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Div : G

[1]:
```
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns


data = {
    'sepal_length': [5.1, 4.9, 4.7, 4.6, 5.0, 5.4, 4.6, 5.0, 4.4, 4.9, 5.4, 4.
 ↪8, 4.8, 4.3, 5.8, 5.7, 5.4, 5.1, 5.7, 5.1],
    'sepal_width': [3.5, 3.0, 3.2, 3.1, 3.6, 3.9, 3.4, 3.4, 2.9, 3.1, 3.7, 3.4,␣
 ↪3.0, 3.0, 4.0, 4.4, 3.9, 3.5, 3.8, 3.8],
    'petal_length': [1.4, 1.4, 1.3, 1.5, 1.4, 1.7, 1.4, 1.5, 1.4, 1.5, 1.5, 1.
 ↪6, 1.4, 1.1, 1.2, 1.5, 1.3, 1.4, 1.7, 1.5],
    'petal_width': [0.2, 0.2, 0.2, 0.2, 0.2, 0.4, 0.3, 0.2, 0.2, 0.1, 0.2, 0.2,␣
 ↪0.1, 0.1, 0.2, 0.4, 0.4, 0.3, 0.3, 0.3],
    'species': ['setosa', 'setosa', 'setosa', 'setosa', 'setosa', 'setosa',␣
 ↪'setosa', 'setosa', 'setosa', 'setosa',
                'versicolor', 'versicolor', 'versicolor', 'versicolor',␣
 ↪'versicolor', 'versicolor', 'versicolor',
                'versicolor', 'versicolor', 'versicolor']
}

df = pd.DataFrame(data)


grains = df.sample(n=10)
print("10 Grains:")
print(grains)
print()


plt.figure(figsize=(8, 6))
sns.scatterplot(x='sepal_length', y='sepal_width', hue='species', data=df)
plt.title("Sepal Length vs Sepal Width")
plt.xlabel("Sepal Length")
plt.ylabel("Sepal Width")
```

