In [113…
```
pip install pandas
```

```
Requirement already satisfied: pandas in c:\users\kumar\appdata\local\programs\python
\python39\lib\site-packages (1.4.2)
Requirement already satisfied: pytz>=2020.1 in c:\users\kumar\appdata\local\programs
\python\python39\lib\site-packages (from pandas) (2022.1)
Requirement already satisfied: python-dateutil>=2.8.1 in c:\users\kumar\appdata\local
\programs\python\python39\lib\site-packages (from pandas) (2.8.2)
Requirement already satisfied: numpy>=1.18.5 in c:\users\kumar\appdata\local\programs
\python\python39\lib\site-packages (from pandas) (1.22.3)
Requirement already satisfied: six>=1.5 in c:\users\kumar\appdata\local\programs\pyth
on\python39\lib\site-packages (from python-dateutil>=2.8.1->pandas) (1.15.0)
Note: you may need to restart the kernel to use updated packages.
```

In [114…
```
pip install matplotlib
```

```
Requirement already satisfied: matplotlib in c:\users\kumar\appdata\local\programs\py
thon\python39\lib\site-packages (3.5.1)
Requirement already satisfied: fonttools>=4.22.0 in c:\users\kumar\appdata\local\prog
rams\python\python39\lib\site-packages (from matplotlib) (4.32.0)
Requirement already satisfied: packaging>=20.0 in c:\users\kumar\appdata\local\progra
ms\python\python39\lib\site-packages (from matplotlib) (21.3)
Requirement already satisfied: cycler>=0.10 in c:\users\kumar\appdata\local\programs
\python\python39\lib\site-packages (from matplotlib) (0.11.0)
Requirement already satisfied: pillow>=6.2.0 in c:\users\kumar\appdata\local\programs
\python\python39\lib\site-packages (from matplotlib) (9.1.0)
Requirement already satisfied: numpy>=1.17 in c:\users\kumar\appdata\local\programs\p
ython\python39\lib\site-packages (from matplotlib) (1.22.3)
Requirement already satisfied: kiwisolver>=1.0.1 in c:\users\kumar\appdata\local\prog
rams\python\python39\lib\site-packages (from matplotlib) (1.4.2)
Requirement already satisfied: pyparsing>=2.2.1 in c:\users\kumar\appdata\local\progr
ams\python\python39\lib\site-packages (from matplotlib) (3.0.8)
Requirement already satisfied: python-dateutil>=2.7 in c:\users\kumar\appdata\local\p
rograms\python\python39\lib\site-packages (from matplotlib) (2.8.2)
Requirement already satisfied: six>=1.5 in c:\users\kumar\appdata\local\programs\pyth
on\python39\lib\site-packages (from python-dateutil>=2.7->matplotlib) (1.15.0)
Note: you may need to restart the kernel to use updated packages.
```

In [115…
```
#pip install sklearn
```

In [116…
```
#pip install seaborn
```

In [139…
```
#Importing the Libraries
import numpy as np
import matplotlib.pyplot as plt
import pandas as pd
```

In [140…
```
#Importing the dataset
dataset = pd.read_csv('https://raw.githubusercontent.com/mk-gurucharan/Classification/

X = dataset.iloc[:,:4].values
y = dataset['species'].values
print(dataset)
```

```
     sepal_length  sepal_width  petal_length  petal_width    species
0             5.1          3.5           1.4          0.2     setosa
1             4.9          3.0           1.4          0.2     setosa
2             4.7          3.2           1.3          0.2     setosa
3             4.6          3.1           1.5          0.2     setosa
4             5.0          3.6           1.4          0.2     setosa
..            ...          ...           ...          ...        ...
145           6.7          3.0           5.2          2.3  virginica
146           6.3          2.5           5.0          1.9  virginica
147           6.5          3.0           5.2          2.0  virginica
148           6.2          3.4           5.4          2.3  virginica
149           5.9          3.0           5.1          1.8  virginica

[150 rows x 5 columns]
```

In [141…
```
# Splitting the dataset into the Training set and Test set

from sklearn.model_selection import train_test_split
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size = 0.2)
```

In [142…
```
# Feature Scaling

from sklearn.preprocessing import StandardScaler
sc = StandardScaler()
X_train = sc.fit_transform(X_train)
X_test = sc.transform(X_test)
```

In [143…
```
#Training the Naive Bayes Classification model on the Training Set

from sklearn.naive_bayes import GaussianNB
classifier = GaussianNB()
classifier.fit(X_train, y_train)
```

Out[143]:
```
GaussianNB()
```

In [151…
```
#Predicting the Test set results
y_pred = classifier.predict(X_test)
y_pred
```

Out[151]:
```
array(['versicolor', 'virginica', 'virginica', 'setosa', 'versicolor',
       'setosa', 'setosa', 'setosa', 'setosa', 'virginica', 'virginica',
       'versicolor', 'setosa', 'setosa', 'versicolor', 'setosa',
       'versicolor', 'virginica', 'virginica', 'setosa', 'versicolor',
       'versicolor', 'virginica', 'setosa', 'versicolor', 'versicolor',
       'virginica', 'setosa', 'virginica', 'versicolor'], dtype='<U10')
```

In [154…
```
y_pred = classifier.predict(X_test)
y_pred

#Comparing the Real Values with Predicted Values
df = pd.DataFrame({'Real Values':y_test, 'Predicted Values':y_pred})
df
```

Out[154]:

	Real Values	Predicted Values
0	versicolor	versicolor
1	virginica	virginica
2	virginica	virginica
3	setosa	setosa
4	versicolor	versicolor
5	setosa	setosa
6	setosa	setosa
7	setosa	setosa
8	setosa	setosa
9	virginica	virginica
10	virginica	virginica
11	versicolor	versicolor
12	setosa	setosa
13	setosa	setosa
14	versicolor	versicolor
15	setosa	setosa
16	versicolor	versicolor
17	virginica	virginica
18	virginica	virginica
19	setosa	setosa
20	virginica	versicolor
21	versicolor	versicolor
22	virginica	virginica
23	setosa	setosa
24	versicolor	versicolor
25	versicolor	versicolor
26	versicolor	virginica
27	setosa	setosa
28	virginica	virginica
29	versicolor	versicolor

In [164…

```
y_pred = classifier.predict(X_test)
y_pred

#Confusion Matrix and Accuracy
from sklearn.metrics import confusion_matrix
```

```
cm = confusion_matrix(y_test, y_pred)
cm
```

Out[164]:
```
array([[11,  0,  0],
       [ 0,  9,  1],
       [ 0,  1,  8]], dtype=int64)
```

In [170…
```
y_pred = classifier.predict(X_test)
y_pred
from sklearn.metrics import accuracy_score
print ("Accuracy : ", accuracy_score(y_test, y_pred))
```

```
Accuracy :  0.9333333333333333
```

In [174…
```
y_pred = classifier.predict(X_test)
y_pred

from sklearn.metrics import confusion_matrix
cm = confusion_matrix(y_test, y_pred)

from sklearn.metrics import precision_score
#precision =precision_score(y_test, y_pred,average='macro')
print ("precision : ",precision_score(y_test, y_pred,average='macro'))
```

```
precision :  0.9296296296296296
```

In [176…
```
y_pred = classifier.predict(X_test)
y_pred

from sklearn.metrics import confusion_matrix
cm = confusion_matrix(y_test, y_pred)

from sklearn.metrics import recall_score
#precision =precision_score(y_test, y_pred,average='macro')
print ("recall : ",recall_score(y_test, y_pred,average='macro'))
```

```
recall :  0.9296296296296296
```

In [ ]:
```

```