ASSIGNMENT - 6

In [2]:
```
import numpy as np
import matplotlib.pyplot as plt
import pandas as pd
```

In [3]:
```
dataset = pd.read_csv('https://raw.githubusercontent.com/mk-gurucharan/Class
```

In [4]:
```
dataset.describe()
```

Out[4]:

	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

In [5]:
```
dataset.head()
```

Out[5]:

	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

In [6]:
```
dataset.shape
```

Out[6]:
```
(150, 5)
```

In [7]:
```
X = dataset.iloc[:,:4].values
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],
       [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, 0.1],
       [5. , 3.2, 1.2, 0.2],
       [5.5, 3.5, 1.3, 0.2],
       [4.9, 3.1, 1.5, 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],
[5.6, 2.5, 3.9, 1.1],
[5.9, 3.2, 4.8, 1.8],
[6.1, 2.8, 4. , 1.3],
[6.3, 2.5, 4.9, 1.5],
[6.1, 2.8, 4.7, 1.2],
[6.4, 2.9, 4.3, 1.3],
[6.6, 3. , 4.4, 1.4],
[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],
[5.4, 3. , 4.5, 1.5],
[6. , 3.4, 4.5, 1.6],
[6.7, 3.1, 4.7, 1.5],
[6.3, 2.3, 4.4, 1.3],
[5.6, 3. , 4.1, 1.3],
[5.5, 2.5, 4. , 1.3],
[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. ],
[5.6, 2.7, 4.2, 1.3],
[5.7, 3. , 4.2, 1.2],
[5.7, 2.9, 4.2, 1.3],
[6.2, 2.9, 4.3, 1.3],
[5.1, 2.5, 3. , 1.1],
[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 [8]:

```
y = dataset['species'].values
y
```

Out[8]:
```
array(['setosa', 'setosa', 'setosa', 'setosa', 'setosa', 'setosa',
       'setosa', 'setosa', 'setosa', 'setosa', 'setosa', 'setosa',
       'setosa', 'setosa', 'setosa', 'setosa', 'setosa', 'setosa',
       'setosa', 'setosa', 'setosa', 'setosa', 'setosa', 'setosa',
       'setosa', 'setosa', 'setosa', 'setosa', 'setosa', 'setosa',
       'setosa', 'setosa', 'setosa', 'setosa', 'setosa', 'setosa',
       'setosa', 'setosa', 'setosa', 'setosa', 'setosa', 'setosa',
       'setosa', 'setosa', 'versicolor', 'versicolor', 'versicolor',
       'versicolor', 'versicolor', 'versicolor', 'versicolor',
       'versicolor', 'versicolor', 'versicolor', 'versicolor',
       'versicolor', 'versicolor', 'versicolor', 'versicolor',
       'versicolor', 'versicolor', 'versicolor', 'versicolor',
       'versicolor', 'versicolor', 'versicolor', 'versicolor',
       'versicolor', 'versicolor', 'versicolor', 'versicolor',
       'versicolor', 'versicolor', 'versicolor', 'versicolor',
       'versicolor', 'versicolor', 'versicolor', 'versicolor',
       'versicolor', 'versicolor', 'versicolor', 'virginica', 'virginica',
       'virginica', 'virginica', 'virginica', 'virginica', 'virginica',
       'virginica', 'virginica', 'virginica', 'virginica', 'virginica',
       'virginica', 'virginica', 'virginica', 'virginica', 'virginica',
       'virginica', 'virginica', 'virginica', 'virginica', 'virginica',
       'virginica', 'virginica', 'virginica', 'virginica', 'virginica',
       'virginica', 'virginica', 'virginica', 'virginica', 'virginica',
       'virginica', 'virginica', 'virginica', 'virginica', 'virginica',
       'virginica', 'virginica', 'virginica'], dtype=object)
```

In [9]:
```
#Step 4: 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 [10]:
```
#Step 5: Feature Scaling
from sklearn.preprocessing import StandardScaler
sc = StandardScaler()
X_train = sc.fit_transform(X_train)
X_test = sc.transform(X_test)
X_train
```

