```
# 1.    Load the basic libraries and packages

import pandas as pd
import seaborn as sns
import numpy as np
import math
import matplotlib.pyplot as plt
from sklearn.datasets import load_iris
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# 2.  Load the dataset

# URL of the Iris dataset
url = "https://archive.ics.uci.edu/ml/machine-learning-databases/iris/iris.data"
# Column names
names = ["Sepal_Length", "Sepal_Width", "Petal_Length", "Petal_Width", "Class"]
# Loading the dataset
dataset = pd.read_csv(url, names=names)
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# 3.    Analyse the dataset

dataset.describe()
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	Sepal_Length	Sepal_Width	Petal_Length	Petal_Width
count	150.000000	150.000000	150.000000	150.000000
mean	5.843333	3.054000	3.758667	1.198667
std	0.828066	0.433594	1.764420	0.763161
min	4.300000	2.000000	1.000000	0.100000
25%	5.100000	2.800000	1.600000	0.300000
50%	5.800000	3.000000	4.350000	1.300000
75%	6.400000	3.300000	5.100000	1.800000
max	7.900000	4.400000	6.900000	2.500000

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# 4.    Pre-process the data

# Extract the 'Class' column as the target variable
traningclass = dataset.values[:, -1]
# Get unique class names and assign numeric labels
unique_list = list(set(traningclass))

# Encoding classes as numbers
for i in range(len(traningclass)):
    for j in range(len(unique_list)):
        if traningclass[i] == unique_list[j]:
            traningclass[i] = j

# Remove the last element if it's a separate testing example
traningclass = traningclass[:-1]
```

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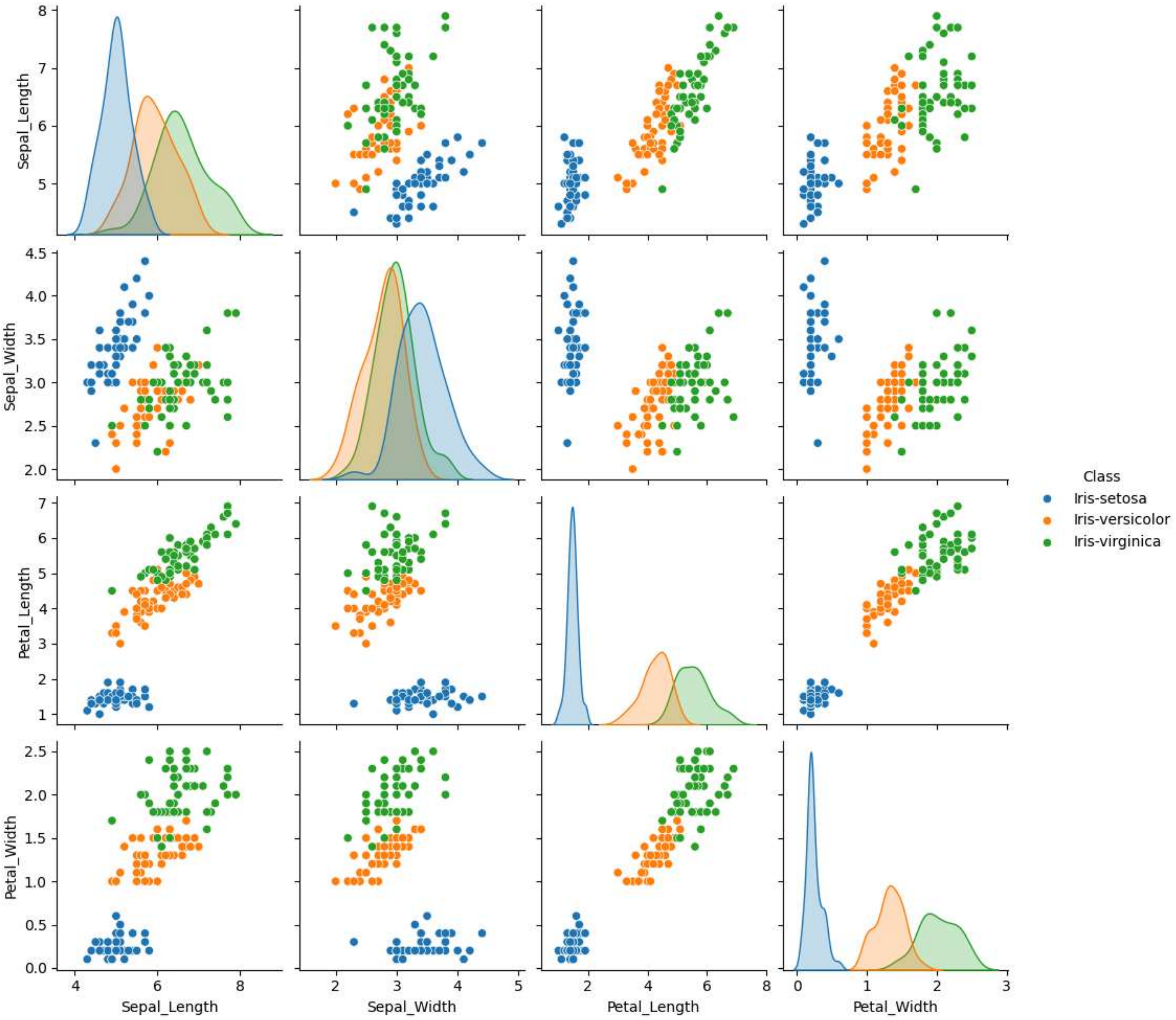
# 5.    Visualize the Data

# Pairplot to visualize relationships
sns.pairplot(dataset, hue="Class")
plt.show()
```



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# 6.    Separate the feature and prediction value columns

# Separate the features and target variable
training = dataset.values[:, :-1]  # All feature columns
testing = dataset.values[149, :-1]  # Using the last row as the test sample
training = dataset.values[:149, :-1]  # Training set (excluding the last row)
```

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# 7.    Select the number K of the neighbors

# Define the number of neighbors
k = 25
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# 8.    Calculate the Euclidean distance of K number of neighbors

# Function to calculate Euclidean distance
def Euclidean_Distance(row_i, row_j):
    distance = 0.0
    for i in range(len(row_i)):
        distance += (row_i[i] - row_j[i])**2
    return np.sqrt(distance)
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# Calculate distances between the test sample and each training sample
distance = []
for i in range(len(training)):
    dist = Euclidean_Distance(training[i], testing)
    distance.append([dist, traningclass[i]])


# 9.    Take the K nearest neighbors as per the calculated Euclidean distance.

# Sort the distances and select the first k
distance.sort()
k_nearest_neighbors = distance[:k]


# 10. Among these k neighbors, count the number of the data points in each category.

# Count occurrences of each class in the K nearest neighbors
result = {}
for dist, label in k_nearest_neighbors:
    result[label] = result.get(label, 0) + 1


# Determine the class with the highest count
max_key = max(result, key=result.get)
class_name = unique_list[max_key]
print("Predicted Class:", class_name)
```

```
Predicted Class: Iris-virginica
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