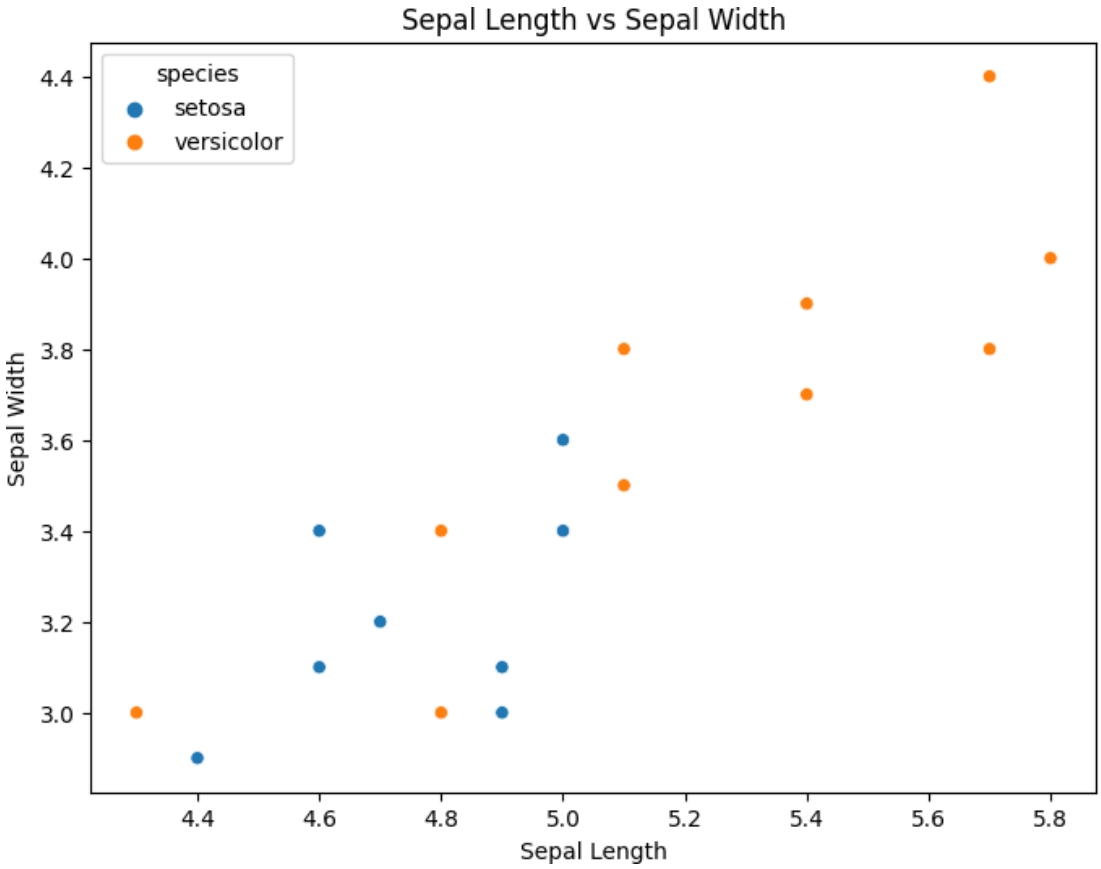
```
plt.show()
```

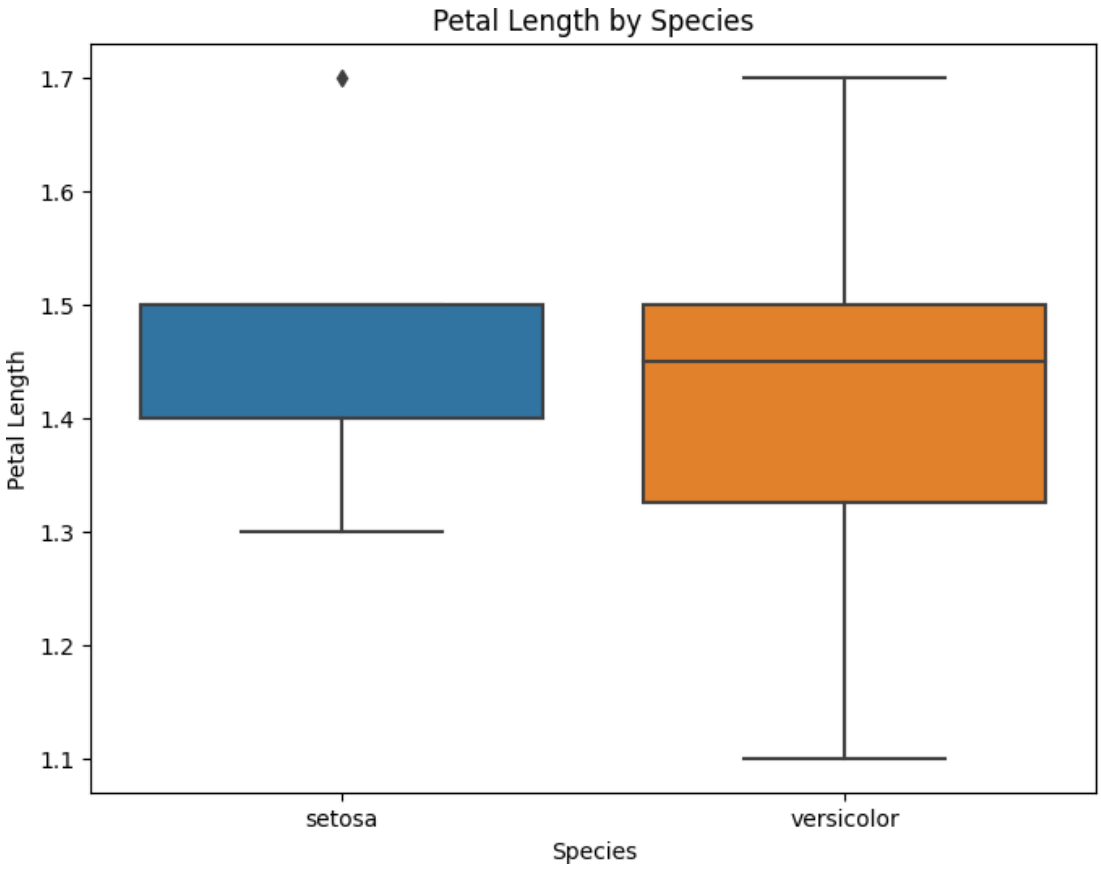
```
plt.figure(figsize=(8, 6))
sns.boxplot(x='species', y='petal_length', data=df)
plt.title("Petal Length by Species")
plt.xlabel("Species")
plt.ylabel("Petal Length")
plt.show()

plt.figure(figsize=(8, 6))
sns.violinplot(x='species', y='petal_width', data=df)
plt.title("Petal Width by Species")
plt.xlabel("Species")
plt.ylabel("Petal Width")
plt.show()


plt.figure(figsize=(8, 6))
sns.histplot(data=df, x='sepal_length', kde=True)
plt.title("Distribution of Sepal Length")
plt.xlabel("Sepal  Length")
plt.ylabel("Frequency")
plt.show()

plt.figure(figsize=(8, 6))
sns.barplot(x='species', y='sepal_width', data=df)
plt.title("Mean Sepal Width by Species")
plt.xlabel("Species")
plt.ylabel("Mean Sepal Width")
plt.show()

sns.pairplot(df, hue='species')
plt.title("Pairwise Relationships")
plt.show()

correlation = df.corr()
plt.figure(figsize=(8, 6))
sns.heatmap(correlation, annot=True, cmap='coolwarm')
plt.title("Correlation Heatmap")
plt.show()
```

