In [ ]:
```
Pooja Dhumal
LGM task 2
Name-Iris flower classification ML project
```

In [54]:
```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
sns.set(style='white', color_codes=True)

from sklearn.linear_model import LogisticRegression
from sklearn.model_selection import train_test_split
from sklearn.neighbors import KNeighborsClassifier
from sklearn import svm
from sklearn import metrics
from sklearn.tree import DecisionTreeClassifier
```

In [58]:
```
df= pd.read_csv(r"C:\Users\Pooja\Downloads\Iris.csv")
```

In [22]:
```
df
```

Out[22]:

	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 [59]:
```
df.head()
```

Out[59]:

	Id	SepalLengthCm	SepalWidthCm	PetalLengthCm	PetalWidthCm	Species
0	1	5.1	3.5	1.4	0.2	Iris-setosa

	Id	SepalLengthCm	SepalWidthCm	PetalLengthCm	PetalWidthCm	Species
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

In [60]:
```
df.tail()
```

Out[60]:

	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 [61]:
```
df.shape
```

Out[61]:
```
(150, 6)
```

In [62]:
```
df.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 [63]:
```
df.isnull().sum()
```

Out[63]:
```
Id               0
SepalLengthCm    0
SepalWidthCm     0
PetalLengthCm    0
PetalWidthCm     0
Species          0
dtype: int64
```

In [64]:
```
df.describe()
```

Out[64]:

	Id	SepalLengthCm	SepalWidthCm	PetalLengthCm	PetalWidthCm

	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

In [65]:
```
df.nunique()
```

Out[65]:
```
Id               150
SepalLengthCm     35
SepalWidthCm      23
PetalLengthCm     43
PetalWidthCm      22
Species            3
dtype: int64
```

In [66]:
```
df['SepalWidthCm'].value_counts()
```

Out[66]:
```
3.0    26
2.8    14
3.2    13
3.1    12
3.4    12
2.9    10
2.7     9
2.5     8
3.5     6
3.3     6
3.8     6
2.6     5
2.3     4
3.7     3
2.4     3
2.2     3
3.6     3
3.9     2
4.4     1
4.0     1
4.1     1
4.2     1
2.0     1
Name: SepalWidthCm, dtype: int64
```

In [67]:
```
df.corr()
```

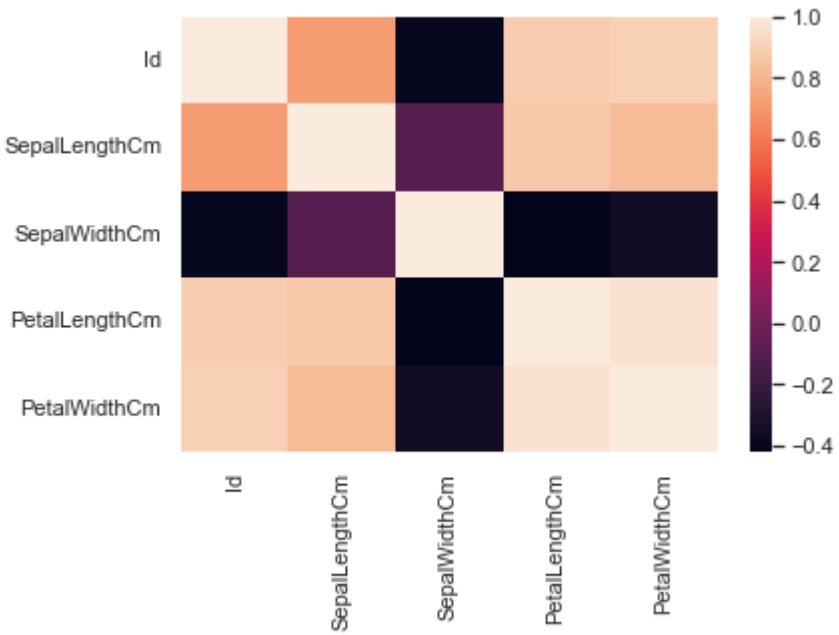
Out[67]:

	Id	SepalLengthCm	SepalWidthCm	PetalLengthCm	PetalWidthCm

	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 [68]:
```
sns.heatmap(df.corr())
```

Out[68]:
```
<AxesSubplot:>
```



In [69]:
```
df.columns
```

Out[69]:
```
Index(['Id', 'SepalLengthCm', 'SepalWidthCm', 'PetalLengthCm', 'PetalWidthCm',
       'Species'],
      dtype='object')
```

In [70]:
```
n = len(df[df['Species'] == 'Iris-versicolor'])
print("No of Versicolor in Dataset:",n)
```

