In [1]:
```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
```

In [3]:
```
df=pd.read_csv(r'C:\Users\91778\Downloads\iris.csv')
```

In [4]:
```
df
```

Out[4]:

	Id	SepalLengthCm	SepalWidthCm	PetalLengthCm	PetalWidthCm	Species
0	1	5.1	3.5	1.4	0.2	Iris-setosa
1	2	4.9	3.0	1.4	0.2	Iris-setosa
2	3	4.7	3.2	1.3	0.2	Iris-setosa
3	4	4.6	3.1	1.5	0.2	Iris-setosa
4	5	5.0	3.6	1.4	0.2	Iris-setosa
5	6	5.4	3.9	1.7	0.4	Iris-setosa
6	7	4.6	3.4	1.4	0.3	Iris-setosa
7	8	5.0	3.4	1.5	0.2	Iris-setosa
8	9	4.4	2.9	1.4	0.2	Iris-setosa
9	10	4.9	3.1	1.5	0.1	Iris-setosa
10	11	5.4	3.7	1.5	0.2	Iris-setosa
11	12	4.8	3.4	1.6	0.2	Iris-setosa
12	13	4.8	3.0	1.4	0.1	Iris-setosa
13	14	4.3	3.0	1.1	0.1	Iris-setosa
14	15	5.8	4.0	1.2	0.2	Iris-setosa
15	16	5.7	4.4	1.5	0.4	Iris-setosa
16	17	5.4	3.9	1.3	0.4	Iris-setosa
17	18	5.1	3.5	1.4	0.3	Iris-setosa
18	19	5.7	3.8	1.7	0.3	Iris-setosa
19	20	5.1	3.8	1.5	0.3	Iris-setosa
20	21	5.4	3.4	1.7	0.2	Iris-setosa
21	22	5.1	3.7	1.5	0.4	Iris-setosa
22	23	4.6	3.6	1.0	0.2	Iris-setosa
23	24	5.1	3.3	1.7	0.5	Iris-setosa
24	25	4.8	3.4	1.9	0.2	Iris-setosa

	Id	SepalLengthCm	SepalWidthCm	PetalLengthCm	PetalWidthCm	Species
25	26	5.0	3.0	1.6	0.2	Iris-setosa
26	27	5.0	3.4	1.6	0.4	Iris-setosa
27	28	5.2	3.5	1.5	0.2	Iris-setosa
28	29	5.2	3.4	1.4	0.2	Iris-setosa
29	30	4.7	3.2	1.6	0.2	Iris-setosa
...	...	...	...	...	...	...
120	121	6.9	3.2	5.7	2.3	Iris-virginica
121	122	5.6	2.8	4.9	2.0	Iris-virginica
122	123	7.7	2.8	6.7	2.0	Iris-virginica
123	124	6.3	2.7	4.9	1.8	Iris-virginica
124	125	6.7	3.3	5.7	2.1	Iris-virginica
125	126	7.2	3.2	6.0	1.8	Iris-virginica
126	127	6.2	2.8	4.8	1.8	Iris-virginica
127	128	6.1	3.0	4.9	1.8	Iris-virginica
128	129	6.4	2.8	5.6	2.1	Iris-virginica
129	130	7.2	3.0	5.8	1.6	Iris-virginica
130	131	7.4	2.8	6.1	1.9	Iris-virginica
131	132	7.9	3.8	6.4	2.0	Iris-virginica
132	133	6.4	2.8	5.6	2.2	Iris-virginica
133	134	6.3	2.8	5.1	1.5	Iris-virginica
134	135	6.1	2.6	5.6	1.4	Iris-virginica
135	136	7.7	3.0	6.1	2.3	Iris-virginica
136	137	6.3	3.4	5.6	2.4	Iris-virginica
137	138	6.4	3.1	5.5	1.8	Iris-virginica
138	139	6.0	3.0	4.8	1.8	Iris-virginica
139	140	6.9	3.1	5.4	2.1	Iris-virginica