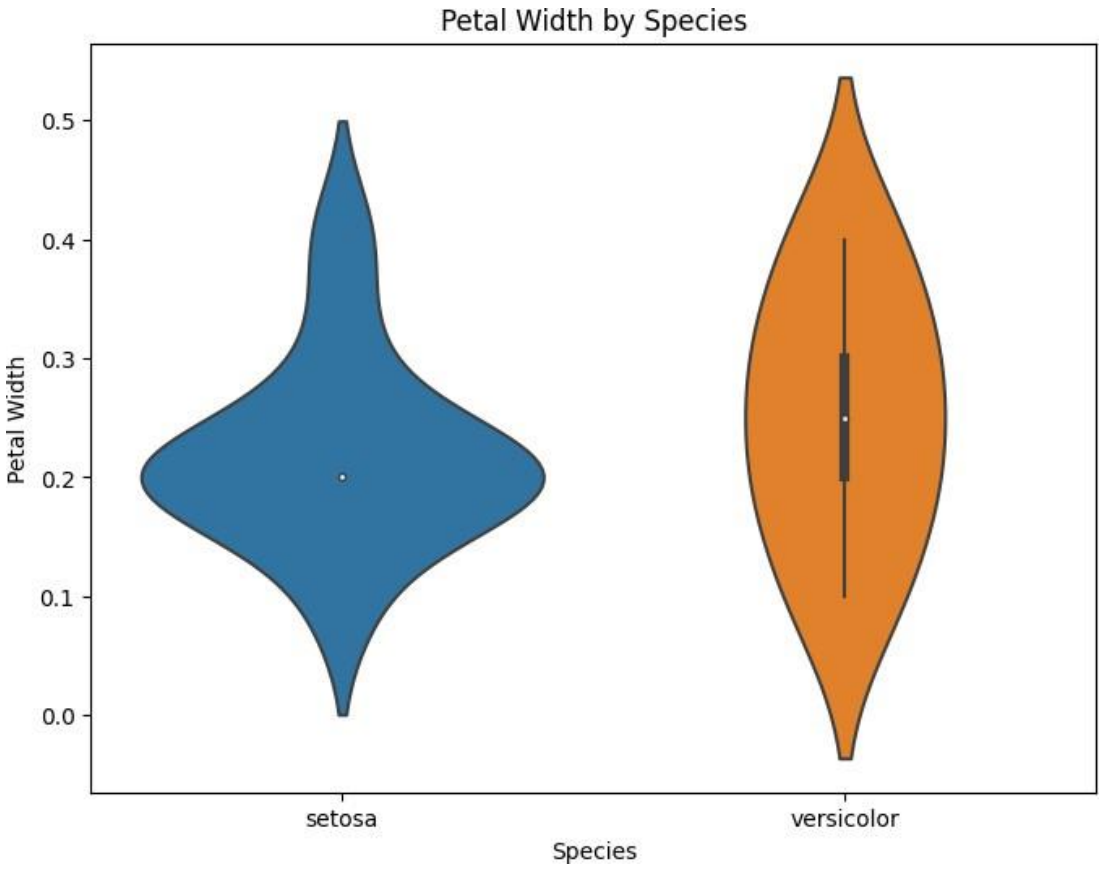
10 Grains:

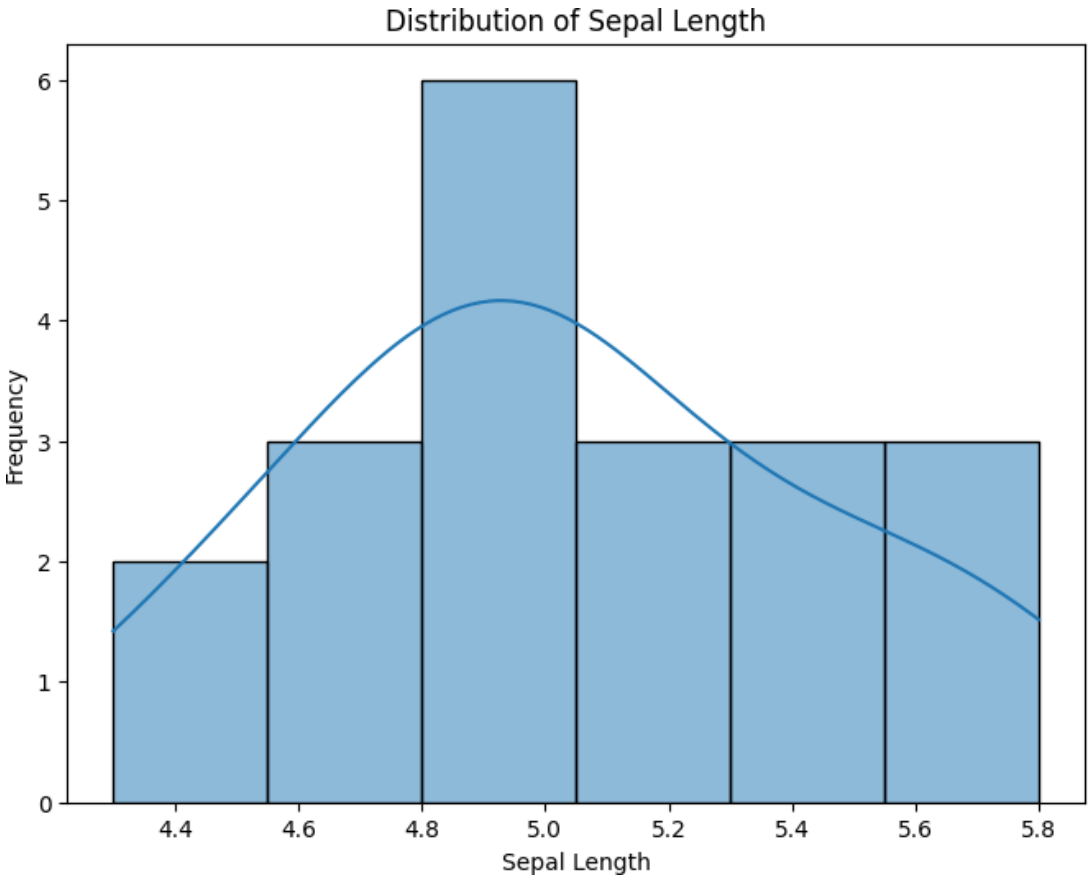
	sepal_length	sepal_width	petal_length	petal_width	species
18	5.7	3.8	1.7	0.3	versicolor
17	5.1	3.5	1.4	0.3	versicolor
6	4.6	3.4	1.4	0.3	setosa
10	5.4	3.7	1.5	0.2	versicolor
3	4.6	3.1	1.5	0.2	setosa
14	5.8	4.0	1.2	0.2	versicolor

