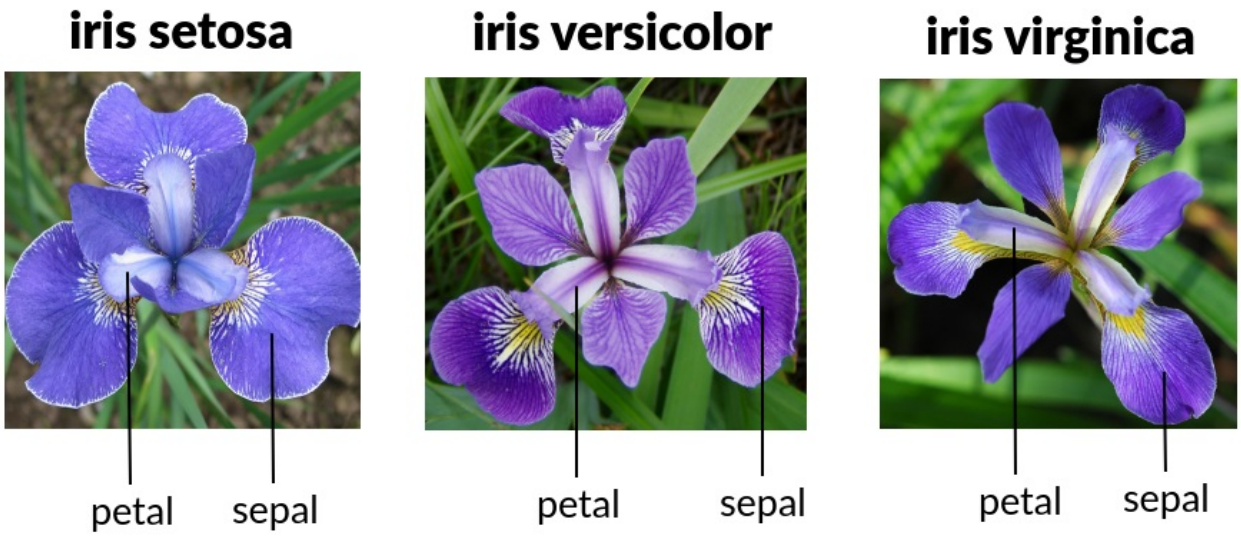
Project: Iris Flower Classification using Machine Learning!

By Farhan



- **Dataset: Iris flower dataset**
- **Species: Setosa, Versicolor, Virginica**
- **Objective: Train a machine learning model**
- **Task: Classify Iris flowers by species using their measurements.**

In [26]:

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

import warnings
warnings.filterwarnings('ignore')
```

In [2]:

```
df=pd.read_csv("D:/8-9(WD) Machine learning/iris.csv")
df
```

Out[2]:

	sepal_length	sepal_width	petal_length	petal_width	class
0	5.1	3.5	1.4	0.2	0
1	4.9	3.0	1.4	0.2	0
2	4.7	3.2	1.3	0.2	0
3	4.6	3.1	1.5	0.2	0
4	5.0	3.6	1.4	0.2	0
...	...	...	...	...	...
145	6.7	3.0	5.2	2.3	2
146	6.3	2.5	5.0	1.9	2
147	6.5	3.0	5.2	2.0	2

	sepal_length	sepal_width	petal_length	petal_width	class
148	6.2	3.4	5.4	2.3	2
149	5.9	3.0	5.1	1.8	2

150 rows × 5 columns

In [37]:

```
df.head()
```

Out[37]:

	sepal_length	sepal_width	petal_length	petal_width	class
0	5.1	3.5	1.4	0.2	0
1	4.9	3.0	1.4	0.2	0
2	4.7	3.2	1.3	0.2	0
3	4.6	3.1	1.5	0.2	0
4	5.0	3.6	1.4	0.2	0

In [38]:

```
df.tail()
```

Out[38]:

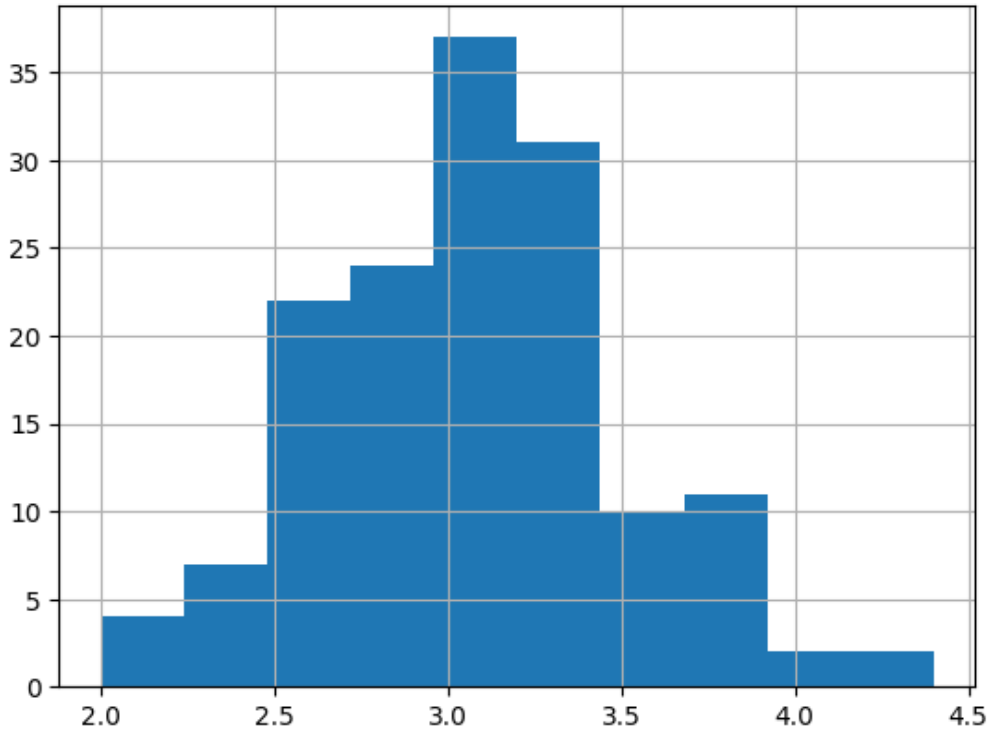
	sepal_length	sepal_width	petal_length	petal_width	class
145	6.7	3.0	5.2	2.3	2
146	6.3	2.5	5.0	1.9	2
147	6.5	3.0	5.2	2.0	2
148	6.2	3.4	5.4	2.3	2
149	5.9	3.0	5.1	1.8	2

In [30]:

```
df['sepal_width'].hist()
```

Out[30]:

<Axes: >

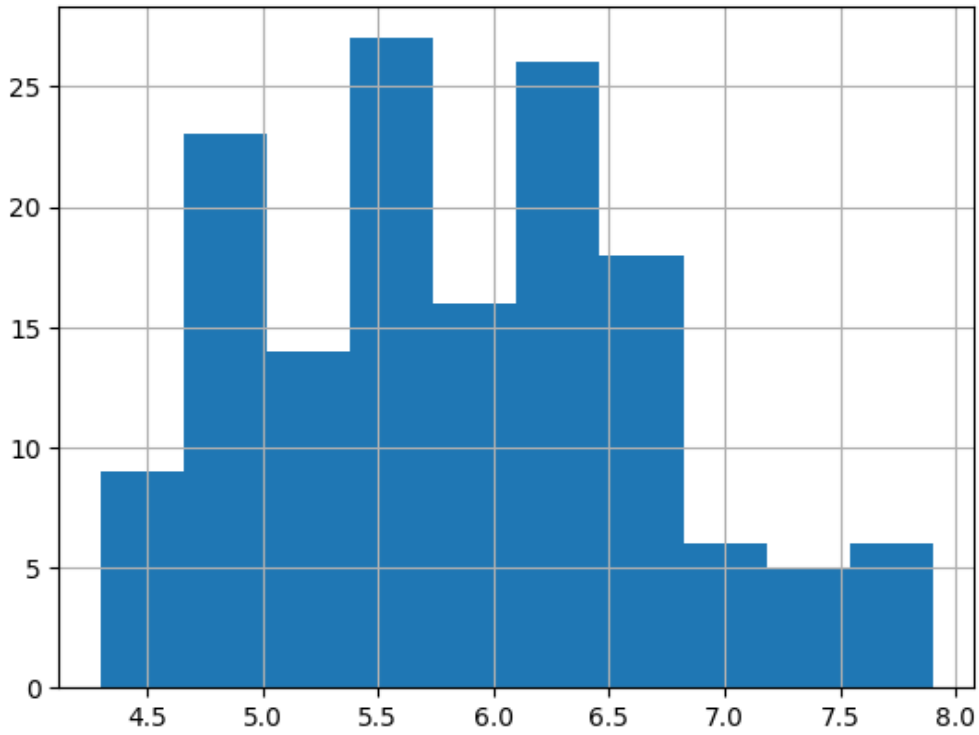


In [31]:

```
df['sepal_length'].hist()
```

Out[31]:

<Axes: >

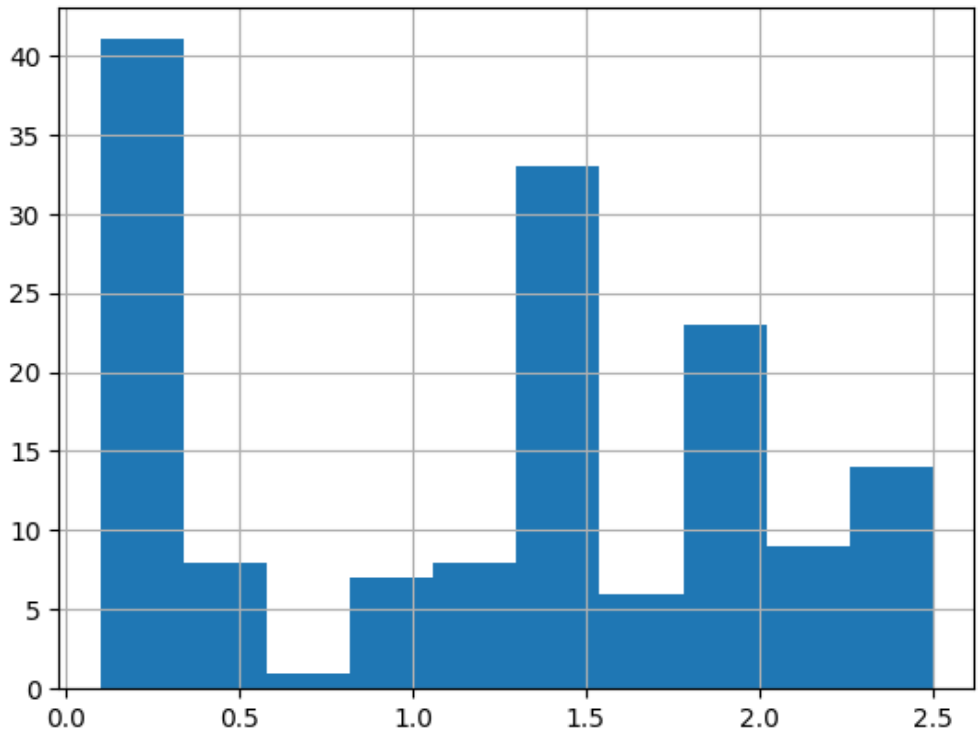


In [32]:

```
df['petal_width'].hist()
```

Out[32]:

<Axes: >

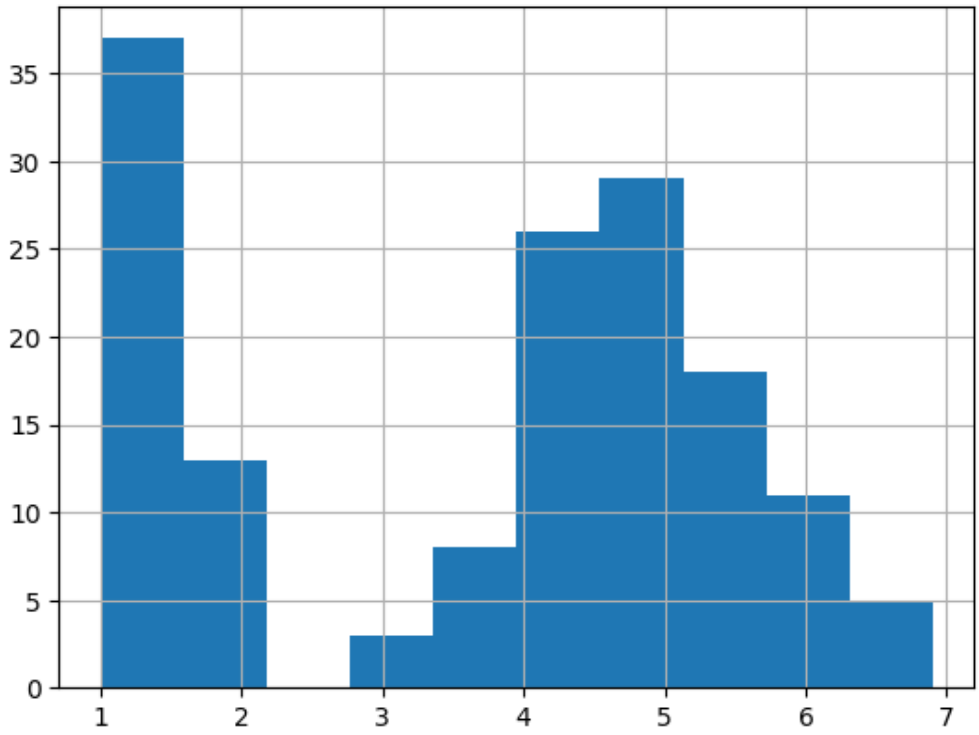


In [33]:

```
df['petal_length'].hist()
```

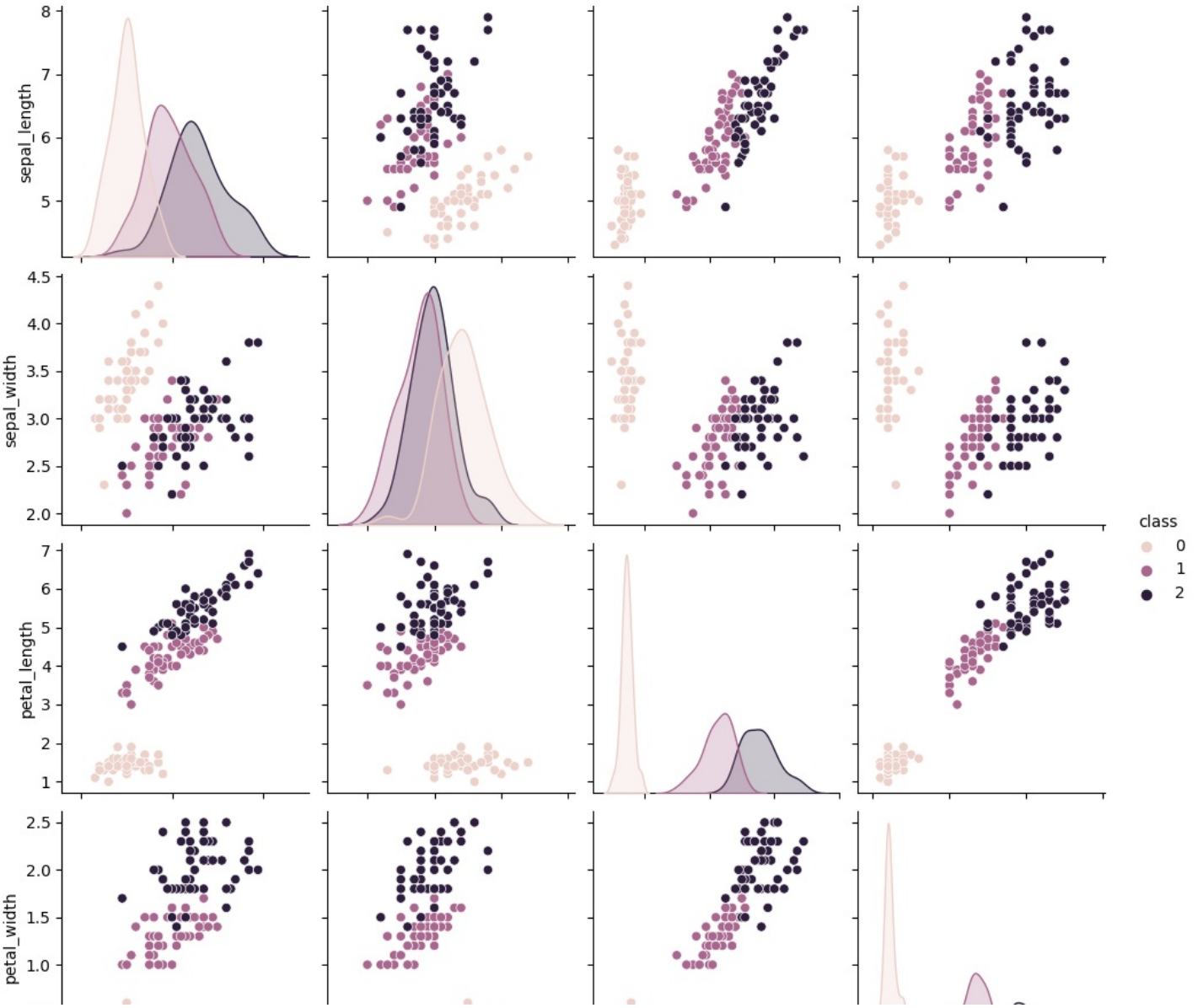
Out[33]:

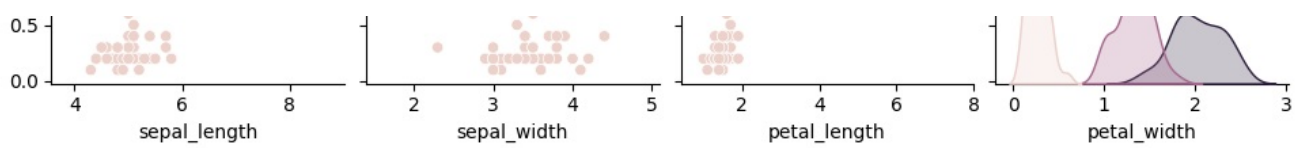