```
No of Versicolor in Dataset: 50
```

In [71]:
```
n1 = len(df[df['Species'] == 'Iris-versicolor'])
print("No of Versicolor in Dataset:",n1)
```

```
No of Versicolor in Dataset: 50
```

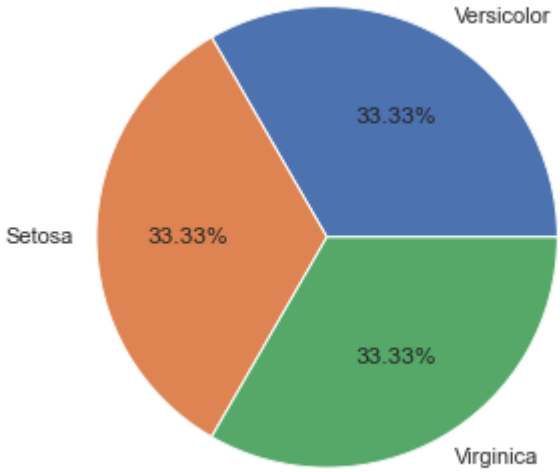
In [72]:
```
n2 = len(df[df['Species'] == 'Iris-versicolor'])
print("No of Versicolor in Dataset:",n2)
```

```
No of Versicolor in Dataset: 50
```

In [73]:
```
df.isnull().sum()
```

Out[73]:
```
Id               0
SepalLengthCm    0
SepalWidthCm     0
PetalLengthCm    0
PetalWidthCm     0
Species          0
dtype: int64
```

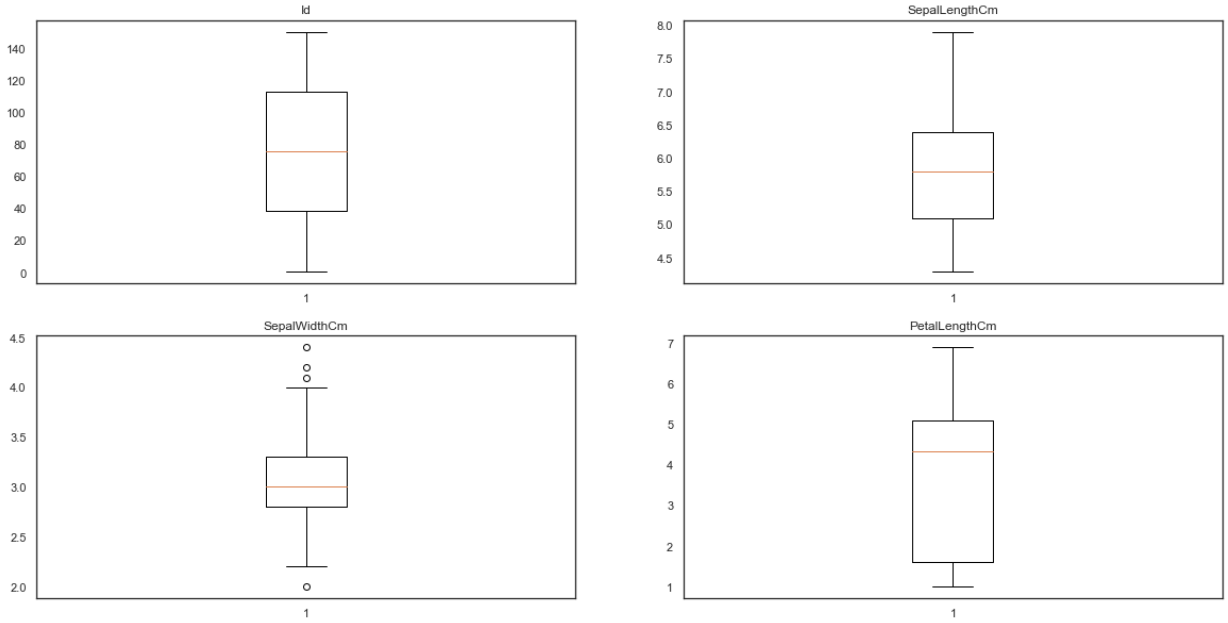
In [78]:
```
fig = plt.figure()
ax = fig.add_axes([0,0,1,1])
ax.axis('equal')
l = ['Versicolor', 'Setosa', 'Virginica']
s = [50, 50, 50]
ax.pie(s, labels = l,autopct= '%1.2f%%')

plt.show()
```



In [79]:
```
# Checking outliers
rows = 2
cols = 2
fig, axs = plt.subplots(rows,cols)
index=-1
for i in range(rows):
  for j in range(cols):
    index+=1
    axs[i,j].boxplot(df[df.columns[index]])
    axs[i,j].set_title(df.columns[index])
fig.set_size_inches(10,5)
fig.show()
```

```
C:\Users\urmil\AppData\Local\Temp/ipykernel_11072/1577605351.py:12: UserWarnin
g: Matplotlib is currently using module://matplotlib_inline.backend_inline, wh
ich is a non-GUI backend, so cannot show the figure.
```

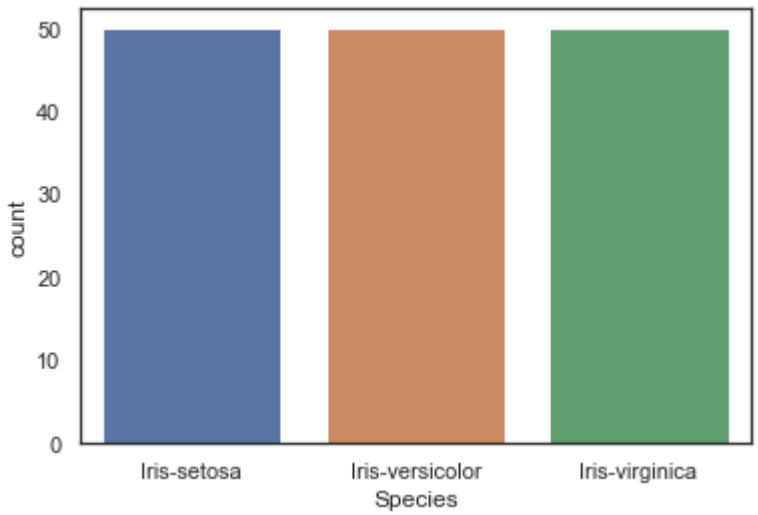
fig.show()



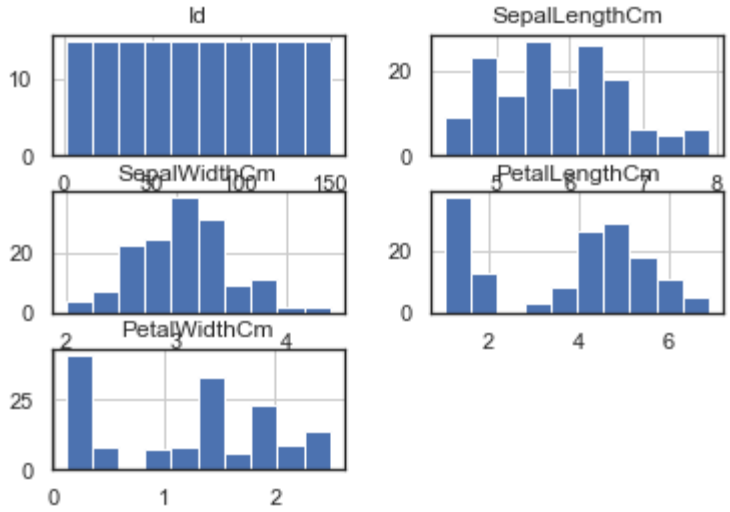
In [80]:
```
sns.countplot(df['Species'])
```

