In [20]:
```
import pandas as pd
data = pd.read_csv("iris.csv")
print('Iris-setosa')
```

```
Iris-setosa
```

In [21]:
```
setosa = data['Species'] == 'Iris-setosa'
print(data[setosa].describe())
```

```
              Id  SepalLengthCm  SepalWidthCm  PetalLengthCm  PetalWidthCm
count  50.00000       50.00000     50.000000      50.000000      50.00000
mean   25.50000        5.00600      3.418000       1.464000       0.24400
std    14.57738        0.35249      0.381024       0.173511       0.10721
min     1.00000        4.30000      2.300000       1.000000       0.10000
25%    13.25000        4.80000      3.125000       1.400000       0.20000
50%    25.50000        5.00000      3.400000       1.500000       0.20000
75%    37.75000        5.20000      3.675000       1.575000       0.30000
max    50.00000        5.80000      4.400000       1.900000       0.60000
```

In [22]:
```
setosa = data['Species'] == 'Iris-versicolor'
print(data[setosa].describe())
print('\nIris-virginica')
setosa = data['Species'] == 'Iris-virginica'
print(data[setosa].describe())
```

```
              Id  SepalLengthCm  SepalWidthCm  PetalLengthCm  PetalWidthCm
count   50.00000      50.000000     50.000000      50.000000     50.000000
mean    75.50000       5.936000      2.770000       4.260000      1.326000
std     14.57738       0.516171      0.313798       0.469911      0.197753
min     51.00000       4.900000      2.000000       3.000000      1.000000
25%     63.25000       5.600000      2.525000       4.000000      1.200000
50%     75.50000       5.900000      2.800000       4.350000      1.300000
75%     87.75000       6.300000      3.000000       4.600000      1.500000
max    100.00000       7.000000      3.400000       5.100000      1.800000

Iris-virginica
              Id  SepalLengthCm  SepalWidthCm  PetalLengthCm  PetalWidthCm
count   50.00000       50.00000     50.000000      50.000000      50.00000
mean   125.50000        6.58800      2.974000       5.552000       2.02600
std     14.57738        0.63588      0.322497       0.551895       0.27465
min    101.00000        4.90000      2.200000       4.500000       1.40000
25%    113.25000        6.22500      2.800000       5.100000       1.80000
50%    125.50000        6.50000      3.000000       5.550000       2.00000
75%    137.75000        6.90000      3.175000       5.875000       2.30000
max    150.00000        7.90000      3.800000       6.900000       2.50000
```

In [23]:
```
import numpy as np
import pandas as pd
import seaborn as sns
sns.set_palette('husl')
import matplotlib.pyplot as plt
%matplotlib inline

from sklearn import metrics
from sklearn.neighbors import KNeighborsClassifier
from sklearn.linear_model import LogisticRegression
from sklearn.model_selection import train_test_split

data = pd.read_csv('iris.csv')
```

In [24]:
```
#There are 150 observations with 4 features each (sepal length, sepal width, petal ler
#There are no null values, so we don't have to worry about that.
#There are 50 observations of each species (setosa, versicolor, virginica).
```

In [25]:
```
data.head()
```

Out[25]:

| | 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 [26]:
```
data.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 [27]:
```
data.describe()
```

Out[27]:

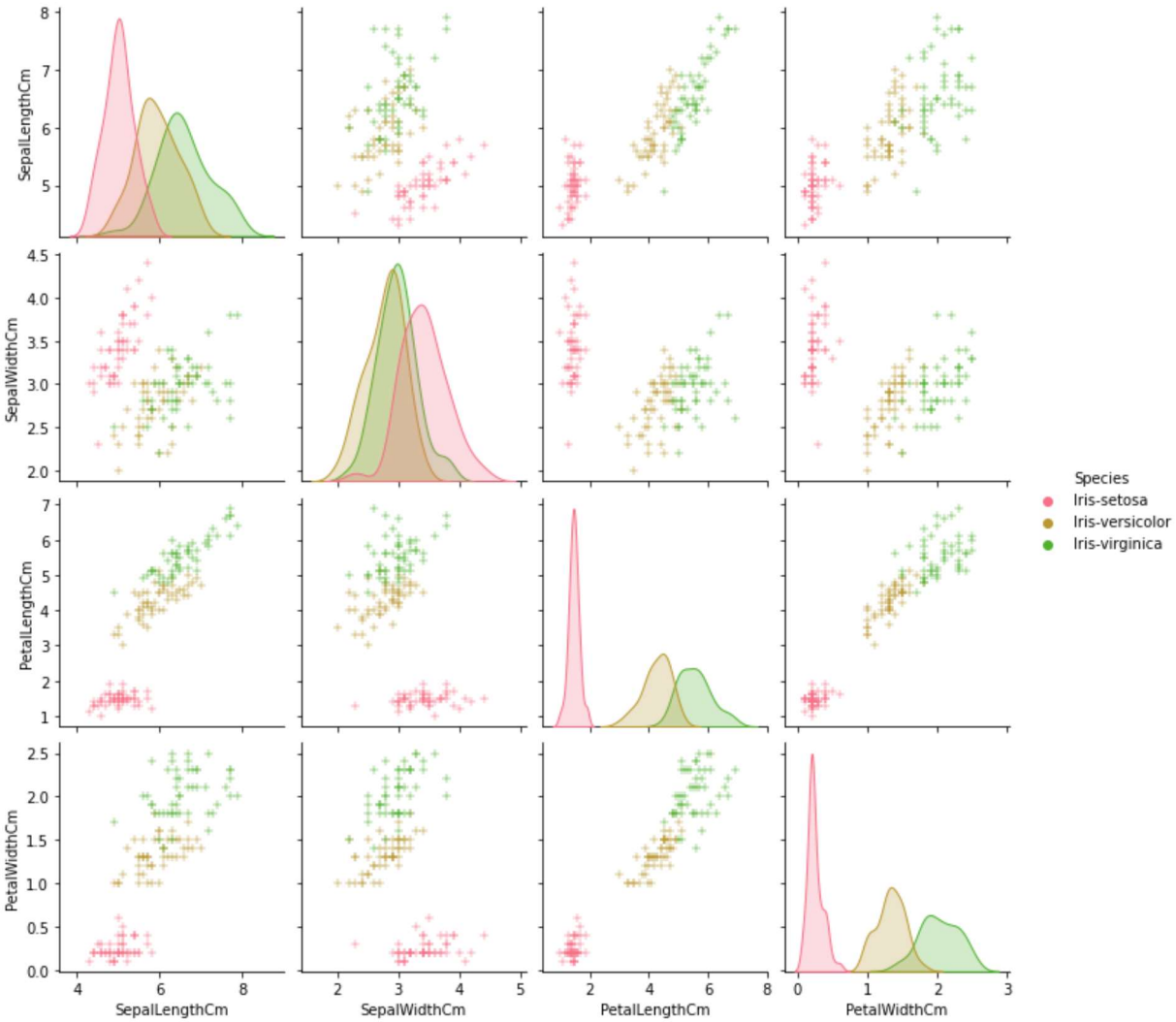
| | Id | SepalLengthCm | SepalWidthCm | PetalLengthCm | PetalWidthCm |
|---|---|---|---|---|---|
| **count** | 150.000000 | 150.000000 | 150.000000 | 150.000000 | 150.000000 |
| **mean** | 75.500000 | 5.843333 | 3.054000 | 3.758667 | 1.198667 |
| **std** | 43.445368 | 0.828066 | 0.433594 | 1.764420 | 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 [28]:
```
data['Species'].value_counts()
```

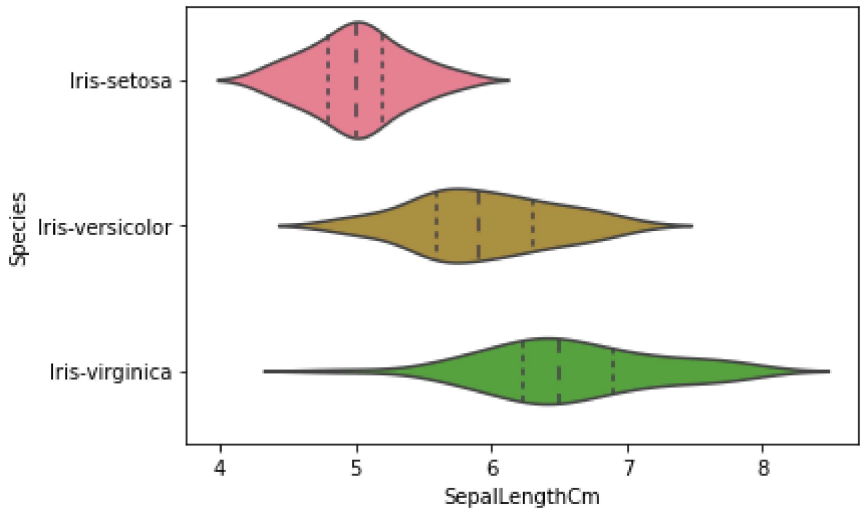
Out[28]:
```
Iris-setosa        50
Iris-versicolor    50
Iris-virginica     50
Name: Species, dtype: int64
```

# Data Visualization

In [29]:
```
tmp = data.drop('Id', axis=1)
g = sns.pairplot(tmp, hue='Species', markers='+')
plt.show()
```




In [30]:
```
g = sns.violinplot(y='Species', x='SepalLengthCm', data=data, inner='quartile')
plt.show()
```




In [31]:
```
X = data.drop(['Id', 'Species'], axis=1)
```

