```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
```

```
# 1. Import the iris dataset
df = pd.read_csv('Iris.csv')
print("Dataset loaded successfully!")
print(f"Dataset shape: {df.shape}")
print(df.head())
```

```
Dataset loaded successfully!
Dataset shape: (150, 6)
   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
```

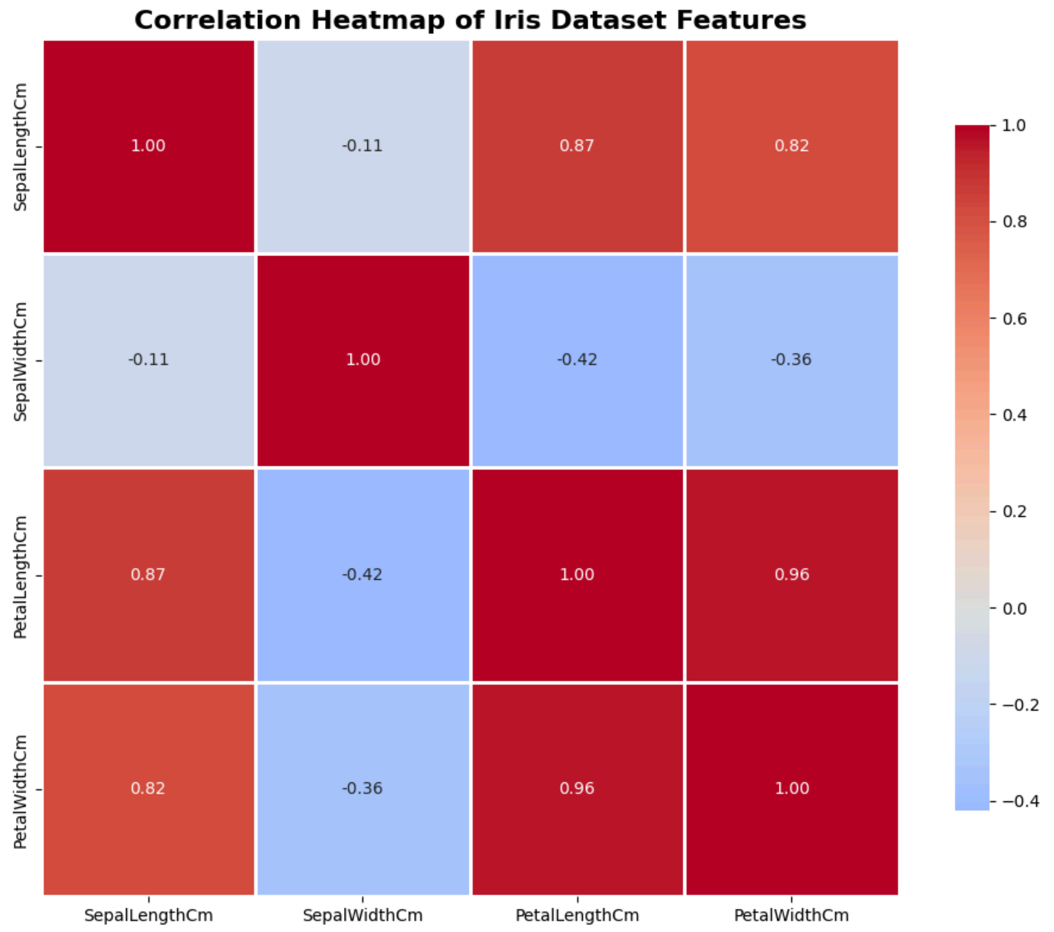
```
# 2. Separate the numeric columns in a dataframe
numeric_cols = ['SepalLengthCm', 'SepalWidthCm', 'PetalLengthCm', 'PetalWidthCm']
df_numeric = df[numeric_cols]
```

```
# 3. Create a correlation matrix
correlation_matrix = df_numeric.corr()
print("Correlation Matrix:")
print(correlation_matrix)
```

```
Correlation Matrix:
               SepalLengthCm  SepalWidthCm  PetalLengthCm  PetalWidthCm
SepalLengthCm       1.000000     -0.109369       0.871754      0.817954
SepalWidthCm       -0.109369      1.000000      -0.420516     -0.356544
PetalLengthCm       0.871754     -0.420516       1.000000      0.962757
PetalWidthCm        0.817954     -0.356544       0.962757      1.000000
```

```
# 4. Plot a heatmap
plt.figure(figsize=(10, 8))
sns.heatmap(correlation_matrix,
            annot=True,  # Show correlation values
            cmap='coolwarm',  # Color scheme
            center=0,  # Center colormap at 0
            square=True,  # Make cells square-shaped
            linewidths=1,  # Add gridlines
            cbar_kws={"shrink": 0.8},  # Adjust colorbar size
            fmt='.2f')  # Format numbers to 2 decimal places

plt.title('Correlation Heatmap of Iris Dataset Features', fontsize=16, fontweight='bold')
plt.tight_layout()
plt.show()
```




```
# 5. Write inference
print("INFERENCE:")
print("""
1. STRONG POSITIVE CORRELATIONS:
   - Petal Length & Petal Width: 0.96 (Very Strong)
     → These features are highly related; longer petals tend to be wider

   - Sepal Length & Petal Length: 0.87 (Strong)
     → Flowers with longer sepals tend to have longer petals

   - Sepal Length & Petal Width: 0.82 (Strong)
     → Sepal length is a good predictor of petal width

2. WEAK/NEGATIVE CORRELATION:
   - Sepal Width & Petal Length: -0.42 (Moderate Negative)
   - Sepal Width & Petal Width: -0.37 (Weak Negative)
     → Sepal width behaves differently from petal dimensions
     → This suggests sepal width may help distinguish species

3. KEY INSIGHTS:
   - Petal measurements are more strongly correlated with each other
     than sepal measurements

   - Sepal width shows the weakest correlations with other features,
     making it potentially valuable for classification

   - The strong correlations between petal features suggest they may
     contain redundant information for predictive modeling

4. IMPLICATIONS FOR MODELING:
   - Feature reduction techniques (PCA) might be beneficial given
     the high correlations

   - Petal length and width could potentially be combined into a
     single feature

   - Sepal width's unique behavior suggests it captures different
     information about iris species
""")
```

```
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