<Axes: >



In [35]:

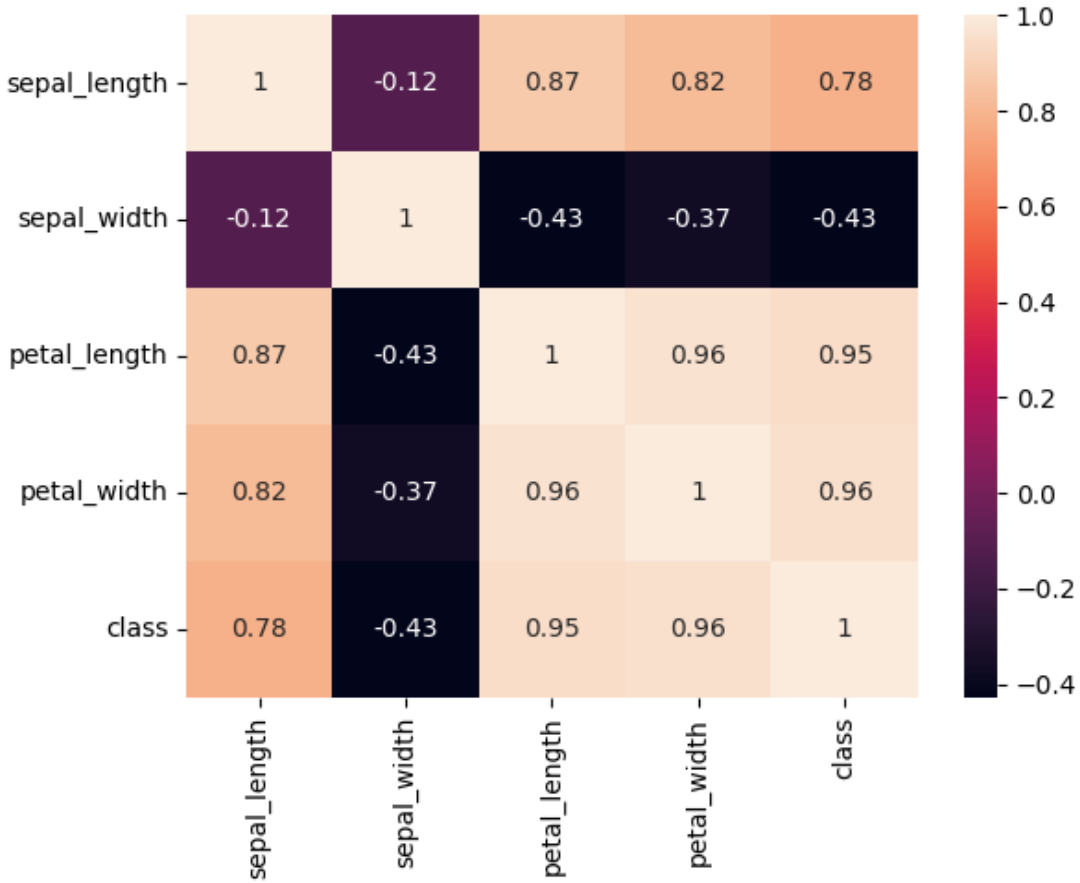
```
sns.pairplot(df,height=2.5,hue="class")
plt.show()
```





In [36]:

```
#checking correaltion use of heatmap
sns.heatmap(df.corr(),annot=True)
plt.show()
```



In [3]:

```
#feature matrix
X=df.iloc[:,:-1].values
```

In [4]:

```
#target(response vector)
y=df.iloc[:,-1].values
```

In [5]:

```
from sklearn.datasets import load_iris
iris = load_iris()
```

In [6]:

```
X=iris.data       #extract feature matrix
y=iris.target     #extract target
```

In [7]:

```
X
```

Out[7]:

```
array([[5.1, 3.5, 1.4, 0.2],
       [4.9, 3. , 1.4, 0.2],
       [4.7, 3.2, 1.3, 0.2],
       [4.6, 3.1, 1.5, 0.2],
```

[4.6, 3.1, 1.5, 0.2],
[5. , 3.6, 1.4, 0.2],
[5.4, 3.9, 1.7, 0.4],
[4.6, 3.4, 1.4, 0.3],
[5. , 3.4, 1.5, 0.2],
[4.4, 2.9, 1.4, 0.2],
[4.9, 3.1, 1.5, 0.1],
[5.4, 3.7, 1.5, 0.2],
[4.8, 3.4, 1.6, 0.2],
[4.8, 3. , 1.4, 0.1],
[4.3, 3. , 1.1, 0.1],
[5.8, 4. , 1.2, 0.2],
[5.7, 4.4, 1.5, 0.4],
[5.4, 3.9, 1.3, 0.4],
[5.1, 3.5, 1.4, 0.3],
[5.7, 3.8, 1.7, 0.3],
[5.1, 3.8, 1.5, 0.3],
[5.4, 3.4, 1.7, 0.2],
[5.1, 3.7, 1.5, 0.4],
[4.6, 3.6, 1. , 0.2],
[5.1, 3.3, 1.7, 0.5],
[4.8, 3.4, 1.9, 0.2],
[5. , 3. , 1.6, 0.2],
[5. , 3.4, 1.6, 0.4],
[5.2, 3.5, 1.5, 0.2],
[5.2, 3.4, 1.4, 0.2],
[4.7, 3.2, 1.6, 0.2],
[4.8, 3.1, 1.6, 0.2],
[5.4, 3.4, 1.5, 0.4],
[5.2, 4.1, 1.5, 0.1],
[5.5, 4.2, 1.4, 0.2],
[4.9, 3.1, 1.5, 0.2],
[5. , 3.2, 1.2, 0.2],
[5.5, 3.5, 1.3, 0.2],
[4.9, 3.6, 1.4, 0.1],
[4.4, 3. , 1.3, 0.2],
[5.1, 3.4, 1.5, 0.2],
[5. , 3.5, 1.3, 0.3],
[4.5, 2.3, 1.3, 0.3],
[4.4, 3.2, 1.3, 0.2],
[5. , 3.5, 1.6, 0.6],
[5.1, 3.8, 1.9, 0.4],
[4.8, 3. , 1.4, 0.3],
[5.1, 3.8, 1.6, 0.2],
[4.6, 3.2, 1.4, 0.2],
[5.3, 3.7, 1.5, 0.2],
[5. , 3.3, 1.4, 0.2],
[7. , 3.2, 4.7, 1.4],
[6.4, 3.2, 4.5, 1.5],
[6.9, 3.1, 4.9, 1.5],
[5.5, 2.3, 4. , 1.3],
[6.5, 2.8, 4.6, 1.5],
[5.7, 2.8, 4.5, 1.3],
[6.3, 3.3, 4.7, 1.6],
[4.9, 2.4, 3.3, 1.],
[6.6, 2.9, 4.6, 1.3],
[5.2, 2.7, 3.9, 1.4],
[5. , 2. , 3.5, 1.],
[5.9, 3. , 4.2, 1.5],
[6. , 2.2, 4. , 1.],
[6.1, 2.9, 4.7, 1.4],
[5.6, 2.9, 3.6, 1.3],
[6.7, 3.1, 4.4, 1.4],
[5.6, 3. , 4.5, 1.5],
[5.8, 2.7, 4.1, 1.],
[6.2, 2.2, 4.5, 1.5],
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[5.9, 3.2, 4.8, 1.8],
[6.1, 2.8, 4. , 1.3],
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[6.8, 2.8, 4.8, 1.4],
[6.7, 3. , 5. , 1.7],
[6. , 2.9, 4.5, 1.5],
[5.7, 2.6, 3.5, 1.],
[5.5, 2.4, 3.8, 1.1],
[5.5, 2.4, 3.7, 1.],
[5.8, 2.7, 3.9, 1.2],
[6. , 2.7, 5.1, 1.6],
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[5.5, 2.6, 4.4, 1.2],
[6.1, 3. , 4.6, 1.4],
[5.8, 2.6, 4. , 1.2],
[5. , 2.3, 3.3, 1.],
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[6.2, 2.9, 4.3, 1.3],
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[5.7, 2.8, 4.1, 1.3],
[6.3, 3.3, 6. , 2.5],
[5.8, 2.7, 5.1, 1.9],
[7.1, 3. , 5.9, 2.1],
[6.3, 2.9, 5.6, 1.8],
[6.5, 3. , 5.8, 2.2],
[7.6, 3. , 6.6, 2.1],
[4.9, 2.5, 4.5, 1.7],
[7.3, 2.9, 6.3, 1.8],
[6.7, 2.5, 5.8, 1.8],
[7.2, 3.6, 6.1, 2.5],
[6.5, 3.2, 5.1, 2.],
[6.4, 2.7, 5.3, 1.9],
[6.8, 3. , 5.5, 2.1],
[5.7, 2.5, 5. , 2.],
[5.8, 2.8, 5.1, 2.4],
[6.4, 3.2, 5.3, 2.3],
[6.5, 3. , 5.5, 1.8],
[7.7, 3.8, 6.7, 2.2],
[7.7, 2.6, 6.9, 2.3],
[6. , 2.2, 5. , 1.5],
[6.9, 3.2, 5.7, 2.3],
[5.6, 2.8, 4.9, 2.],
[7.7, 2.8, 6.7, 2.],
[6.3, 2.7, 4.9, 1.8],
[6.7, 3.3, 5.7, 2.1],
[7.2, 3.2, 6. , 1.8],
[6.2, 2.8, 4.8, 1.8],
[6.1, 3. , 4.9, 1.8],
[6.4, 2.8, 5.6, 2.1],
[7.2, 3. , 5.8, 1.6],
[7.4, 2.8, 6.1, 1.9],
[7.9, 3.8, 6.4, 2.],
[6.4, 2.8, 5.6, 2.2],
[6.3, 2.8, 5.1, 1.5],
[6.1, 2.6, 5.6, 1.4],
[7.7, 3. , 6.1, 2.3],
[6.3, 3.4, 5.6, 2.4],
[6.4, 3.1, 5.5, 1.8],
[6. , 3. , 4.8, 1.8],
[6.9, 3.1, 5.4, 2.1],
[6.7, 3.1, 5.6, 2.4],
[6.9, 3.1, 5.1, 2.3],
[5.8, 2.7, 5.1, 1.9],
[6.8, 3.2, 5.9, 2.3],
[6.7, 3.3, 5.7, 2.5],
[6.7, 3. , 5.2, 2.3],
[6.3, 2.5, 5. , 1.9],
[6.5, 3. , 5.2, 2.],

