```python
import pandas as pd
# Load dataset
df = pd.read_csv("iris_dataset.csv")
print(df.head())
# Explore
print(df.describe())
print("Target classes:", df["species"].unique())
```

```
   sepal length (cm)  sepal width (cm)  petal length (cm)  petal width (cm)  \
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

   species
0   setosa
1   setosa
2   setosa
3   setosa
4   setosa
       sepal length (cm)  sepal width (cm)  petal length (cm)  \
count         150.000000        150.000000         150.000000
mean            5.843333          3.057333           3.758000
std             0.828066          0.435866           1.765298
min             4.300000          2.000000           1.000000
25%             5.100000          2.800000           1.600000
50%             5.800000          3.000000           4.350000
75%             6.400000          3.300000           5.100000
max             7.900000          4.400000           6.900000

       petal width (cm)
count        150.000000
mean           1.199333
std            0.762238
min            0.100000
25%            0.300000
50%            1.300000
75%            1.800000
max            2.500000
Target classes: ['setosa' 'versicolor' 'virginica']
```

```python
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
from sklearn.model_selection import train_test_split
from sklearn.linear_model import LogisticRegression
from sklearn.metrics import confusion_matrix, classification_report

df = pd.read_csv("iris_dataset.csv")

print("First 5 rows of the dataset:")
print(df.head())

sns.pairplot(df, hue="species", diag_kind="kde")
plt.suptitle("Iris Dataset Feature Relationships", y=1.02)
plt.show()

X = df.drop(columns=["species"])
y = df["species"]

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

model = LogisticRegression(max_iter=200)
model.fit(X_train, y_train)

y_pred = model.predict(X_test)

cm = confusion_matrix(y_test, y_pred)

print("\nConfusion Matrix:\n", cm)
print("\nClassification Report:\n", classification_report(y_test, y_pred))

plt.figure(figsize=(6, 4))
sns.heatmap(cm, annot=True, cmap="Blues", fmt="d",
        xticklabels=model.classes_,
        yticklabels=model.classes_)
```

```python
plt.xlabel("Predicted")
plt.ylabel("Actual")
plt.title("Confusion Matrix Heatmap")
plt.show()

plt.figure(figsize=(6, 4))
plt.scatter(range(len(y_test)), y_test, color='blue', label='Actual', alpha=0.7)
plt.scatter(range(len(y_pred)), y_pred, color='red', label='Predicted', alpha=0.5)
plt.title("Predicted vs Actual Species")
plt.xlabel("Sample Index")
plt.ylabel("Species")
plt.legend()
plt.show()
```

```
First 5 rows of the dataset:
   sepal length (cm)  sepal width (cm)  petal length (cm)  petal width (cm)  \
0                5.1               3.5                1.4               0.2
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2                4.7               3.2                1.3               0.2
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  species
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1  setosa
2  setosa
3  setosa
4  setosa
```


Iris Dataset Feature Relationships
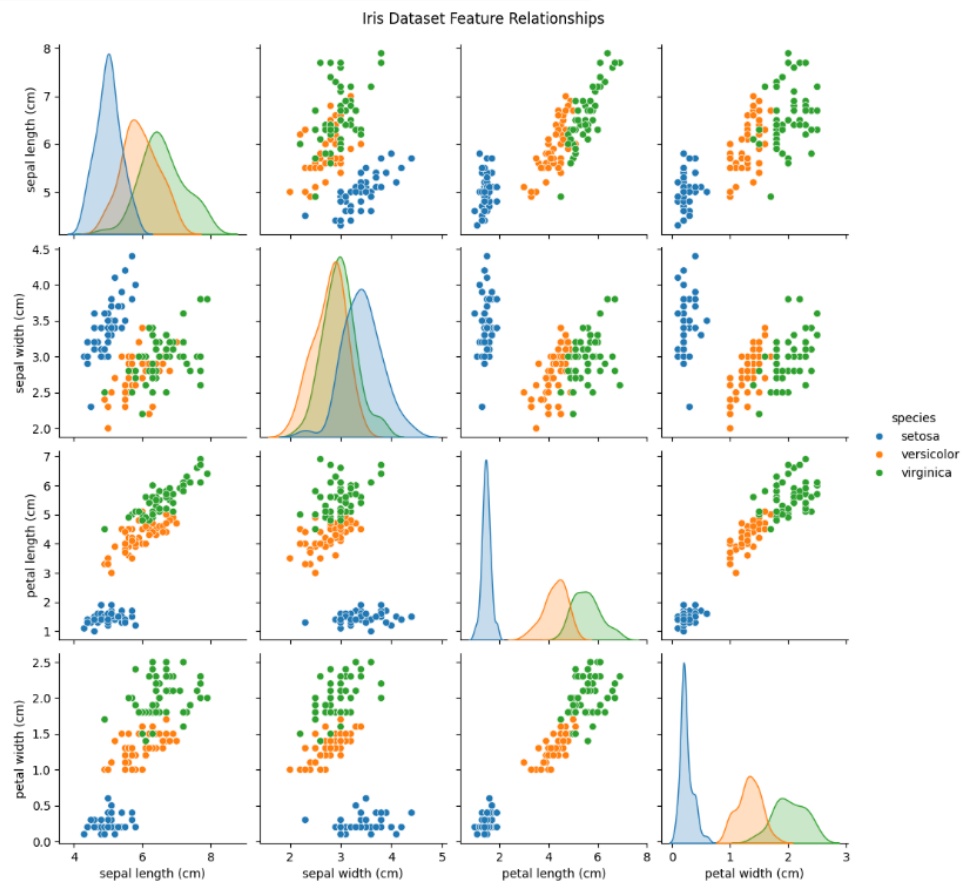
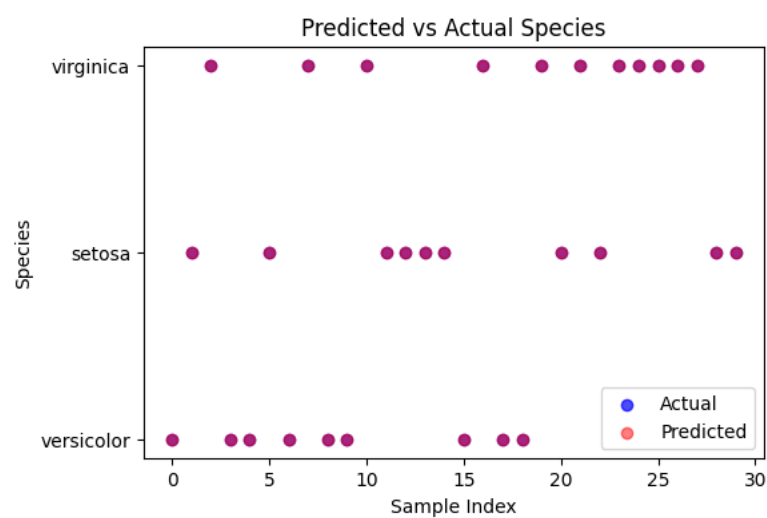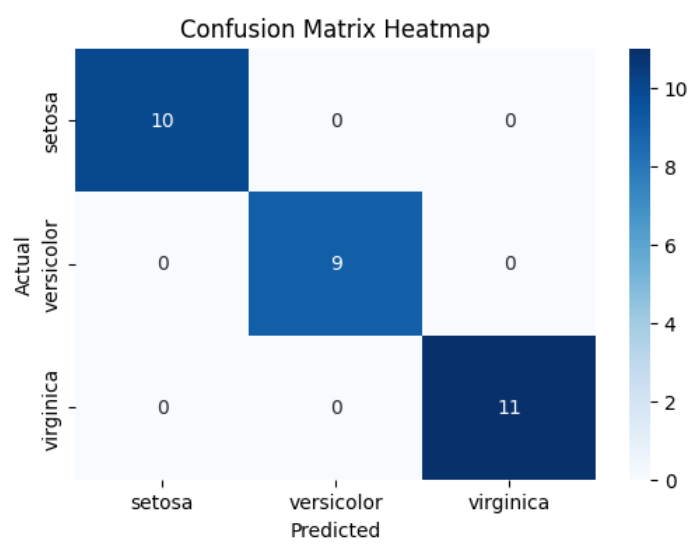```
Confusion Matrix:
 [[10 0 0]
 [0 9 0]
 [0 0 11]]

Classification Report:
              precision   recall f1-score   support

      setosa   1.00   1.00   1.00   10
  versicolor   1.00   1.00   1.00   9
   virginica   1.00   1.00   1.00   11

    accuracy   1.00   30
   macro avg   1.00   1.00   1.00   30
weighted avg   1.00   1.00   1.00   30
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