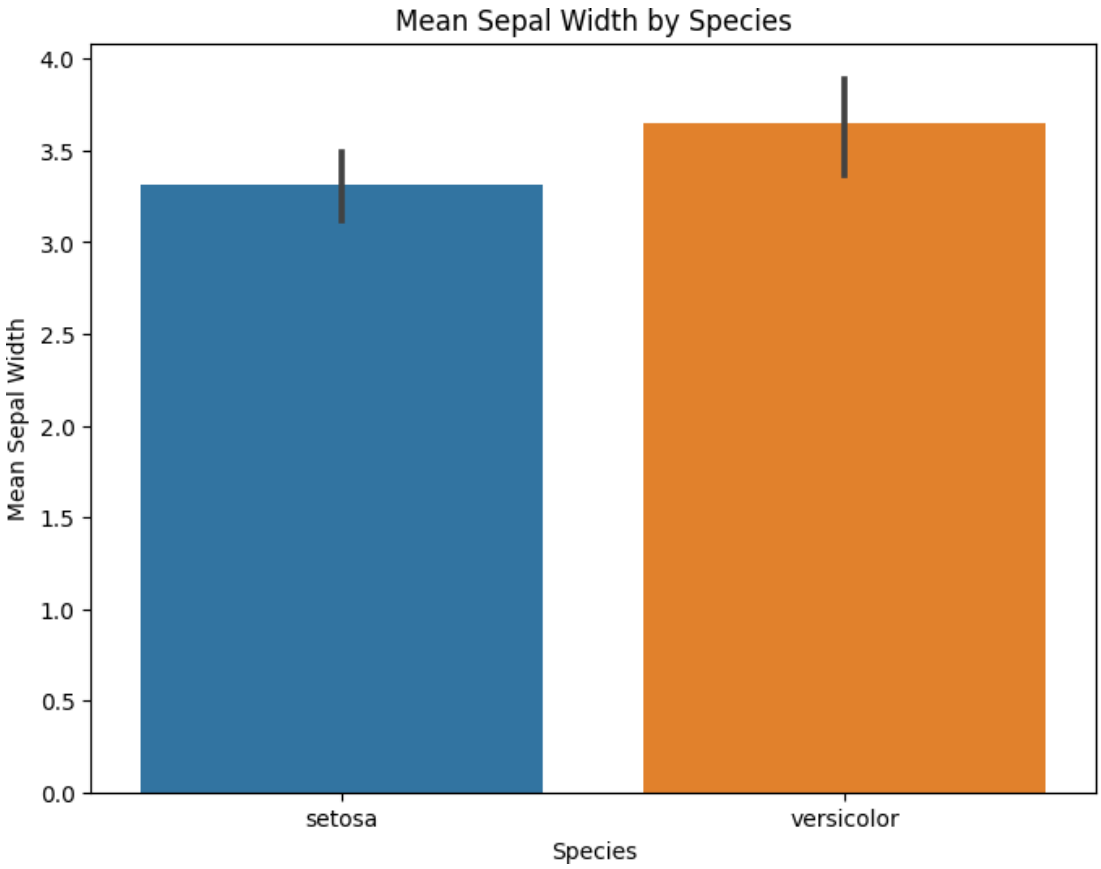
11	4.8	3.4	1.6	0.2	versicolor
16	5.4	3.9	1.3	0.4	versicolor
7	5.0	3.4	1.5	0.2	setosa
2	4.7	3.2	1.3	0.2	setosa