```
y = data['Species']
# print(X.head())
print(X.shape)
# print(y.head())
print(y.shape)
```

```
(150, 4)
(150,)
```

In [32]:
```
data.isnull().sum()
```

Out[32]:
```
Id               0
SepalLengthCm    0
SepalWidthCm     0
PetalLengthCm    0
PetalWidthCm     0
Species          0
dtype: int64
```

In [33]:
```
data1 = data.drop_duplicates(subset ="Species",)
data1
```

Out[33]:

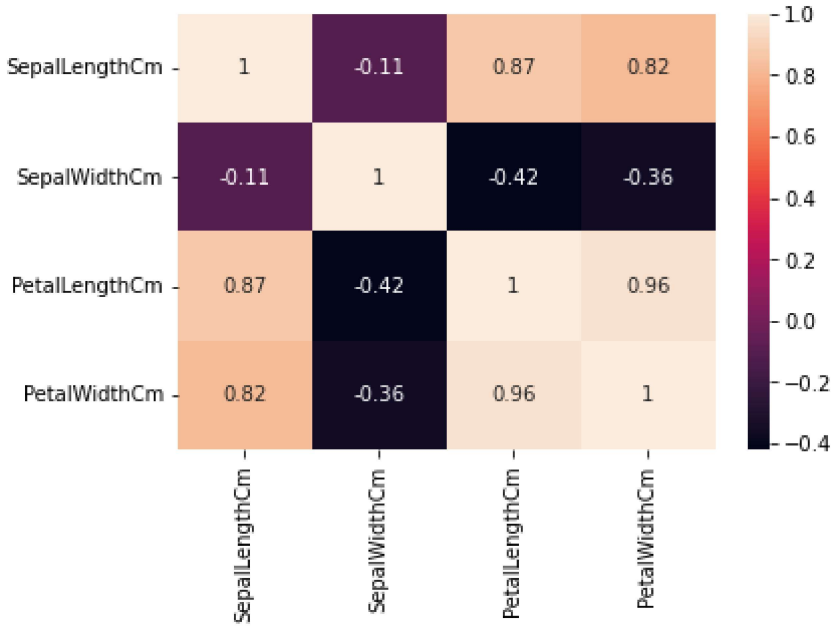
| | Id | SepalLengthCm | SepalWidthCm | PetalLengthCm | PetalWidthCm | Species |
|---|---|---|---|---|---|---|
| **0** | 1 | 5.1 | 3.5 | 1.4 | 0.2 | Iris-setosa |
| **50** | 51 | 7.0 | 3.2 | 4.7 | 1.4 | Iris-versicolor |
| **100** | 101 | 6.3 | 3.3 | 6.0 | 2.5 | Iris-virginica |

In [34]:
```
data.corr(method='pearson')
```

Out[34]:

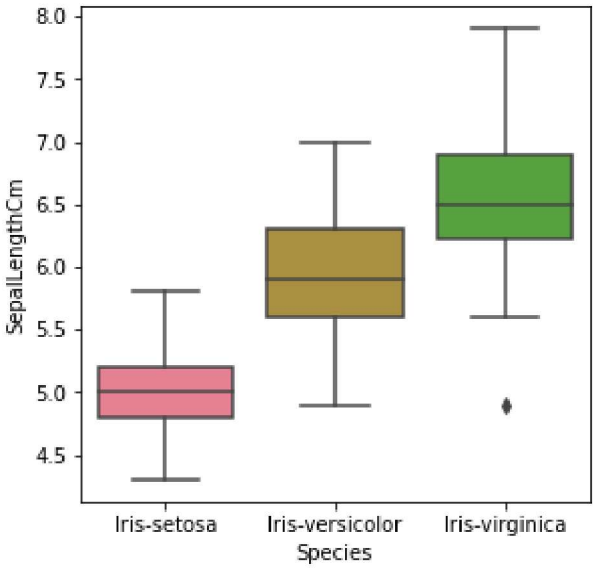
| | Id | SepalLengthCm | SepalWidthCm | PetalLengthCm | PetalWidthCm |
|---|---|---|---|---|---|
| **Id** | 1.000000 | 0.716676 | -0.397729 | 0.882747 | 0.899759 |
| **SepalLengthCm** | 0.716676 | 1.000000 | -0.109369 | 0.871754 | 0.817954 |
| **SepalWidthCm** | -0.397729 | -0.109369 | 1.000000 | -0.420516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

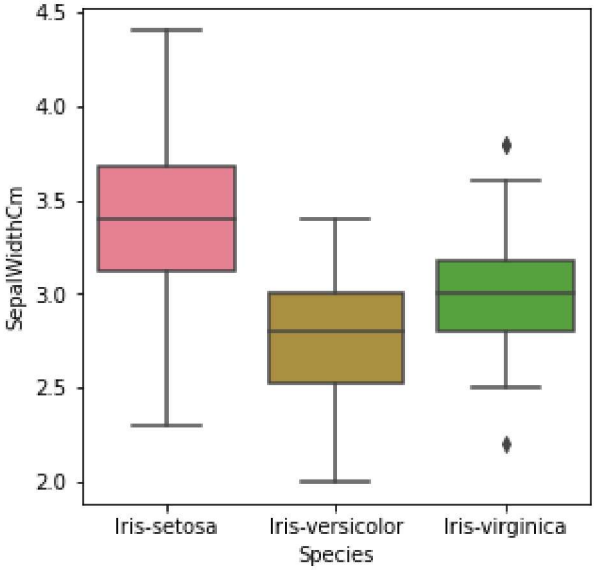
In [35]:
```
# importing packages
import seaborn as sns
import matplotlib.pyplot as plt