	Id	SepalLengthCm	SepalWidthCm	PetalLengthCm	PetalWidthCm	Species
140	141	6.7	3.1	5.6	2.4	Iris-virginica
141	142	6.9	3.1	5.1	2.3	Iris-virginica
142	143	5.8	2.7	5.1	1.9	Iris-virginica
143	144	6.8	3.2	5.9	2.3	Iris-virginica
144	145	6.7	3.3	5.7	2.5	Iris-virginica
145	146	6.7	3.0	5.2	2.3	Iris-virginica
146	147	6.3	2.5	5.0	1.9	Iris-virginica
147	148	6.5	3.0	5.2	2.0	Iris-virginica
148	149	6.2	3.4	5.4	2.3	Iris-virginica
149	150	5.9	3.0	5.1	1.8	Iris-virginica

150 rows × 6 columns

In [5]:
```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 150 entries, 0 to 149
Data columns (total 6 columns):
Id               150 non-null int64
SepalLengthCm    150 non-null float64
SepalWidthCm     150 non-null float64
PetalLengthCm    150 non-null float64
PetalWidthCm     150 non-null float64
Species          150 non-null object
dtypes: float64(4), int64(1), object(1)
memory usage: 7.1+ KB
```

In [6]:
```
#checking for null values
df.isnull().sum()
```

Out[6]:
```
Id               0
SepalLengthCm    0
SepalWidthCm     0
PetalLengthCm    0
PetalWidthCm     0
Species          0
dtype: int64
```

In [7]:
```
df.columns
```

Out[7]:
```
Index(['Id', 'SepalLengthCm', 'SepalWidthCm', 'PetalLengthCm', 'PetalWidthCm',
       'Species'],
      dtype='object')
```

In [8]:
```
df=df.drop(columns="Id")
```

In [9]:
```
df
```

Out[9]:

	SepalLengthCm	SepalWidthCm	PetalLengthCm	PetalWidthCm	Species
0	5.1	3.5	1.4	0.2	Iris-setosa
1	4.9	3.0	1.4	0.2	Iris-setosa
2	4.7	3.2	1.3	0.2	Iris-setosa
3	4.6	3.1	1.5	0.2	Iris-setosa
4	5.0	3.6	1.4	0.2	Iris-setosa
5	5.4	3.9	1.7	0.4	Iris-setosa
6	4.6	3.4	1.4	0.3	Iris-setosa
7	5.0	3.4	1.5	0.2	Iris-setosa
8	4.4	2.9	1.4	0.2	Iris-setosa
9	4.9	3.1	1.5	0.1	Iris-setosa
10	5.4	3.7	1.5	0.2	Iris-setosa
11	4.8	3.4	1.6	0.2	Iris-setosa
12	4.8	3.0	1.4	0.1	Iris-setosa
13	4.3	3.0	1.1	0.1	Iris-setosa
14	5.8	4.0	1.2	0.2	Iris-setosa
15	5.7	4.4	1.5	0.4	Iris-setosa
16	5.4	3.9	1.3	0.4	Iris-setosa
17	5.1	3.5	1.4	0.3	Iris-setosa
18	5.7	3.8	1.7	0.3	Iris-setosa
19	5.1	3.8	1.5	0.3	Iris-setosa
20	5.4	3.4	1.7	0.2	Iris-setosa
21	5.1	3.7	1.5	0.4	Iris-setosa
22	4.6	3.6	1.0	0.2	Iris-setosa
23	5.1	3.3	1.7	0.5	Iris-setosa
24	4.8	3.4	1.9	0.2	Iris-setosa

