```python
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
import warnings
warnings.filterwarnings("ignore")

data=pd.read_csv("C:/Users/SRMVEC/Downloads/aneef iris dataset.csv")
data
```

```
    Id  SepalLengthCm  SepalWidthCm  PetalLengthCm  PetalWidthCm  \
0    1            5.1           3.5            1.4           0.2
1    2            4.9           3.0            1.4           0.2
2    3            5.0           3.3            1.4           0.2
3    4            5.2           3.6            1.5           0.2
4    5            5.4           3.9            1.7           0.4
5    6            6.2           2.8            4.8           1.8
6    7            6.1           3.0            4.6           1.4
7    8            6.3           2.9            5.6           1.8
8    9            5.7           2.8            4.5           1.3
9   10            5.9           3.0            5.1           1.8
10  11            5.5           2.4            3.8           1.1
11  12            5.6           2.7            4.2           1.3
12  13            6.0           2.2            4.0           1.0
13  14            6.4           3.2            4.5           1.5
14  15            5.8           2.7            5.1           1.9
15  16            7.1           3.0            5.9           2.1
16  17            5.0           3.4            1.5           0.2
17  18            4.7           3.2            1.3           0.2
18  19            6.5           3.0            5.2           2.0
19  20            6.7           3.1            4.7           1.5

            Species
0        Iris-setosa
1        Iris-setosa
2        Iris-setosa
3        Iris-setosa
4        Iris-setosa
5     Iris-virginica
6     Iris-virginica
7     Iris-virginica
8     Iris-virginica
9     Iris-virginica
10   Iris-versicolor
11   Iris-versicolor
12   Iris-versicolor
13    Iris-virginica
14    Iris-virginica
15    Iris-virginica
16       Iris-setosa
```

```
17        Iris-setosa
18    Iris-virginica
19    Iris-versicolor
```

data.head()

	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	5.0	3.3	1.4	0.2	Iris-setosa
3	4	5.2	3.6	1.5	0.2	Iris-setosa
4	5	5.4	3.9	1.7	0.4	Iris-setosa

data.info()

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 20 entries, 0 to 19
Data columns (total 6 columns):
 #   Column         Non-Null Count  Dtype
---  ------         --------------  -----
 0   Id             20 non-null     int64
 1   SepalLengthCm  20 non-null     float64
 2   SepalWidthCm   20 non-null     float64
 3   PetalLengthCm  20 non-null     float64
 4   PetalWidthCm   20 non-null     float64
 5   Species        20 non-null     object
dtypes: float64(4), int64(1), object(1)
memory usage: 1.1+ KB
```

data.describe()

	Id	SepalLengthCm	SepalWidthCm	PetalLengthCm	PetalWidthCm
count	20.00000	20.000000	20.000000	20.000000	20.000000
mean	10.50000	5.755000	3.035000	3.610000	1.105000
std	5.91608	0.661318	0.397724	1.692367	0.717066
min	1.00000	4.700000	2.200000	1.300000	0.200000
25%	5.75000	5.175000	2.800000	1.500000	0.200000
50%	10.50000	5.750000	3.000000	4.350000	1.300000

```
75%     15.25000        6.225000        3.225000        4.875000
1.800000
max     20.00000        7.100000        3.900000        5.900000
2.100000

data.isnull().sum()

Id              0
SepalLengthCm   0
SepalWidthCm    0
PetalLengthCm   0
PetalWidthCm    0
Species         0
dtype: int64

features = ['SepalLengthCm', 'SepalWidthCm', 'PetalLengthCm',
'PetalWidthCm']
for feature in features:
  plt.figure (figsize = (6, 4))
sns.histplot (data [feature], kde=True, bins=20)
plt.title (f"Distribution of {feature}")
plt.show ( )

<Figure size 600x400 with 0 Axes>

<Figure size 600x400 with 0 Axes>

<Figure size 600x400 with 0 Axes>
```
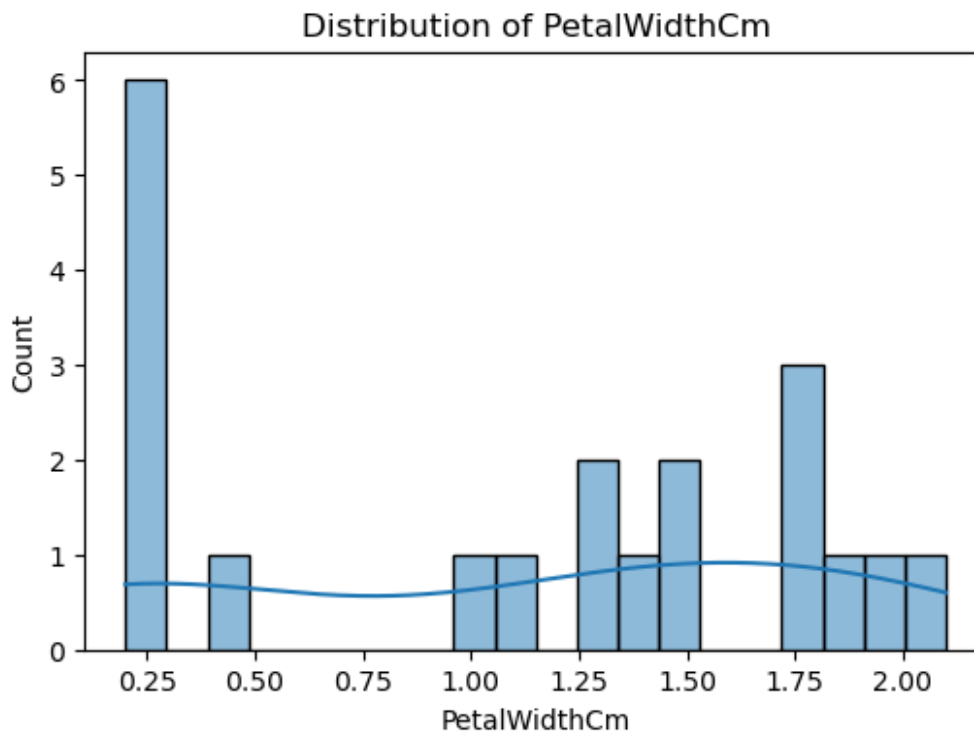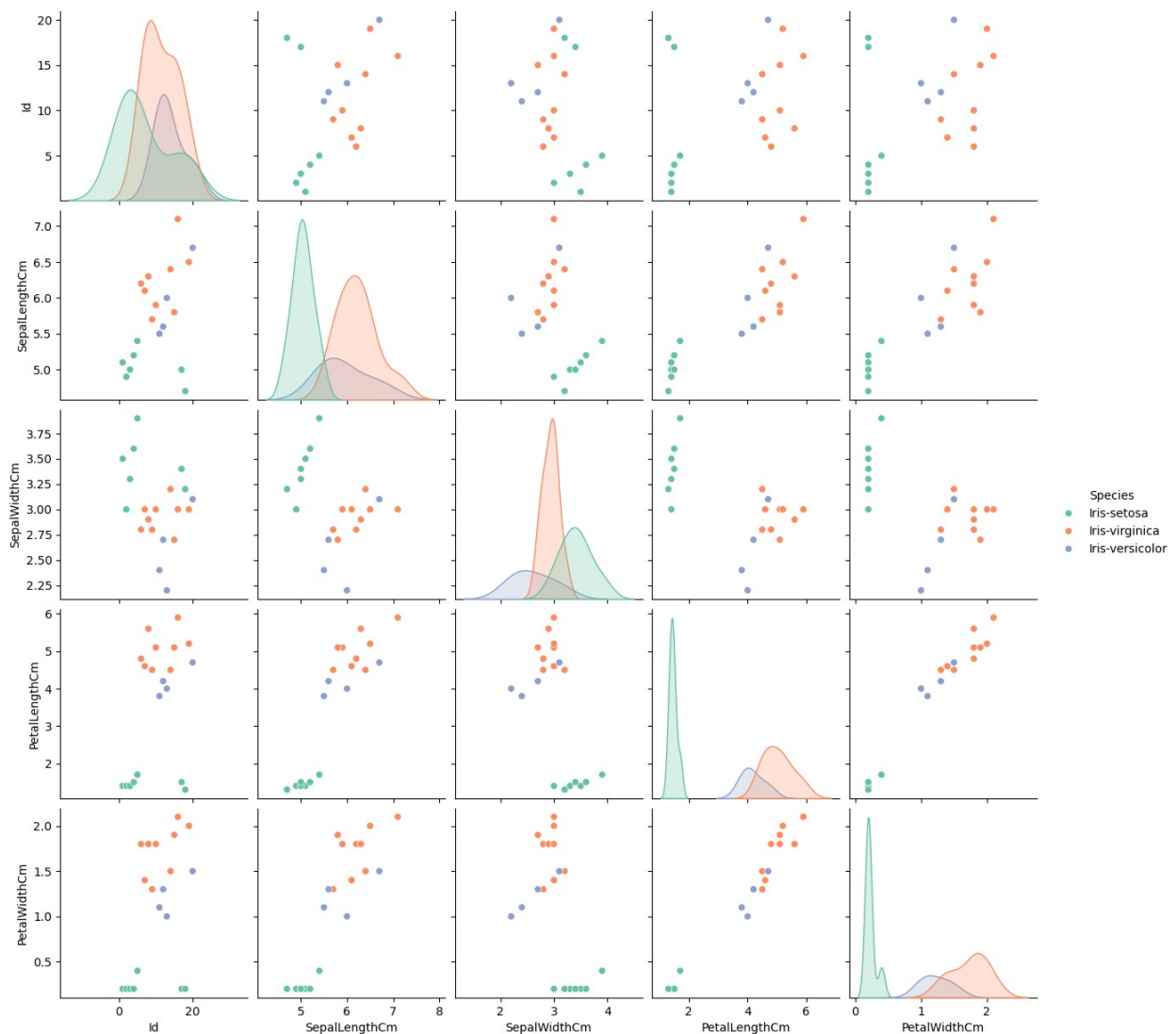

Distribution of PetalWidthCm