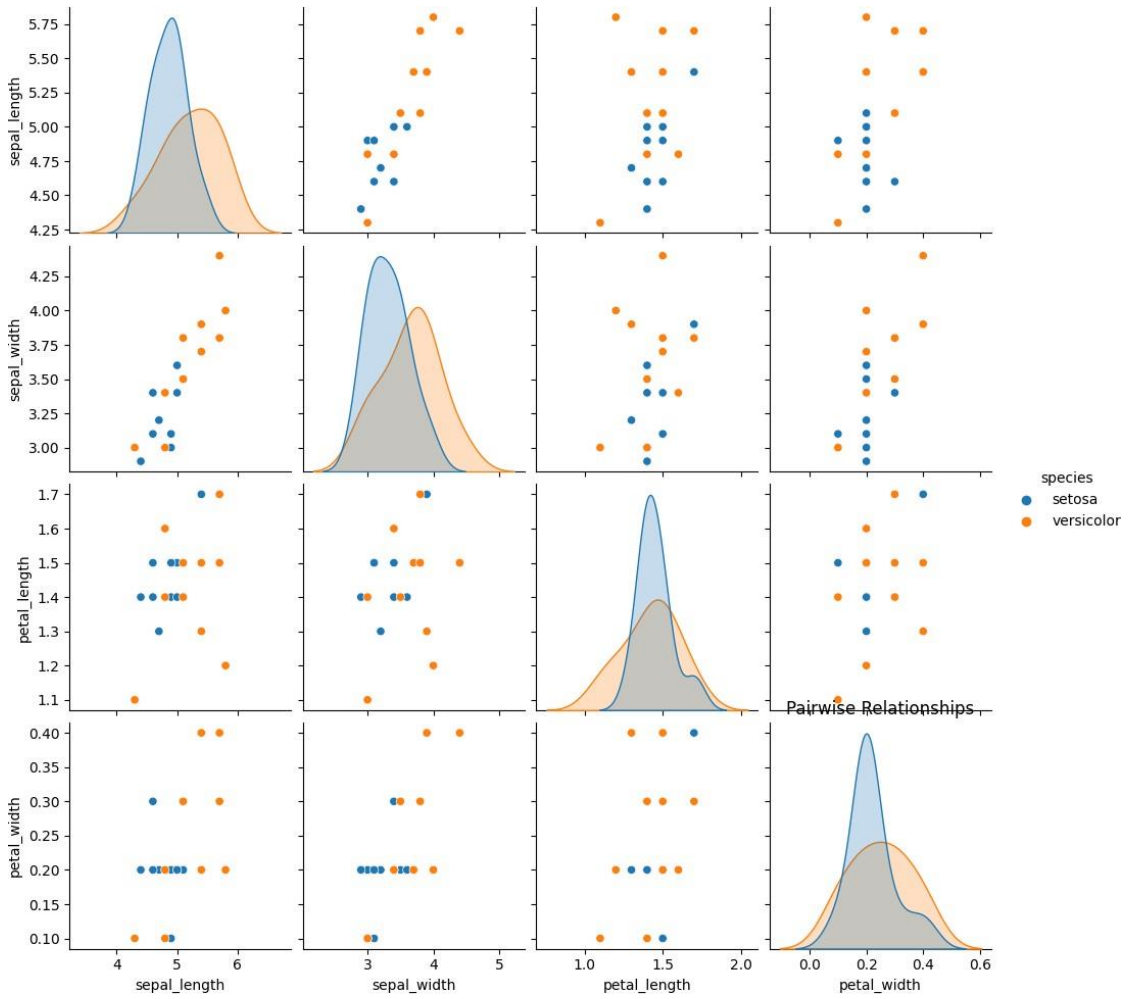



Petal Length by Species
1.7
1.6
1.5
1.4
1.3
1.2
1.1
Petal Length
setosa
versicolor
Species


Petal Width by Species
Petal Width
0.5
0.4
0.3
0.2
0.1
0.0
setosa
versicolor
Species

