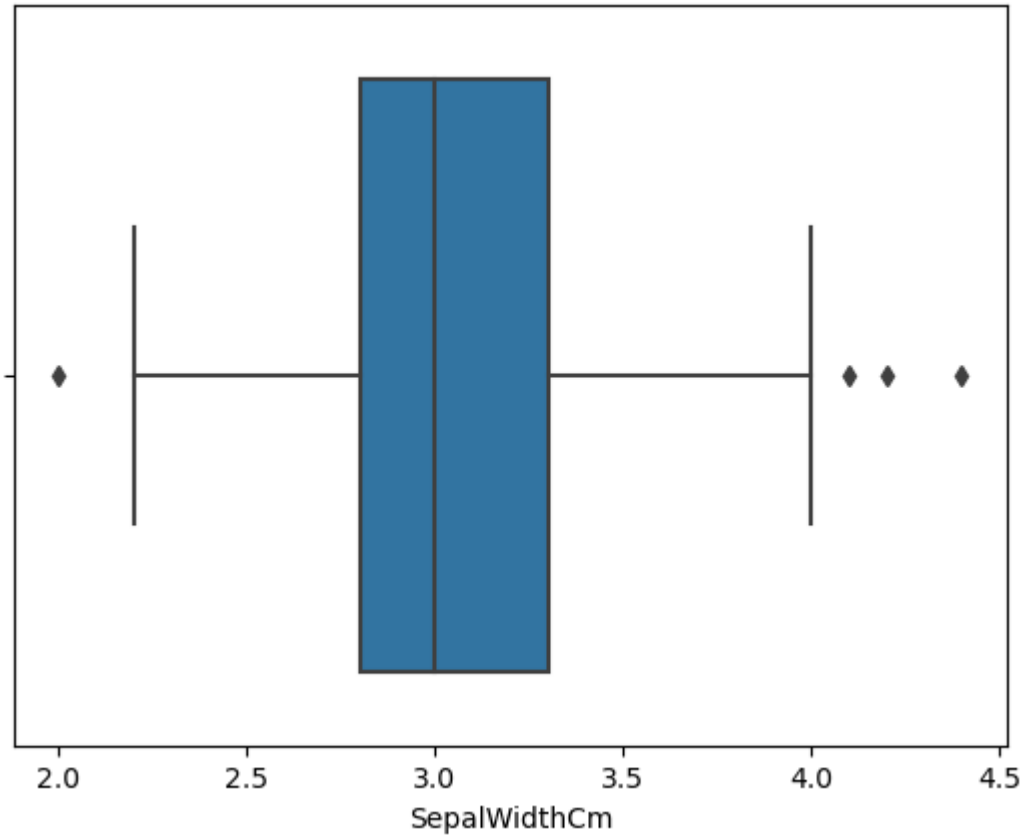
In [41]:

```
def graph(y):
    sns.boxplot(x="Species", y=y, data=iris)

plt.figure(figsize=(10,10))

plt.subplot(221)
graph('SepalLengthCm')

plt.subplot(222)
graph('SepalWidthCm')

plt.subplot(223)
graph('PetalLengthCm')

plt.subplot(224)
graph('PetalWidthCm')

plt.show()
```



In [42]:
```
sns.boxplot(x='SepalWidthCm', data=iris)
```

Out[42]:
```
<Axes: xlabel='SepalWidthCm'>
```



In [ ]: