In [1]:
```
#IMPORT NECESSARY LIBRARIES
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
```

In [2]:
```
#loading dataset.

iris_df= pd.read_csv("C:\\Users\\skp18\\Downloads\\archive (3)\\IRIS.csv")
```

In [5]:
```
iris_df.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
```

In [3]:
```
iris_df.head()
```

Out[3]:

	sepal_length	sepal_width	petal_length	petal_width	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 [4]:
```
iris_df.describe()
```

Out[4]:

	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

In [7]:
```
#check for null values and data cleaning.
iris_df.isnull().sum()/len(iris_df)*100
```

Out[7]:
```
sepal_length    0.0
sepal_width     0.0
petal_length    0.0
petal_width     0.0
species         0.0
dtype: float64
```

In [8]:
```
iris_df.duplicated().sum()
```

Out[8]:
```
3
```

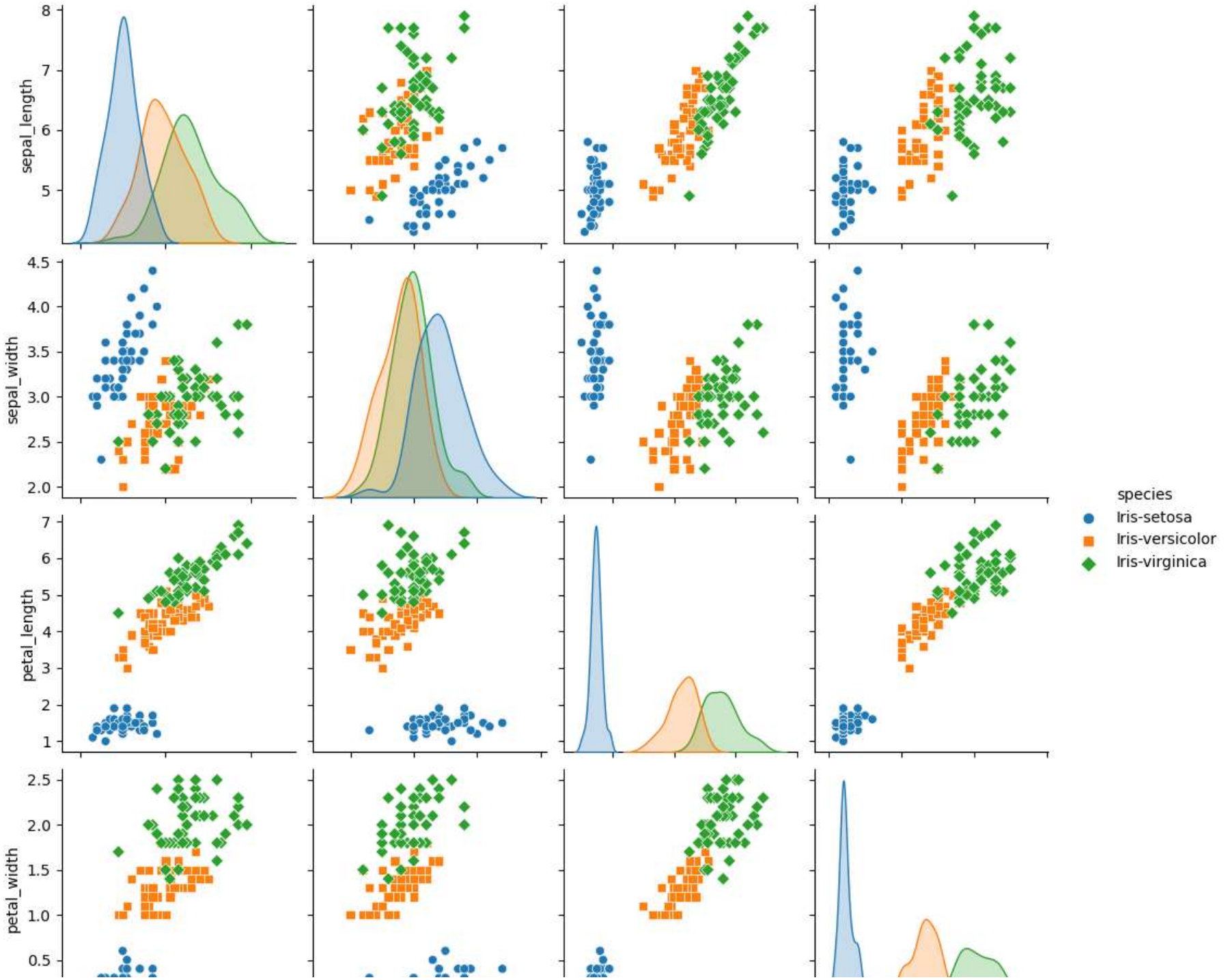
In [15]:
```
new_df = iris_df.drop_duplicates()
new_df.duplicated().sum()
```

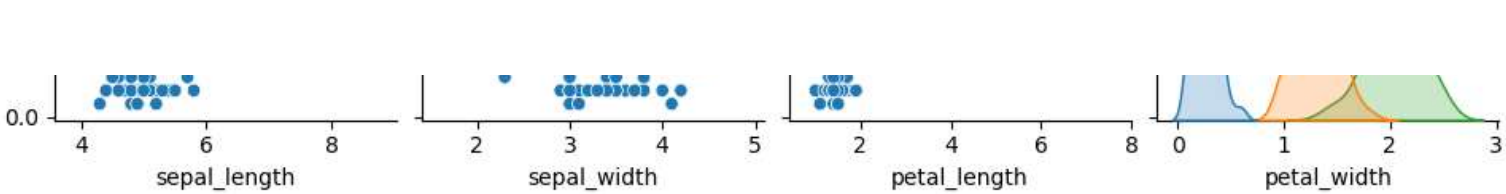
Out[15]:
```
0
```

In [ ]:
```
#DATA VISUALIZATION
```

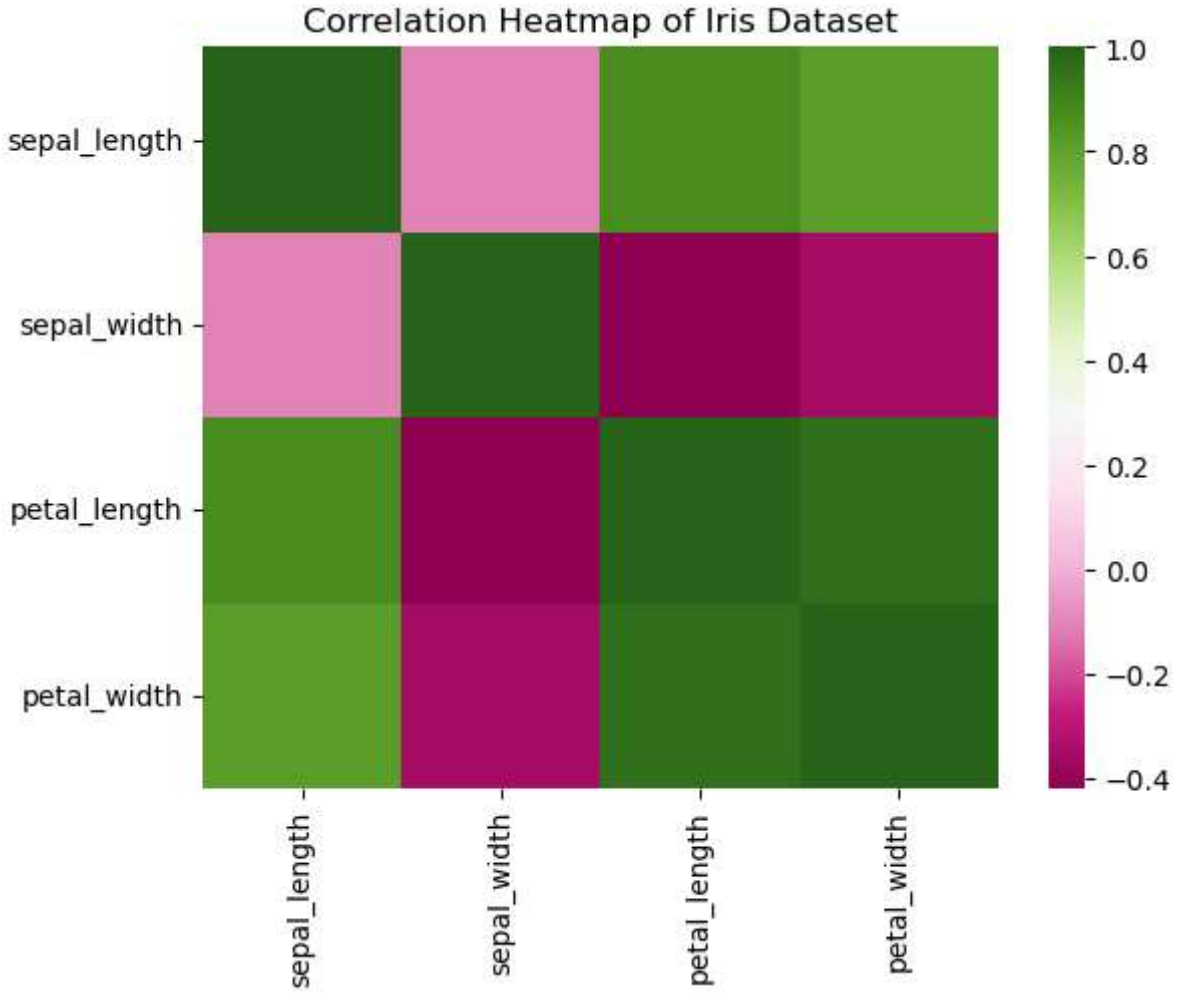
In [22]:
```
sns.pairplot(iris_df, hue='species', markers=["o", "s", "D"])
plt.show()
```

```
C:\Users\skp18\anaconda3\Lib\site-packages\seaborn\axisgrid.py:118: UserWarning: The figure layout has changed to tig
ht
  self._figure.tight_layout(*args, **kwargs)
```


sepal_length
sepal_width
petal_length
petal_width
species
Iris-setosa
Iris-versicolor
Iris-virginica


0.0
4
6
8
sepal_length
2
3
4
5
sepal_width
2
4
6
8
petal_length
0
1
2
3
petal_width

In [23]:
```
#finding correlation
numeric_df = iris_df.select_dtypes(include=['float64'])
iris_corr = numeric_df.corr()
sns.heatmap(iris_corr,cmap='PiYG')
plt.title('Correlation Heatmap of Iris Dataset')
plt.xticks(rotation=90)
plt.yticks(rotation=0)
plt.show()
```



In [27]:
```python
#training model

from sklearn.model_selection import train_test_split
from sklearn.tree import DecisionTreeClassifier
from sklearn.metrics import accuracy_score, classification_report, confusion_matrix
from sklearn import tree

X = new_df.drop('species', axis=1)
y = new_df['species']


X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2, random_state=42)

clf = DecisionTreeClassifier()

clf.fit(X_train, y_train)

y_pred = clf.predict(X_test)

accuracy = accuracy_score(y_test, y_pred)
report = classification_report(y_test, y_pred)

print(f"Accuracy: {accuracy}")
print("Classification Report:\n", report)
```

```
Accuracy: 0.9666666666666667
Classification Report:
                  precision    recall  f1-score   support

    Iris-setosa       1.00      1.00      1.00        11
Iris-versicolor       1.00      0.90      0.95        10
 Iris-virginica       0.90      1.00      0.95         9

       accuracy                           0.97        30
      macro avg       0.97      0.97      0.96        30
   weighted avg       0.97      0.97      0.97        30
```