Out[10]:
```
array([[ 1.07399735,  0.05176719,  1.06692515,  1.5595129 ],
       [-1.25367751,  0.05176719, -1.20413503, -1.27791925],
       [-0.8861499 ,  1.66230189, -1.20413503, -1.27791925],
       [-1.74371432, -0.1783092 , -1.37446455, -1.27791925],
       [-0.39611309,  0.97207273, -1.37446455, -1.27791925],
       [ 1.80905256, -0.40838559,  1.46436068,  0.78566777],
       [-1.37618671,  0.28184357, -1.20413503, -1.27791925],
       [-0.02858548, -0.86853836,  0.10172457,  0.01182263],
       [-0.02858548, -0.86853836,  0.78304263,  0.91464196],
       [-0.8861499 ,  1.4322255 , -1.26091154, -1.01997088],
       [ 0.58396053,  0.51191996,  1.29403117,  1.68848709],
       [-0.7636407 ,  0.97207273, -1.26091154, -1.27791925],
       [ 0.58396053,  0.51191996,  0.55593661,  0.52771939],
       [ 1.07399735,  0.51191996,  1.12370165,  1.68848709],
       [ 0.46145133,  0.74199635,  0.95337214,  1.43053871],
       [ 0.33894213, -0.40838559,  0.55593661,  0.26977101],
       [ 1.07399735,  0.51191996,  1.12370165,  1.17259033],
       [-0.8861499 ,  0.97207273, -1.31768804, -1.14894506],
       [ 0.70646974,  0.28184357,  0.4423836 ,  0.3987452 ],
       [ 0.82897894, -0.63846197,  0.4991601 ,  0.3987452 ],
       [-0.6411315 ,  1.4322255 , -1.26091154, -1.27791925],
       [-0.8861499 , -1.32869113, -0.40926397, -0.11715155],
       [ 0.09392372,  0.28184357,  0.61271311,  0.78566777],
       [-0.15109468,  1.66230189, -1.14735853, -1.14894506],
       [-1.0086591 ,  0.97207273, -1.20413503, -0.7620225 ],
       [-1.74371432, -0.40838559, -1.31768804, -1.27791925],
       [-0.8861499 ,  0.74199635, -1.26091154, -1.27791925],
       [ 0.09392372, -0.1783092 ,  0.27205408,  0.3987452 ],
       [-0.39611309, -1.55876752, -0.01182844, -0.24612574],
       [-1.25367751,  0.74199635, -1.03380552, -1.27791925],
       [ 1.07399735, -0.1783092 ,  0.72626612,  0.65669358],
       [-0.39611309, -1.7888439 ,  0.15850108,  0.14079682],
       [-1.25367751,  0.74199635, -1.20413503, -1.27791925],
       [ 0.46145133, -0.63846197,  0.61271311,  0.78566777],
       [ 0.33894213, -1.09861474,  1.06692515,  0.26977101],
       [ 1.07399735,  0.05176719,  0.55593661,  0.3987452 ],
       [ 0.70646974, -0.86853836,  0.89659563,  0.91464196],
       [-1.13116831, -1.55876752, -0.23893446, -0.24612574],
       [-1.13116831,  0.05176719, -1.26091154, -1.40689344],
       [-1.13116831,  0.05176719, -1.26091154, -1.40689344],
       [ 1.07399735, -1.32869113,  1.18047816,  0.78566777],
       [ 0.95148814, -0.40838559,  0.4991601 ,  0.14079682],
       [-1.0086591 , -1.7888439 , -0.23893446, -0.24612574],
       [-0.51862229,  0.74199635, -1.14735853, -1.27791925],
       [ 0.21643293, -0.1783092 ,  0.61271311,  0.78566777],
       [-0.51862229, -0.1783092 ,  0.4423836 ,  0.3987452 ],
       [-0.27360389, -0.1783092 ,  0.4423836 ,  0.3987452 ],
       [-0.02858548, -0.63846197,  0.78304263,  1.5595129 ],
       [ 0.58396053, -0.63846197,  0.78304263,  0.3987452 ],
       [-1.0086591 , -0.1783092 , -1.20413503, -1.27791925],
       [ 0.09392372, -0.1783092 ,  0.78304263,  0.78566777],
       [-1.49869592,  0.28184357, -1.31768804, -1.27791925],
       [-0.7636407 ,  0.74199635, -1.31768804, -1.27791925],
       [ 2.54410778,  1.66230189,  1.52113718,  1.04361614],
       [-1.0086591 ,  0.97207273, -1.37446455, -1.14894506],
       [-1.13116831,  0.05176719, -1.26091154, -1.40689344],