```
sns.pairplot(data, hue="Species", palette="Set2", diag_kind="kde")
plt.show()
```
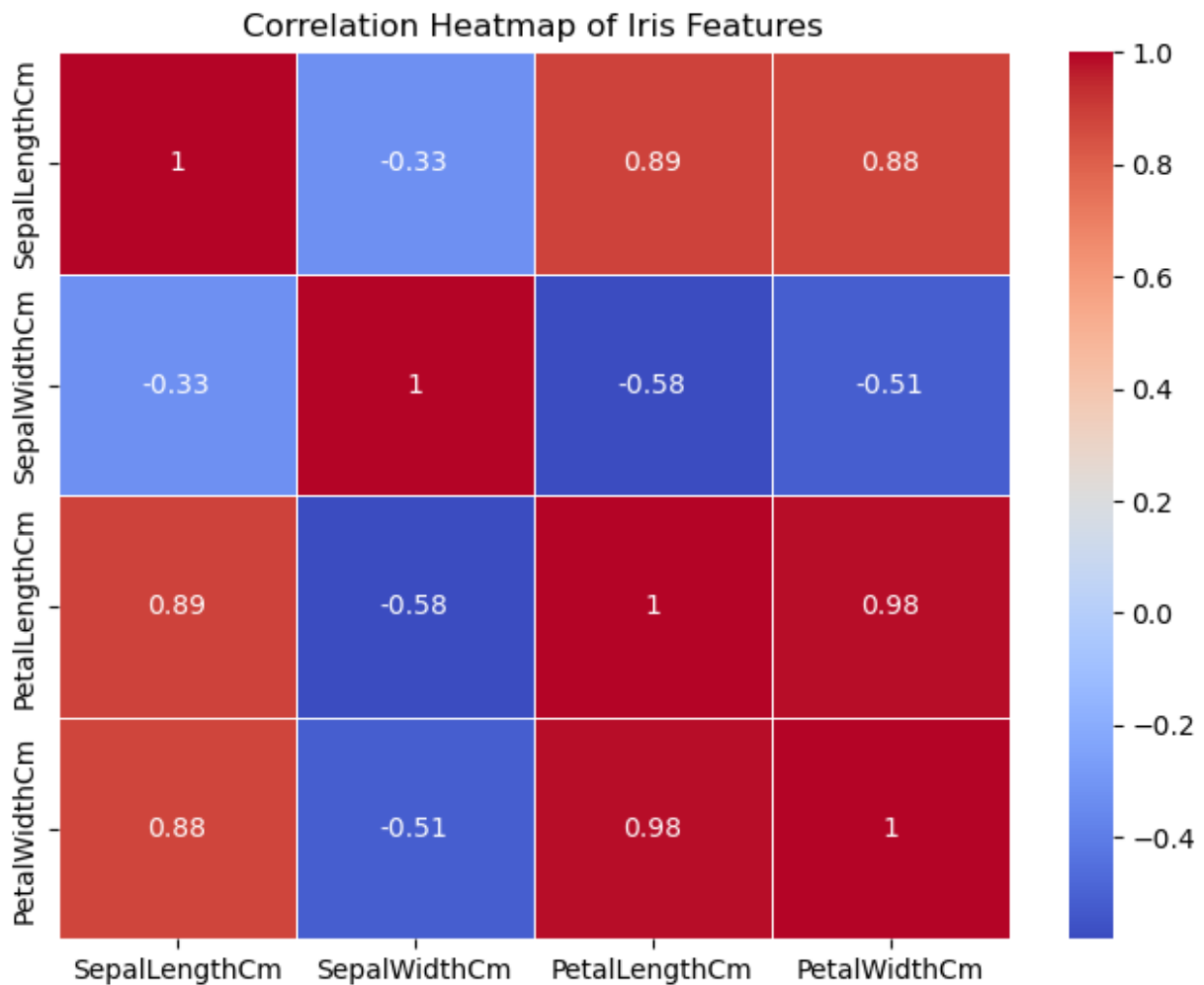