```
C:\Users\urmil\Documents\URMI\lib\site-packages\seaborn\_decorators.py:36: Fut
ureWarning: Pass the following variable as a keyword arg: x. From version 0.1
2, the only valid positional argument will be `data`, and passing other argume
nts without an explicit keyword will result in an error or misinterpretation.
  warnings.warn(
```

Out[80]:
```
<AxesSubplot:xlabel='Species', ylabel='count'>
```

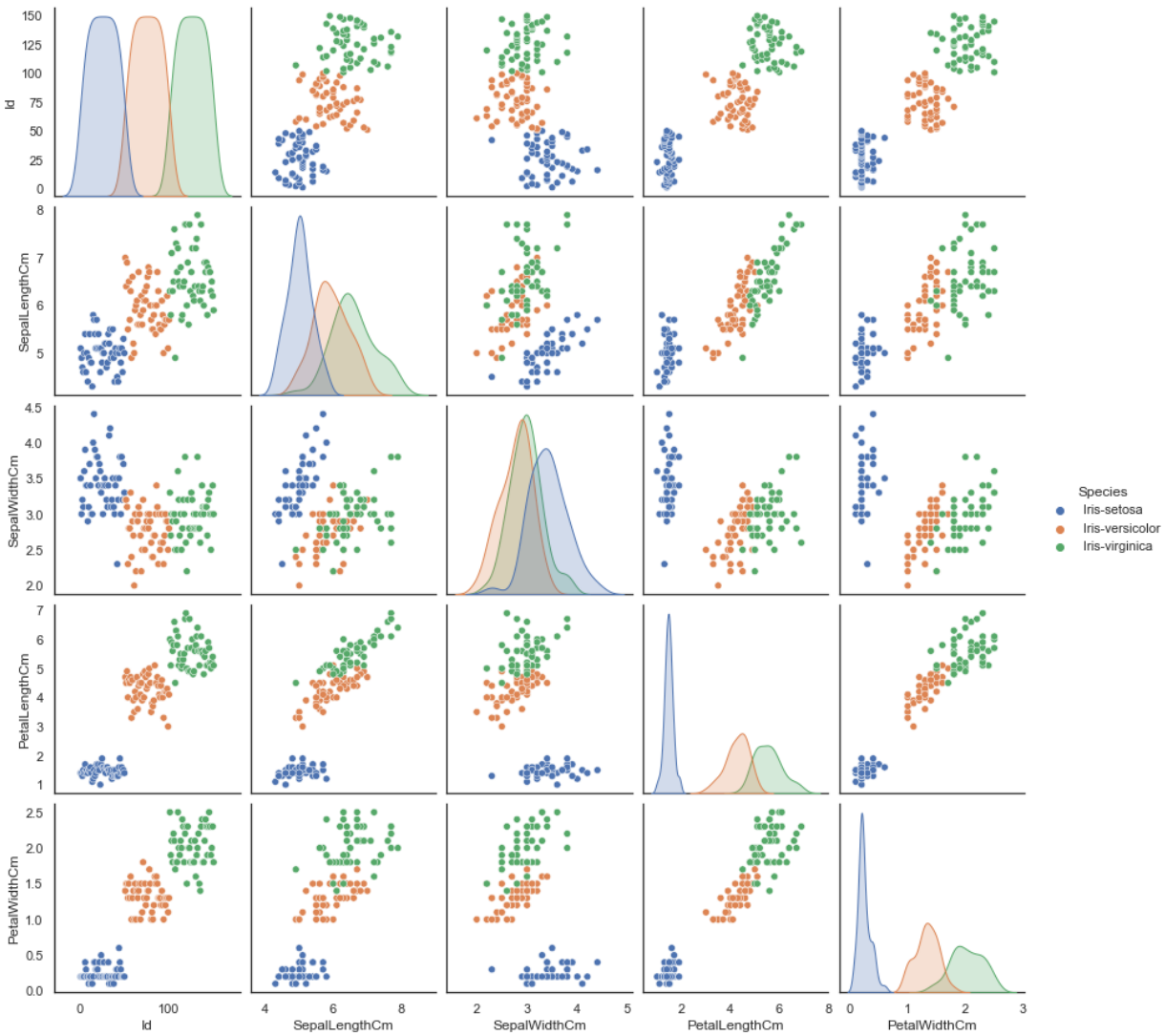


In [81]:
```
df.hist()
plt.show()
```



In [82]:
```
sns.pairplot(df,hue='Species')
```

Out[82]: <seaborn.axisgrid.PairGrid at 0x15a1fd24220>



In [83]:
```
train, test = train_test_split(df, test_size = 0.24)
print(train.shape)
print(test.shape)
```

```
(112, 6)
(38, 6)
```

In [106…
```
train_X = df[['SepalLengthCm', 'SepalWidthCm', 'PetalLengthCm', 'PetalWidthCm

train_y = df.Species

test_X = df[['SepalLengthCm', 'SepalWidthCm', 'PetalLengthCm', 'PetalWidthCm',

test_y = df.Species
```

In [101…
```
train_X.head()
```

Out[101…

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

In [107…
```
test_y.head()
```

Out[107…
```
0    Iris-setosa
1    Iris-setosa
2    Iris-setosa
3    Iris-setosa
4    Iris-setosa
Name: Species, dtype: object
```

In [108…
```
#Using LogisticRegression
model = LogisticRegression()
model.fit(train_X, train_y)
prediction = model.predict(test_X)
print('Accuracy:',metrics.accuracy_score(prediction,test_y))
```

```
Accuracy: 0.9733333333333334
```

In [112…

```
#Using Support Vector
from sklearn.svm import SVC
model1 = SVC()
model1.fit(train_X,train_y)

pred_y = model1.predict(test_X)

from sklearn.metrics import accuracy_score
print("Acc=",accuracy_score(test_y,pred_y))
```

```
Acc= 0.9733333333333334
```

In [113…

```
#Using KNN Neighbours
from sklearn.neighbors import KNeighborsClassifier
model2 = KNeighborsClassifier(n_neighbors=5)
model2.fit(train_X,train_y)
y_pred2 = model2.predict(test_X)

from sklearn.metrics import accuracy_score
print("Accuracy Score:,accuracy_score(test_y,y_pred2)")
```

```
Accuracy Score:,accuracy_score(test_y,y_pred2)
```