```
import numpy as np
import pandas as pd
import seaborn as sns
import matplotlib.pyplot as plt
import sklearn
from sklearn.datasets import load_iris  #we can also load datasets from sklearn ,which are present in sklearn
dataset=load_iris()
dataset
```


```
{'data': array([[5.1, 3.5, 1.4, 0.2],
        [4.9, 3. , 1.4, 0.2],
        [4.7, 3.2, 1.3, 0.2],
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        [5.7, 4.4, 1.5, 0.4],
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        [4.8, 3. , 1.4, 0.3],
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        [5.7, 2.8, 4.5, 1.3],
        [6.3, 3.3, 4.7, 1.6],
        [4.9, 2.4, 3.3, 1. ],
```


```
x=dataset.data
x
```


```
array([[5.1, 3.5, 1.4, 0.2],
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       [4.7, 3.2, 1.3, 0.2],
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```

```
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       [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],
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       [4.8, 3.1, 1.6, 0.2],
       [5.4, 3.4, 1.5, 0.4],
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       [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],
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       [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. ],
```

```
y=dataset.target
y
```

```
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,
       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, 1, 1, 1, 1, 1, 1, 1, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2,
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       2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2])
```

```
from sklearn.model_selection import train_test_split
x_train,x_test,y_train,y_test=train_test_split(x,y,test_size=0.3,random_state=1)
x_train.shape
```

```
(105, 4)
```

```
x_test.shape
```

```
(45, 4)
```

```
from sklearn.tree import DecisionTreeClassifier
classifier=DecisionTreeClassifier(criterion='entropy')
classifier.fit(x_train,y_train)
```

```
DecisionTreeClassifier(criterion='entropy')
```

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

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

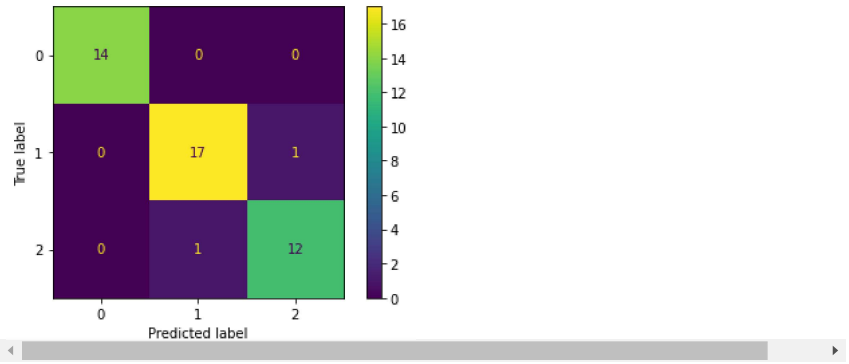
```
from sklearn.metrics import classification_report,ConfusionMatrixDisplay
print(classification_report(y_test,y_pred))
print(ConfusionMatrixDisplay.from_predictions(y_test,y_pred))   #from_predictions  : is used for automatic labeling
```

```
              precision    recall  f1-score   support

           0       1.00      1.00      1.00        14
           1       0.94      0.94      0.94        18
           2       0.92      0.92      0.92        13

    accuracy                           0.96        45
   macro avg       0.96      0.96      0.96        45
weighted avg       0.96      0.96      0.96        45

<sklearn.metrics._plot.confusion_matrix.ConfusionMatrixDisplay object at 0x7f379eb
```




```
from sklearn import tree
plt.figure(figsize=(15,15))
tree.plot_tree(classifier,feature_names=['sepal length (cm)','sepal width (cm)','petal length (cm)','petal width (cm)'],filled=True)
```

```
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[0, 32, 37]'),
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[0, 31, 3]'),
 Text(0.1, 0.3, 'entropy = 0.0\nsamples = 30\nvalue = [0, 30, 0]'),
 Text(0.3, 0.3, 'sepal length (cm) <= 6.05\nentropy = 0.811\nsamples = 4\nvalue =
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 Text(0.2, 0.1, 'entropy = 0.0\nsamples = 1\nvalue = [0, 1, 0]'),
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 Text(0.8, 0.1, 'entropy = 0.0\nsamples = 1\nvalue = [0, 1, 0]'),
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```