```
correlation_matrix = data[['SepalLengthCm', 'SepalWidthCm',
'PetalLengthCm', 'PetalWidthCm']].corr()

print(correlation_matrix)
```

	SepalLengthCm	SepalWidthCm	PetalLengthCm
PetalWidthCm			
SepalLengthCm	1.000000	-0.327869	0.888751
0.880635			
SepalWidthCm	-0.327869	1.000000	-0.581525
0.513685			-
PetalLengthCm	0.888751	-0.581525	1.000000
0.984896			

```
PetalWidthCm          0.880635      -0.513685          0.984896
1.000000

plt.figure(figsize=(8, 6))
sns.heatmap(correlation_matrix, annot=True, cmap='coolwarm',
linewidths=0.5)
plt.title('Correlation Heatmap of Iris Features')
plt.show()
```
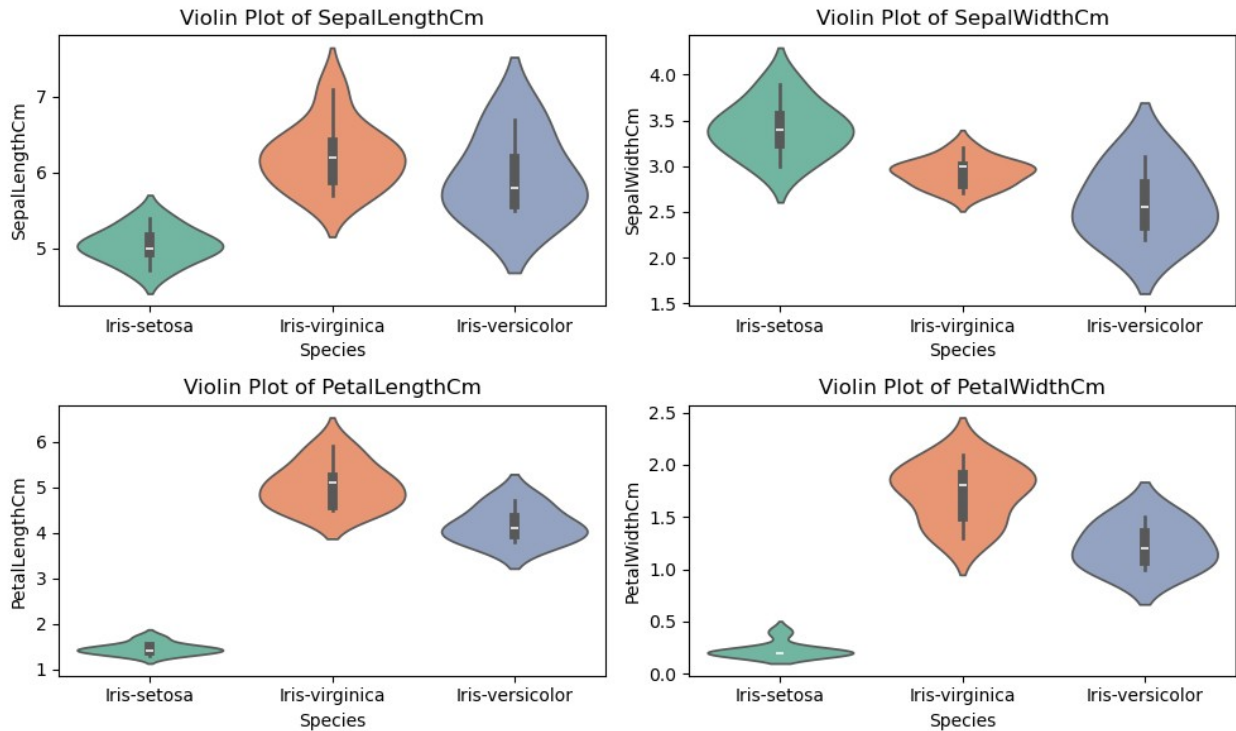

Correlation Heatmap of Iris Features

```
plt.figure(figsize=(10, 6))

for i, feature in enumerate(['SepalLengthCm', 'SepalWidthCm',
'PetalLengthCm', 'PetalWidthCm']):
    plt.subplot(2, 2, i + 1)
    sns.violinplot(x='Species', y=feature, data=data, palette='Set2')
    plt.title(f'Violin Plot of {feature}')
    plt.tight_layout()

plt.show()
```

Violin Plot of SepalLengthCm
Violin Plot of SepalWidthCm
Violin Plot of PetalLengthCm
Violin Plot of PetalWidthCm

```python
plt.figure(figsize=(10, 6))

for i, feature in enumerate(['SepalLengthCm', 'SepalWidthCm',
'PetalLengthCm', 'PetalWidthCm']):
    plt.subplot(2, 2, i + 1)
    sns.boxplot(x='Species', y=feature, data=data, palette='Set2')
    plt.title(f'Boxplot of {feature}')
    plt.tight_layout()

plt.show()
```