```
from sklearn.datasets import load_iris
import pandas as pd

# Load the Iris dataset
iris = load_iris()

# Convert the dataset into a pandas DataFrame
data = pd.DataFrame(data=iris.data, columns=iris.feature_names)
data['target'] = iris.target  # Add target column

# Save the DataFrame to a CSV file
data.to_csv('iris.csv', index=False)
```

Data Cleaning and Preprocessing:

```
# Load data from the CSV file
data = pd.read_csv('iris.csv')

# Remove duplicates
data = data.drop_duplicates()

# Fill missing values with the mean of the column
data.fillna(data.mean(), inplace=True)

# Remove rows with missing values
data = data.dropna()

# Convert string column to datetime (not applicable to Iris dataset)
# Example: data['date_column'] = pd.to_datetime(data['date_column'])
```

```
print(data.columns)
```

```
Index(['sepal length (cm)', 'sepal width (cm)', 'petal length (cm)',
       'petal width (cm)', 'target'],
      dtype='object')
```

Data Selection and Filtering:

```
# Select rows where a condition is met
filtered_data = data[data['sepal length (cm)'] > 5.0]

# Select rows based on multiple conditions
filtered_data = data[(data['sepal length (cm)'] > 5.0) & (data['sepal width (cm)'] == 3.0)]

# Select specific columns
selected_columns = data[['sepal length (cm)', 'sepal width (cm)']]
```

```
# Accessing rows and columns using loc

# Select rows based on index
row_index_5 = data.loc[5]  # Select row with index 5

print("\nRow with index 5:")
print(row_index_5)
```

```
Row with index 5:
sepal length (cm)    5.4
sepal width (cm)     3.9
petal length (cm)    1.7
petal width (cm)     0.4
target               0.0
Name: 5, dtype: float64
```

```
# Accessing rows and columns using iloc

# Accessing the first row
print("\nFirst row:")
print(data.iloc[0])

# Accessing the first column
print("\nFirst column:")
print(data.iloc[:, 0])

# Accessing a specific row and column
print("\nValue at row 2, column 3:")
print(data.iloc[1, 2])
```

```
First row:
sepal length (cm)    5.1
sepal width (cm)     3.5
petal length (cm)    1.4
petal width (cm)     0.2
target               0.0
Name: 0, dtype: float64

First column:
0      5.1
1      4.9
2      4.7
3      4.6
4      5.0
      ...
145    6.7
146    6.3
147    6.5
148    6.2
149    5.9
Name: sepal length (cm), Length: 149, dtype: float64

Value at row 2, column 3:
1.4
```

Grouping and Aggregation:

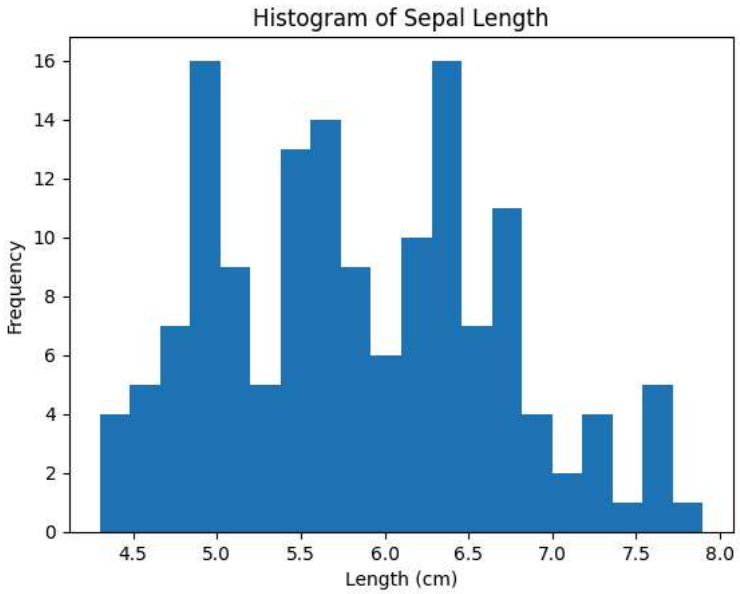
```
# Group data by species
grouped_data = data.groupby('target')

# Calculate mean, sum, etc. within each group
mean_values = grouped_data.mean()
sum_values = grouped_data.sum()
```

Merging and Joining DataFrames:

```
# Merge two DataFrames on a common column
# (Example: Merge with another copy of the same dataset for illustration purposes)
merged_data = pd.merge(data, data, on='target')

# Concatenate DataFrames along rows or columns
concatenated_data = pd.concat([data.head(), data.tail()], axis=0)  # Concatenate along rows
concatenated_data = pd.concat([data.head(), data.tail()], axis=1)  # Concatenate along columns
```

Data Visualization:

```
import matplotlib.pyplot as plt

# Plot histogram
data['sepal length (cm)'].plot(kind='hist', bins=20)
plt.title('Histogram of Sepal Length')
plt.xlabel('Length (cm)')
plt.ylabel('Frequency')
plt.show()

# Plot line chart (not applicable to Iris dataset)
# Example: data.plot(x='date_column', y='numeric_column')
```


Histogram of Sepal Length
Frequency
Length (cm)
0
2
4
6
8
10
12
14
16
4.5
5.0
5.5
6.0
6.5
7.0
7.5
8.0