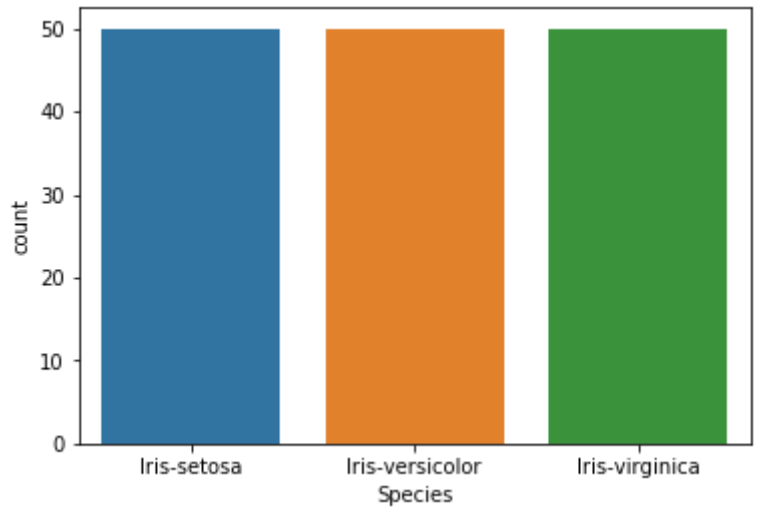
	SepalLengthCm	SepalWidthCm	PetalLengthCm	PetalWidthCm	Species
25	5.0	3.0	1.6	0.2	Iris-setosa
26	5.0	3.4	1.6	0.4	Iris-setosa
27	5.2	3.5	1.5	0.2	Iris-setosa
28	5.2	3.4	1.4	0.2	Iris-setosa
29	4.7	3.2	1.6	0.2	Iris-setosa
...	...	...	...	...	...
120	6.9	3.2	5.7	2.3	Iris-virginica
121	5.6	2.8	4.9	2.0	Iris-virginica
122	7.7	2.8	6.7	2.0	Iris-virginica
123	6.3	2.7	4.9	1.8	Iris-virginica
124	6.7	3.3	5.7	2.1	Iris-virginica
125	7.2	3.2	6.0	1.8	Iris-virginica
126	6.2	2.8	4.8	1.8	Iris-virginica
127	6.1	3.0	4.9	1.8	Iris-virginica
128	6.4	2.8	5.6	2.1	Iris-virginica
129	7.2	3.0	5.8	1.6	Iris-virginica
130	7.4	2.8	6.1	1.9	Iris-virginica
131	7.9	3.8	6.4	2.0	Iris-virginica
132	6.4	2.8	5.6	2.2	Iris-virginica
133	6.3	2.8	5.1	1.5	Iris-virginica
134	6.1	2.6	5.6	1.4	Iris-virginica
135	7.7	3.0	6.1	2.3	Iris-virginica
136	6.3	3.4	5.6	2.4	Iris-virginica
137	6.4	3.1	5.5	1.8	Iris-virginica
138	6.0	3.0	4.8	1.8	Iris-virginica
139	6.9	3.1	5.4	2.1	Iris-virginica

	SepalLengthCm	SepalWidthCm	PetalLengthCm	PetalWidthCm	Species
140	6.7	3.1	5.6	2.4	Iris-virginica
141	6.9	3.1	5.1	2.3	Iris-virginica
142	5.8	2.7	5.1	1.9	Iris-virginica
143	6.8	3.2	5.9	2.3	Iris-virginica
144	6.7	3.3	5.7	2.5	Iris-virginica
145	6.7	3.0	5.2	2.3	Iris-virginica
146	6.3	2.5	5.0	1.9	Iris-virginica
147	6.5	3.0	5.2	2.0	Iris-virginica
148	6.2	3.4	5.4	2.3	Iris-virginica
149	5.9	3.0	5.1	1.8	Iris-virginica

150 rows × 5 columns

In [14]:
```
df['Species'].value_counts()

sns.countplot(df['Species']);
```



In [13]:
```
x=df.iloc[:,:4]
y=df.iloc[:,4]
x
```

Out[13]:

	SepalLengthCm	SepalWidthCm	PetalLengthCm	PetalWidthCm
0	5.1	3.5	1.4	0.2
1	4.9	3.0	1.4	0.2
2	4.7	3.2	1.3	0.2
3	4.6	3.1	1.5	0.2
4	5.0	3.6	1.4	0.2
5	5.4	3.9	1.7	0.4
6	4.6	3.4	1.4	0.3
7	5.0	3.4	1.5	0.2
8	4.4	2.9	1.4	0.2
9	4.9	3.1	1.5	0.1
10	5.4	3.7	1.5	0.2
11	4.8	3.4	1.6	0.2
12	4.8	3.0	1.4	0.1
13	4.3	3.0	1.1	0.1
14	5.8	4.0	1.2	0.2
15	5.7	4.4	1.5	0.4
16	5.4	3.9	1.3	0.4
17	5.1	3.5	1.4	0.3
18	5.7	3.8	1.7	0.3
19	5.1	3.8	1.5	0.3
20	5.4	3.4	1.7	0.2
21	5.1	3.7	1.5	0.4
22	4.6	3.6	1.0	0.2
23	5.1	3.3	1.7	0.5
24	4.8	3.4	1.9	0.2

	SepalLengthCm	SepalWidthCm	PetalLengthCm	PetalWidthCm
25	5.0	3.0	1.6	0.2
26	5.0	3.4	1.6	0.4
27	5.2	3.5	1.5	0.2
28	5.2	3.4	1.4	0.2
29	4.7	3.2	1.6	0.2
...	...	...	...	...
120	6.9	3.2	5.7	2.3
121	5.6	2.8	4.9	2.0
122	7.7	2.8	6.7	2.0
123	6.3	2.7	4.9	1.8
124	6.7	3.3	5.7	2.1
125	7.2	3.2	6.0	1.8
126	6.2	2.8	4.8	1.8
127	6.1	3.0	4.9	1.8
128	6.4	2.8	5.6	2.1
129	7.2	3.0	5.8	1.6
130	7.4	2.8	6.1	1.9
131	7.9	3.8	6.4	2.0
132	6.4	2.8	5.6	2.2
133	6.3	2.8	5.1	1.5
134	6.1	2.6	5.6	1.4
135	7.7	3.0	6.1	2.3
136	6.3	3.4	5.6	2.4
137	6.4	3.1	5.5	1.8
138	6.0	3.0	4.8	1.8
139	6.9	3.1	5.4	2.1

	SepalLengthCm	SepalWidthCm	PetalLengthCm	PetalWidthCm
140	6.7	3.1	5.6	2.4
141	6.9	3.1	5.1	2.3
142	5.8	2.7	5.1	1.9
143	6.8	3.2	5.9	2.3
144	6.7	3.3	5.7	2.5
145	6.7	3.0	5.2	2.3
146	6.3	2.5	5.0	1.9
147	6.5	3.0	5.2	2.0
148	6.2	3.4	5.4	2.3
149	5.9	3.0	5.1	1.8

150 rows × 4 columns

In [15]:
```
y
```

Out[15]:
```
0          Iris-setosa
1          Iris-setosa
2          Iris-setosa
3          Iris-setosa
4          Iris-setosa
5          Iris-setosa
6          Iris-setosa
7          Iris-setosa
8          Iris-setosa
9          Iris-setosa
10         Iris-setosa
11         Iris-setosa
12         Iris-setosa
13         Iris-setosa
14         Iris-setosa
15         Iris-setosa
16         Iris-setosa
17         Iris-setosa
18         Iris-setosa
19         Iris-setosa
20         Iris-setosa
21         Iris-setosa
22         Iris-setosa
23         Iris-setosa
24         Iris-setosa
25         Iris-setosa
26         Iris-setosa
27         Iris-setosa
28         Iris-setosa
29         Iris-setosa
             ...
120    Iris-virginica
121    Iris-virginica
122    Iris-virginica
123    Iris-virginica
124    Iris-virginica
125    Iris-virginica
126    Iris-virginica
127    Iris-virginica
128    Iris-virginica
129    Iris-virginica
```

```
130    Iris-virginica
131    Iris-virginica
132    Iris-virginica
133    Iris-virginica
134    Iris-virginica
135    Iris-virginica
136    Iris-virginica
137    Iris-virginica
138    Iris-virginica
139    Iris-virginica
140    Iris-virginica
141    Iris-virginica
142    Iris-virginica
143    Iris-virginica
144    Iris-virginica
145    Iris-virginica
146    Iris-virginica
147    Iris-virginica
148    Iris-virginica
149    Iris-virginica
Name: Species, Length: 150, dtype: object
```