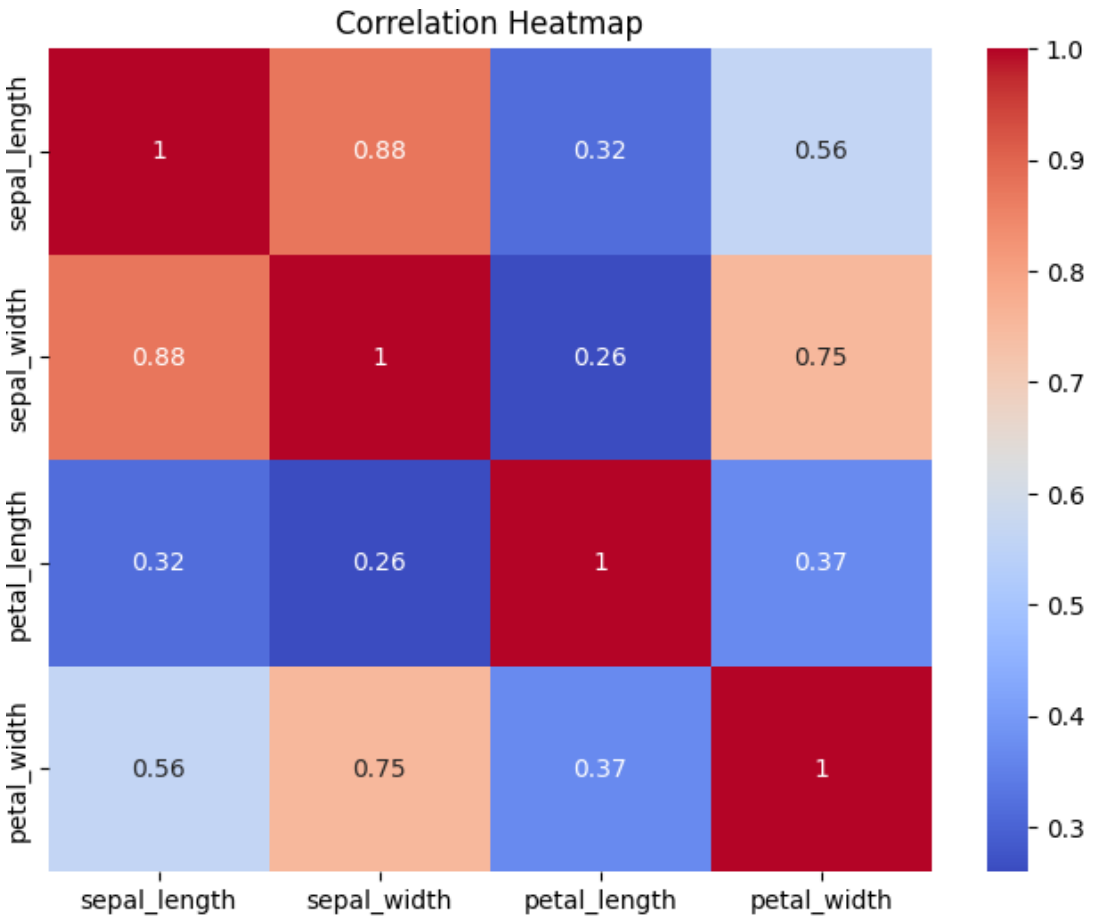

Distribution of Sepal Length
Frequency
Sepal Length
0
1
2
3
4
5
6
4.4
4.6
4.8
5.0
5.2
5.4
5.6
5.8


Mean Sepal Width by Species
Mean Sepal Width
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
setosa
versicolor
Species



<ipython-input-2-74da105c4e26>:72: FutureWarning: 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 specify the value of numeric_only to silence this warning.

```
  correlation = df.corr()
```


Correlation Heatmap
sepal_length
sepal_width
petal_length
petal_width
1
0.88
0.32
0.56
0.88
1
0.26
0.75
0.32
0.26
1
0.37
0.56
0.75
0.37
1
sepal_length
sepal_width
petal_length
petal_width
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3