```
       [6.2, 3.4, 5.4, 2.3],
       [5.9, 3. , 5.1, 1.8]])
```

In [9]:

```
y
```

Out[9]:

```
array([0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
       0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
       0, 0, 0, 0, 0, 0, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,
       1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,
       1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 2, 2, 2, 2, 2, 2, 2, 2, 2,
       2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2,
       2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2])
```

- Class:

- **setosa-0**
- **versicolour-1**
- **virginica-2**

In [10]:

```
from sklearn.model_selection import train_test_split
```

In [11]:

```
X_train,X_test,y_train,y_test=train_test_split(X,y,random_state=10)
```

In [12]:

```
y_train
```

Out[12]:

```
array([2, 2, 0, 0, 1, 0, 1, 0, 1, 1, 2, 2, 1, 2, 1, 1, 1, 0, 0, 1, 0, 2,
       0, 0, 2, 1, 2, 0, 2, 0, 1, 1, 0, 2, 2, 2, 2, 2, 0, 1, 2, 1, 0, 2,
       1, 1, 0, 0, 0, 1, 2, 2, 1, 0, 0, 0, 2, 2, 1, 1, 2, 2, 2, 2, 1, 0,
       0, 1, 0, 0, 2, 1, 0, 0, 0, 1, 0, 1, 0, 1, 2, 0, 1, 1, 2, 0, 2, 0,
       1, 1, 2, 2, 0, 1, 2, 2, 1, 1, 2, 0, 2, 0, 0, 1, 0, 2, 2, 2, 1, 0,
       2, 0])
```

In [13]:

```
y_test
```

Out[13]:

```
array([1, 2, 0, 1, 0, 1, 1, 1, 0, 1, 1, 2, 1, 0, 0, 2, 1, 0, 0, 0, 2, 2,
       2, 0, 1, 0, 1, 1, 1, 2, 1, 1, 2, 2, 2, 0, 2, 2])
```

K-Nearest Neighbours model

In [14]:

```
from sklearn.neighbors import KNeighborsClassifier
```

In [16]:

```
model=KNeighborsClassifier()
model.fit(X_train,y_train)
```

Out[16]:

```
▾ KNeighborsClassifier
KNeighborsClassifier()
```

KNeighborsClassifier()

In [17]:

```
pred_train=model.predict(X_train)
pred_test=model.predict(X_test)
```

In [18]:

```
from sklearn.metrics import accuracy_score
```

In [48]:

```
print("Training Score:",accuracy_score(y_train,pred_train)*100)
print("Testing Score:",accuracy_score(y_test,pred_test)*100)
```

```
Training Score: 97.32142857142857
Testing Score: 97.36842105263158
```

The output of testing comes out low bias low variance.

Logistic regression model

In [40]:

```
from sklearn.linear_model import LogisticRegression
model=LogisticRegression()
```

In [41]:

```
model.fit(X_train,y_train)
```

Out[41]:

▾ LogisticRegression
LogisticRegression()

In [51]:

```
print("Accuracy:",accuracy_score(y_test,pred_test)*100)
```

```
Accuracy: 97.36842105263158
```

Thank You!

In [ ]:

```

```