sns.heatmap(data.corr(method='pearson').drop(
  ['Id'], axis=1).drop(['Id'], axis=0),
            annot = True);

plt.show()
```

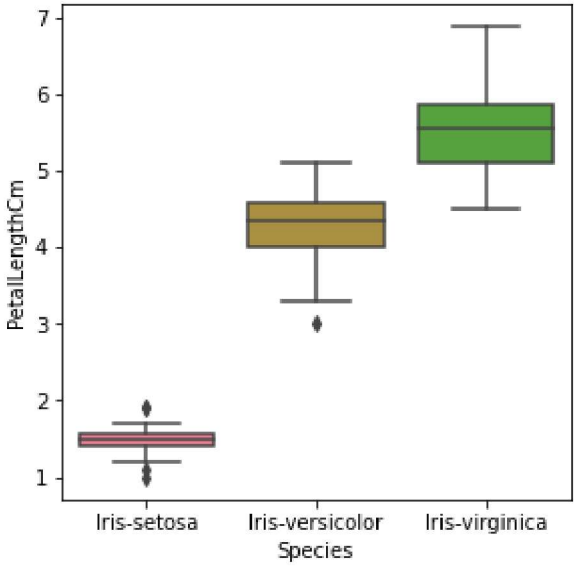


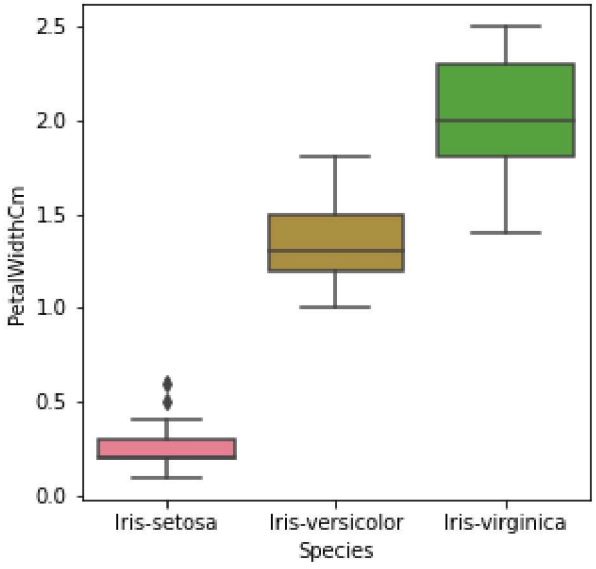

In [36]:

```
# importing packages
import seaborn as sns
import matplotlib.pyplot as plt

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

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

# Adding the subplot at the specified
# grid position
plt.subplot(221)
graph('SepalLengthCm')

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

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

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

plt.show()
```

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