In [ ]:

```
6.  Write a program to implement k-Nearest Neighbour algorithm to classify the iris dat
a set.
```

In [5]:

```
from sklearn.datasets import load_iris
from sklearn.neighbors import KNeighborsClassifier
import numpy as np
from sklearn.model_selection import train_test_split
iris_dataset=load_iris()

print("\n IRIS FEATURES \ TARGET NAMES: \n ", iris_dataset.target_names)
for i in range(len(iris_dataset.target_names)):
    print("\n[{0}]:[{1}]".format(i,iris_dataset.target_names[i]))

print("\n IRIS DATA :\n",iris_dataset["data"])

X_train, X_test, y_train, y_test = train_test_split(iris_dataset["data"], iris_dataset[
"target"], random_state=0)

print("\n Target :\n",iris_dataset["target"])
print("\n X TRAIN \n", X_train)
print("\n X TEST \n", X_test)
print("\n Y TRAIN \n", y_train)
print("\n Y TEST \n", y_test)
kn = KNeighborsClassifier(n_neighbors=1)
kn.fit(X_train, y_train)

x_new = np.array([[5, 2.9, 1, 0.2]])
print("\n XNEW \n",x_new)

prediction = kn.predict(x_new)

print("\n Predicted target value: {}\n".format(prediction))
print("\n Predicted feature name: {}\n".format
    (iris_dataset["target_names"][prediction]))

i=1
x= X_test[i]
x_new = np.array([x])
print("\n XNEW \n",x_new)

for i in range(len(X_test)):
    x = X_test[i]
    x_new = np.array([x])
    prediction = kn.predict(x_new)
    print("\n Actual : {0} {1}, Predicted :{2}{3}".format(y_test[i],iris_dataset["targe
t_names"][y_test[i]],prediction,iris_dataset["target_names"][prediction]))

print("\n TEST SCORE[ACCURACY]: {:.2f}\n".format(kn.score(X_test, y_test)))
```

```
 IRIS FEATURES \ TARGET NAMES:
  ['setosa' 'versicolor' 'virginica']

[0]:[setosa]

[1]:[versicolor]

[2]:[virginica]

 IRIS DATA :
 [[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]
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 [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]
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 [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]
```

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[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]
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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]
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[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]]

Target :
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 2 2]

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

```
X TEST
[[5.8 2.8 5.1 2.4]
[6.  2.2 4.  1. ]
[5.5 4.2 1.4 0.2]
[7.3 2.9 6.3 1.8]
[5.  3.4 1.5 0.2]
[6.3 3.3 6.  2.5]
[5.  3.5 1.3 0.3]
[6.7 3.1 4.7 1.5]
[6.8 2.8 4.8 1.4]
[6.1 2.8 4.  1.3]
[6.1 2.6 5.6 1.4]
[6.4 3.2 4.5 1.5]
[6.1 2.8 4.7 1.2]
[6.5 2.8 4.6 1.5]
[6.1 2.9 4.7 1.4]
[4.9 3.6 1.4 0.1]
[6.  2.9 4.5 1.5]
[5.5 2.6 4.4 1.2]
[4.8 3.  1.4 0.3]
[5.4 3.9 1.3 0.4]
[5.6 2.8 4.9 2. ]
```

```
[5.6 3.  4.5 1.5]
[4.8 3.4 1.9 0.2]
[4.4 2.9 1.4 0.2]
[6.2 2.8 4.8 1.8]
[4.6 3.6 1.  0.2]
[5.1 3.8 1.9 0.4]
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[5.  3.4 1.6 0.4]
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[5.4 3.  4.5 1.5]
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[6.1 3.  4.9 1.8]
[6.4 2.8 5.6 2.2]
[5.2 2.7 3.9 1.4]
[5.7 3.8 1.7 0.3]
[6.  2.7 5.1 1.6]]

Y TRAIN
[1 1 2 0 2 0 0 1 2 2 2 2 1 2 1 1 2 2 2 2 1 2 1 0 2 1 1 1 1 2 0 0 2 1 0 0
1
0 2 1 0 1 2 1 0 2 2 2 2 0 0 2 2 0 2 0 2 2 0 0 2 0 0 0 1 2 2 0 0 0 1 1 0 0
1 0 2 1 2 1 0 2 0 2 0 0 2 0 2 1 1 1 2 2 1 1 0 1 2 2 0 1 1 1 1 0 0 0 2 1 2
0]

Y TEST
[2 1 0 2 0 2 0 1 1 1 2 1 1 1 1 0 1 1 0 0 2 1 0 0 2 0 0 1 1 0 2 1 0 2 2 1
0
1]

XNEW
[[5.  2.9 1.  0.2]]

Predicted target value: [0]


Predicted feature name: ['setosa']


XNEW
[[6.  2.2 4.  1. ]]

Actual : 2 virginica, Predicted :[2]['virginica']

Actual : 1 versicolor, Predicted :[1]['versicolor']

Actual : 0 setosa, Predicted :[0]['setosa']

Actual : 2 virginica, Predicted :[2]['virginica']

Actual : 0 setosa, Predicted :[0]['setosa']

Actual : 2 virginica, Predicted :[2]['virginica']

Actual : 0 setosa, Predicted :[0]['setosa']

Actual : 1 versicolor, Predicted :[1]['versicolor']

Actual : 1 versicolor, Predicted :[1]['versicolor']

Actual : 1 versicolor, Predicted :[1]['versicolor']
```

```
Actual : 2 virginica, Predicted :[2]['virginica']

Actual : 1 versicolor, Predicted :[1]['versicolor']

Actual : 1 versicolor, Predicted :[1]['versicolor']

Actual : 1 versicolor, Predicted :[1]['versicolor']

Actual : 1 versicolor, Predicted :[1]['versicolor']

Actual : 0 setosa, Predicted :[0]['setosa']

Actual : 1 versicolor, Predicted :[1]['versicolor']

Actual : 1 versicolor, Predicted :[1]['versicolor']

Actual : 0 setosa, Predicted :[0]['setosa']

Actual : 0 setosa, Predicted :[0]['setosa']

Actual : 2 virginica, Predicted :[2]['virginica']

Actual : 1 versicolor, Predicted :[1]['versicolor']

Actual : 0 setosa, Predicted :[0]['setosa']

Actual : 0 setosa, Predicted :[0]['setosa']

Actual : 2 virginica, Predicted :[2]['virginica']

Actual : 0 setosa, Predicted :[0]['setosa']

Actual : 0 setosa, Predicted :[0]['setosa']

Actual : 1 versicolor, Predicted :[1]['versicolor']

Actual : 1 versicolor, Predicted :[1]['versicolor']

Actual : 0 setosa, Predicted :[0]['setosa']

Actual : 2 virginica, Predicted :[2]['virginica']

Actual : 1 versicolor, Predicted :[1]['versicolor']

Actual : 0 setosa, Predicted :[0]['setosa']

Actual : 2 virginica, Predicted :[2]['virginica']

Actual : 2 virginica, Predicted :[2]['virginica']

Actual : 1 versicolor, Predicted :[1]['versicolor']

Actual : 0 setosa, Predicted :[0]['setosa']

Actual : 1 versicolor, Predicted :[2]['virginica']

TEST SCORE[ACCURACY]: 0.97
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In [ ]:

In [ ]:

In [ ]: