```python
import matplotlib.pyplot as plt
import numpy as np
import pandas as pd
```

```python
url = "https://archive.ics.uci.edu/ml/machine-learning-databases/iris/iris.data"
```

```python
col_names=["sepallength","sepalwidth","petallength","petalwidth","class"]
```

```python
dataset=pd.read_csv(url,names=col_names)
```

```python
dataset
```

	sepallength	sepalwidth	petallength	petalwidth	class
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
...	...	...	...	...	...
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

```python
dataset_knn=dataset.values[:,0:4]
labels=dataset.values[:,-1]
```

```python
dataset_knn
```

```
array([[5.1, 3.5, 1.4, 0.2],
       [4.9, 3.0, 1.4, 0.2],
       [4.7, 3.2, 1.3, 0.2],
       [4.6, 3.1, 1.5, 0.2],
       [5.0, 3.6, 1.4, 0.2],
       [5.4, 3.9, 1.7, 0.4],
       [4.6, 3.4, 1.4, 0.3],
       [5.0, 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, 3.0, 1.4, 0.1],
       [4.3, 3.0, 1.1, 0.1],
       [5.8, 4.0, 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, 0.2],
       [5.1, 3.3, 1.7, 0.5],
       [4.8, 3.4, 1.9, 0.2],
       [5.0, 3.0, 1.6, 0.2],
       [5.0, 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],
       [5.0, 3.2, 1.2, 0.2],
       [5.5, 3.5, 1.3, 0.2],
       [4.9, 3.1, 1.5, 0.1],
       [4.4, 3.0, 1.3, 0.2],
       [5.1, 3.4, 1.5, 0.2],
       [5.0, 3.5, 1.3, 0.3],
```

```
            [4.5, 2.3, 1.3, 0.3],
            [4.4, 3.2, 1.3, 0.2],
            [5.0, 3.5, 1.6, 0.6],
            [5.1, 3.8, 1.9, 0.4],
            [4.8, 3.0, 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],
            [5.0, 3.3, 1.4, 0.2],
            [7.0, 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, 4.0, 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, 1.0],
```

```python
import math
def distance(x1,x2):
  distances=0.0
  for i in range(len(x1)):
    distances+=(x1[i]-x2[i])**2
  return (math.sqrt(distances))
```

```python
testing_data=dataset.values[54,0:4]
```

```python
distances_with_labels = []
for i in range(len(dataset_knn)):
  dist = distance(testing_data, dataset_knn[i])
  distances_with_labels.append((dist, labels[i]))
```

```python
distances_with_labels.sort()
```

```python
distances_cumm.sort()
```

```python
distances_with_labels
```

```
[(0.0, 'Iris-versicolor'),
 (0.24494897427831766, 'Iris-versicolor'),
 (0.31622776601683755, 'Iris-versicolor'),
 (0.3741657386773941, 'Iris-versicolor'),
 (0.3741657386773946, 'Iris-versicolor'),
 (0.3872983346207415, 'Iris-versicolor'),
 (0.42426406871192845, 'Iris-versicolor'),
 (0.4242640687119287, 'Iris-versicolor'),
 (0.43588989435406783, 'Iris-versicolor'),
 (0.4582575694955844, 'Iris-versicolor'),
 (0.469041575982343, 'Iris-virginica'),
 (0.4690415759823434, 'Iris-versicolor'),
 (0.47958315233127174, 'Iris-versicolor'),
 (0.47958315233312724, 'Iris-virginica'),
 (0.5099019513592788, 'Iris-versicolor'),
 (0.5196152422706631, 'Iris-versicolor'),
 (0.5291502622129185, 'Iris-versicolor'),
 (0.5385164807134505, 'Iris-virginica'),
 (0.5567764362830024, 'Iris-versicolor'),
 (0.5830951894845308, 'Iris-versicolor'),
 (0.6082762530298218, 'Iris-versicolor'),
 (0.6164414002968983, 'Iris-virginica'),
 (0.6480740698407862, 'Iris-virginica'),
 (0.6557438524302004, 'Iris-versicolor'),
 (0.670820393249937, 'Iris-virginica'),
 (0.6782329983125264, 'Iris-versicolor'),
 (0.7211102550927979, 'Iris-versicolor'),
 (0.7483314773547878, 'Iris-versicolor'),
 (0.7483314773547881, 'Iris-versicolor'),
 (0.7937253933193772, 'Iris-versicolor'),
 (0.8062257748298549, 'Iris-versicolor'),
 (0.8062257748298555, 'Iris-virginica'),
 (0.8124038404635961, 'Iris-virginica'),
 (0.8185352771872451, 'Iris-virginica'),
 (0.8306623862918072, 'Iris-versicolor'),
 (0.8602325267042625, 'Iris-virginica'),
 (0.8774964387392121, 'Iris-virginica'),
 (0.9219544457292883, 'Iris-versicolor'),
 (0.927361849495707, 'Iris-versicolor'),
 (0.9539392014169458, 'Iris-virginica'),
 (0.9539392014169458, 'Iris-virginica'),
 (0.9643650760992951, 'Iris-versicolor'),
 (0.9643650760992953, 'Iris-virginica'),
 (0.9695359714832661, 'Iris-virginica'),
 (0.9899494936611664, 'Iris-versicolor'),
 (1.0, 'Iris-versicolor'),
 (1.0000000000000002, 'Iris-virginica'),
```

```
        (1.0099504938362078, 'Iris-versicolor'),
        (1.0392304845413263, 'Iris-versicolor'),
        (1.0392304845413267, 'Iris-virginica'),
        (1.067707825203131, 'Iris-virginica'),
        (1.0677078252031311, 'Iris-virginica'),
        (1.0677078252031311, 'Iris-virginica'),
        (1.0677078252031313, 'Iris-versicolor'),
        (1.0723805294763613, 'Iris-virginica'),
        (1.0816653826391966, 'Iris-versicolor'),
        (1.1, 'Iris-virginica'),
        (1.1045361017187258, 'Iris-versicolor')
```

```python
k = 10
top_k_neighbors = distances_with_labels[:k]

class_counts = {}
for dist, label in top_k_neighbors:
  class_counts[label] = class_counts.get(label, 0) + 1

predicted_class = max(class_counts, key=class_counts.get)

print(f"The predicted class for the testing data is: {predicted_class}")
```

⊋ The predicted class for the testing data is: Iris-versicolor

```python
max_key = max(class_counts, key=class_counts.get)
print("predicated class :", max_key)
```

⊋ predicated class : Iris-versicolor