```

```
[-0.39611309, -1.32869113,  0.15850108,  0.14079682],
[ 1.93156177, -0.63846197,  1.35080767,  0.91464196],
[-0.27360389, -0.1783092 ,  0.21527758,  0.14079682],
[-1.49869592,  1.20214912, -1.54479406, -1.27791925],
[-0.15109468, -0.63846197,  0.4423836 ,  0.14079682],
[-0.8861499 ,  1.66230189, -1.26091154, -1.14894506],
[ 1.68654336, -0.1783092 ,  1.18047816,  0.52771939],
[ 1.19650655, -0.63846197,  0.61271311,  0.26977101],
[-0.15109468, -1.09861474, -0.12538145, -0.24612574],
[-1.49869592,  0.05176719, -1.26091154, -1.27791925],
[ 0.33894213, -0.1783092 ,  0.66948962,  0.78566777],
[-1.49869592,  0.74199635, -1.31768804, -1.14894506],
[ 0.82897894,  0.28184357,  0.78304263,  1.04361614],
[ 0.95148814, -0.1783092 ,  0.38560709,  0.26977101],
[ 0.70646974, -0.40838559,  0.32883059,  0.14079682],
[ 1.68654336,  1.20214912,  1.35080767,  1.68848709],
[ 0.70646974,  0.28184357,  0.89659563,  1.43053871],
[ 0.70646974, -0.63846197,  1.06692515,  1.17259033],
[ 0.46145133, -2.01892029,  0.4423836 ,  0.3987452 ],
[-0.39611309, -1.09861474,  0.38560709,  0.01182263],
[ 0.21643293, -2.01892029,  0.72626612,  0.3987452 ],
[ 0.33894213, -0.63846197,  0.55593661,  0.01182263],
[-1.25367751, -0.1783092 , -1.31768804, -1.40689344],
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[-0.15109468,  3.04276021, -1.26091154, -1.01997088],
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[-0.15109468, -0.1783092 ,  0.27205408,  0.01182263],
[ 2.29908938,  1.66230189,  1.6914667 ,  1.30156452],
[ 1.44152496,  0.28184357,  0.55593661,  0.26977101],
[-0.02858548, -1.09861474,  0.15850108,  0.01182263],
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[-1.62120512, -1.7888439 , -1.37446455, -1.14894506],
[-0.15109468, -0.63846197,  0.21527758,  0.14079682],
[-1.37618671,  0.28184357, -1.37446455, -1.27791925],
[-0.51862229,  1.4322255 , -1.26091154, -1.27791925],
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[-0.15109468, -0.40838559,  0.27205408,  0.14079682],
[ 0.58396053, -0.40838559,  1.06692515,  0.78566777],
[-1.0086591 ,  0.51191996, -1.31768804, -1.27791925],
[ 1.31901575,  0.05176719,  0.95337214,  1.17259033],
[-0.51862229,  1.89237828, -1.37446455, -1.01997088],
[ 1.31901575,  0.05176719,  0.78304263,  1.43053871],
[-1.0086591 ,  1.20214912, -1.31768804, -1.27791925],
[ 0.21643293,  0.74199635,  0.4423836 ,  0.52771939],
[ 1.68654336,  0.28184357,  1.29403117,  0.78566777],
[ 0.33894213, -0.63846197,  0.15850108,  0.14079682],
[ 0.21643293, -2.01892029,  0.15850108, -0.24612574],
[-0.7636407 ,  2.35253105, -1.26091154, -1.40689344],
[-1.0086591 ,  0.74199635, -1.20413503, -1.01997088],
[ 0.70646974, -0.63846197,  1.06692515,  1.30156452],
[-0.27360389, -0.63846197,  0.66948962,  1.04361614],
[ 0.58396053, -1.32869113,  0.66948962,  0.3987452 ],
[ 0.58396053,  0.74199635,  1.06692515,  1.5595129 ],
[ 1.07399735,  0.05176719,  0.38560709,  0.26977101],
```

```
       [-0.27360389, -0.40838559, -0.06860494,  0.14079682],
       [-0.02858548,  2.12245466, -1.43124105, -1.27791925],
       [ 2.29908938, -1.09861474,  1.80501971,  1.43053871],
       [-0.02858548, -0.86853836,  0.78304263,  0.91464196],
       [ 0.46145133, -0.40838559,  0.32883059,  0.14079682],
       [ 1.19650655,  0.28184357,  1.23725466,  1.43053871],
       [-1.86622353, -0.1783092 , -1.48801756, -1.40689344],
       [-1.25367751, -0.1783092 , -1.31768804, -1.14894506]])
```

In [11]:
```
X_test
```

Out[11]:
```
array([[ 2.29908938, -0.1783092 ,  1.35080767,  1.43053871],
       [-0.7636407 , -0.86853836,  0.10172457,  0.26977101],
       [-1.13116831, -0.1783092 , -1.31768804, -1.27791925],
       [ 2.29908938, -0.63846197,  1.6914667 ,  1.04361614],
       [-0.51862229,  1.89237828, -1.14735853, -1.01997088],
       [ 1.31901575,  0.05176719,  0.66948962,  0.3987452 ],
       [ 0.58396053, -0.86853836,  0.66948962,  0.78566777],
       [-0.27360389, -1.32869113,  0.10172457, -0.11715155],
       [ 0.58396053, -1.32869113,  0.72626612,  0.91464196],
       [-0.39611309, -1.55876752,  0.04494807, -0.11715155],
       [ 0.82897894, -0.1783092 ,  1.01014864,  0.78566777],
       [-0.8861499 ,  1.66230189, -1.03380552, -1.01997088],
       [ 0.21643293, -0.40838559,  0.4423836 ,  0.3987452 ],
       [ 0.70646974,  0.05176719,  1.01014864,  0.78566777],
       [ 0.82897894, -0.1783092 ,  0.83981913,  1.04361614],
       [ 0.33894213, -0.1783092 ,  0.4991601 ,  0.26977101],
       [ 2.17658017, -0.1783092 ,  1.63469019,  1.17259033],
       [-1.0086591 ,  0.28184357, -1.43124105, -1.27791925],
       [-0.8861499 ,  0.51191996, -1.14735853, -0.89099669],
       [-0.27360389, -0.86853836,  0.27205408,  0.14079682],
       [ 0.58396053, -1.7888439 ,  0.38560709,  0.14079682],
       [-0.02858548, -0.86853836,  0.21527758, -0.24612574],
       [-1.74371432,  0.28184357, -1.37446455, -1.27791925],
       [-1.0086591 ,  0.74199635, -1.26091154, -1.27791925],
       [-0.51862229,  0.74199635, -1.26091154, -1.01997088],
       [ 0.82897894, -0.1783092 ,  1.18047816,  1.30156452],
       [-1.0086591 , -2.47907306, -0.12538145, -0.24612574],
       [ 1.19650655, -0.1783092 ,  1.01014864,  1.17259033],
       [-0.8861499 ,  0.97207273, -1.31768804, -1.27791925],
       [ 0.21643293, -0.86853836,  0.78304263,  0.52771939]])
```

In [12]:
```
#Step 6: 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[12]:
```
GaussianNB()
```

In [13]:
```
y_pred = classifier.predict(X_test)
y_pred
```

Out[13]:
```
array(['virginica', 'versicolor', 'setosa', 'virginica', 'setosa',
       'virginica', 'virginica', 'versicolor', 'virginica', 'versicolor',
       'virginica', 'setosa', 'versicolor', 'virginica', 'virginica',
       'versicolor', 'virginica', 'setosa', 'setosa', 'versicolor',
       'versicolor', 'versicolor', 'setosa', 'setosa', 'setosa',
       'virginica', 'versicolor', 'virginica', 'setosa', 'versicolor'],
      dtype='<U10')
```

In [14]:
```
#Step 7: Confusion Matrix and Accuracy
from sklearn.metrics import confusion_matrix
cm = confusion_matrix(y_test, y_pred)
cm
```

Out[14]:
```
array([[ 9,  0,  0],
       [ 0, 10,  1],
       [ 0,  0, 10]], dtype=int64)
```

In [15]:
```
from sklearn.metrics import accuracy_score
print ("Accuracy : ", accuracy_score(y_test, y_pred))
Accuracy :  1.0
```

```
Accuracy :  0.9666666666666667
```

In [16]:
```
#Step 8: Comparing the Real Values with Predicted Values


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

Out[16]:

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