In [16]:
```
#Import train_test_split to split the data into train and test datasets.

from sklearn.model_selection import train_test_split
x_train,x_test,y_train,y_test=train_test_split(x,y,random_state=0)
```

In [17]:
```
x_train.shape
```

Out[17]:
```
(112, 4)
```

In [18]:
```
x_test.shape
```

Out[18]:
```
(38, 4)
```

In [19]:
```
y_train.shape
```

Out[19]:
```
(112,)
```

In [20]:
```
y_test.shape
```

Out[20]:
```
(38,)
```

In [21]:
```
#import LogisticRegression from the sci-kit learn library.

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

In [22]:
```
model.fit(x_train,y_train)
```

Out[22]:
```
LogisticRegression(C=1.0, class_weight=None, dual=False, fit_intercept=True,
          intercept_scaling=1, max_iter=100, multi_class='ovr', n_jobs=1,
          penalty='l2', random_state=None, solver='liblinear', tol=0.0001,
          verbose=0, warm_start=False)
```

In [23]:
```
#predicting the results using predict method.
y_pred=model.predict(x_test)
y_pred
```

Out[23]:
```
array(['Iris-virginica', 'Iris-versicolor', 'Iris-setosa',
       'Iris-virginica', 'Iris-setosa', 'Iris-virginica', 'Iris-setosa',
       'Iris-versicolor', 'Iris-versicolor', 'Iris-versicolor',
       'Iris-virginica', 'Iris-versicolor', 'Iris-versicolor',
       'Iris-versicolor', 'Iris-versicolor', 'Iris-setosa',
       'Iris-virginica', 'Iris-versicolor', 'Iris-setosa', 'Iris-setosa',
       'Iris-virginica', 'Iris-virginica', 'Iris-setosa', 'Iris-setosa',
       'Iris-virginica', 'Iris-setosa', 'Iris-setosa', 'Iris-versicolor',
       'Iris-versicolor', 'Iris-setosa', 'Iris-virginica',
       'Iris-virginica', 'Iris-setosa', 'Iris-virginica',
       'Iris-virginica', 'Iris-virginica', 'Iris-setosa',
       'Iris-virginica'], dtype=object)
```

In [24]:
```
#import accuracy_score and confusion_matrix from the sci-kit learn metric library.
from sklearn.metrics import accuracy_score,confusion_matrix
confusion_matrix(y_test,y_pred)
```

Out[24]:
```
array([[13,  0,  0],
       [ 0, 11,  5],
       [ 0,  0,  9]], dtype=int64)
```

In [25]:
```
accuracy=accuracy_score(y_test,y_pred)*100
print("Accuracy of the model is {:.2f}".format(accuracy))
```

```
Accuracy of the model is 86.84
```

In [ ]:
```
#Conclusion on Classification
#Flower classification is a very important, simple, and basic project for any machine learning student. Every machine

##Mainly we focused on Logistic Regression
##We took Iris Flowers dataset and performed a logistic regression algorithm
##Finally, it classified flowers into their species.
##And we got an accuracy of 86.84%, which shows that the model we built is very accurate.
```