In [22]:

```
import matplotlib
import matplotlib.pyplot as plt
from sklearn import datasets
from sklearn.cluster import KMeans
import sklearn.metrics as sm
import pandas as pd
import numpy as np
```

In [23]:

```
data = pd.read_csv("Iris.csv")
data.sample(10)
```

Out[23]:

	Id	SepalLengthCm	SepalWidthCm	PetalLengthCm	PetalWidthCm	Species
137	138	6.4	3.1	5.5	1.8	Iris-virginica
74	75	6.4	2.9	4.3	1.3	Iris-versicolor
57	58	4.9	2.4	3.3	1.0	Iris-versicolor
4	5	5.0	3.6	1.4	0.2	Iris-setosa
64	65	5.6	2.9	3.6	1.3	Iris-versicolor
28	29	5.2	3.4	1.4	0.2	Iris-setosa
112	113	6.8	3.0	5.5	2.1	Iris-virginica
91	92	6.1	3.0	4.6	1.4	Iris-versicolor
116	117	6.5	3.0	5.5	1.8	Iris-virginica
17	18	5.1	3.5	1.4	0.3	Iris-setosa

In [24]:

```
X = data[['SepalLengthCm', 'SepalWidthCm', 'PetalLengthCm', 'PetalWidthCm']]
y = data.Species.astype("category").cat.codes
```

In [25]:

```
model = KMeans(n_clusters=3)
model.fit(X)
```

Out[25]:

```
KMeans(n_clusters=3)
```

In [26]:

```
print('The Accuracy Score Of K-Mean: ', sm.accuracy_score(y, model.labels_))
print('The Confusion Matrix Of K-Mean: ', sm.confusion_matrix(y, model.labels_))
```

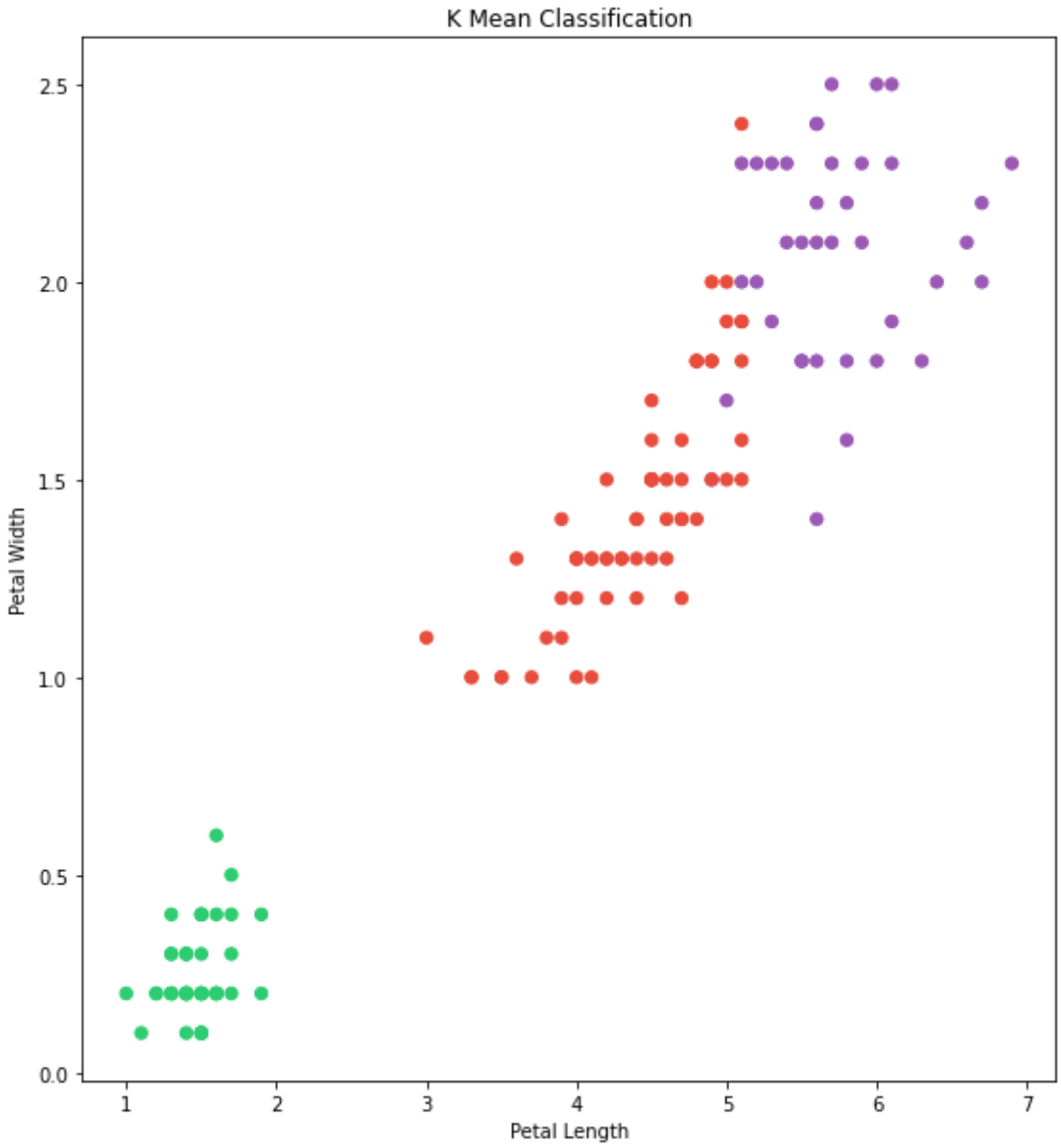
```
The Accuracy Score Of K-Mean:  0.24
The Confusion Matrix Of K-Mean:  [[ 0 50  0]
 [48  0  2]
 [14  0 36]]
```

In [27]:

```
plt.figure(figsize=(20, 10))
plt.subplot(1, 2, 2)
colormap = np.array(['#e74c3c', '#2ecc71', '#9b59b6', '#3498db', '#f1c40f', '#e67e22', '#34
plt.scatter(X.PetalLengthCm, X.PetalWidthCm, c=colormap[model.labels_], s=40)
plt.title('K Mean Classification')
plt.xlabel('Petal Length')
plt.ylabel('Petal Width')
```

Out[27]:

```
Text(0, 0.5, 'Petal Width')
```



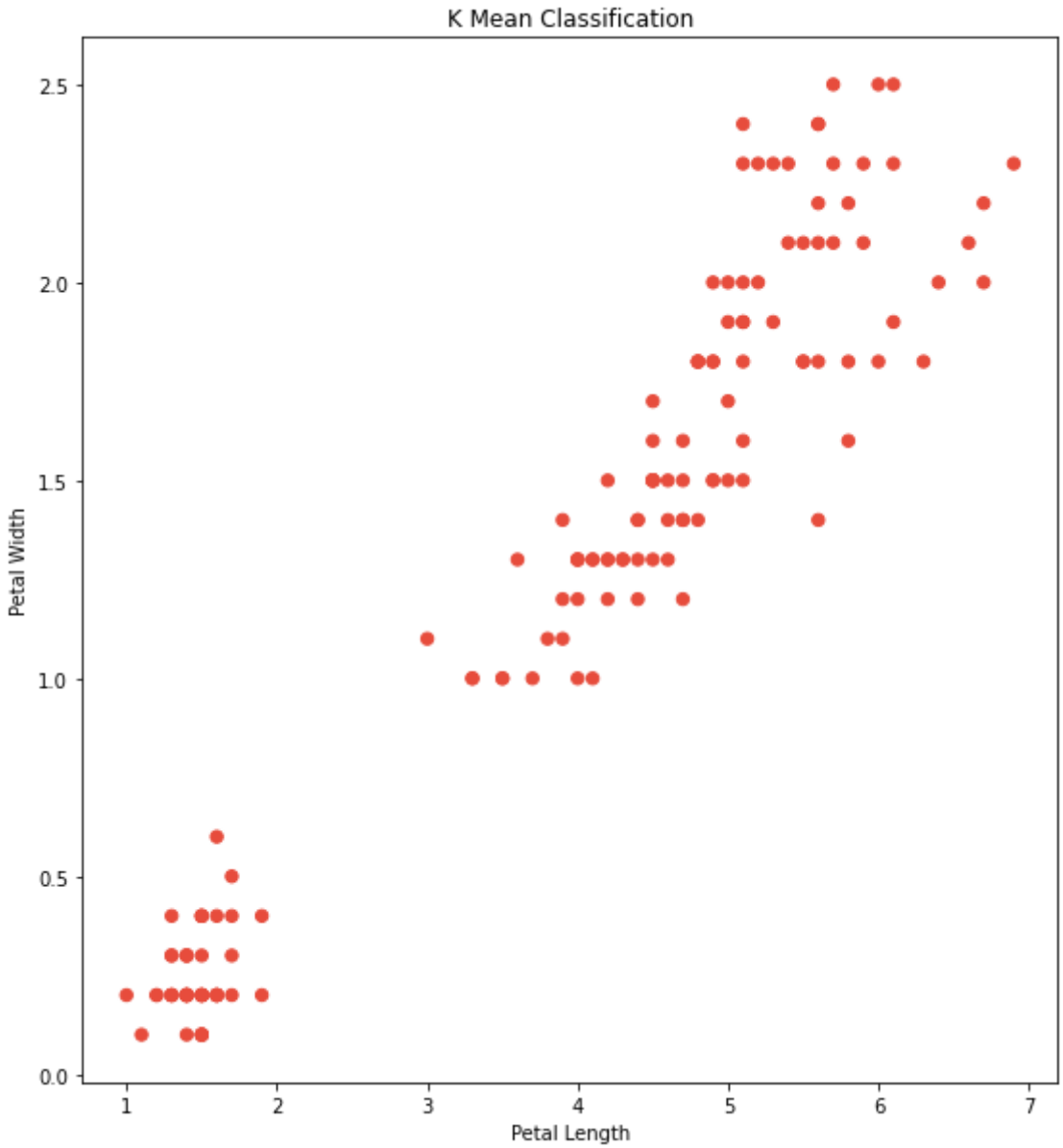
In [136]:

```
K = 1

model = KMeans(n_clusters=K)
model.fit(X)

print('The accuracy score of K-Mean: ', sm.accuracy_score(y, model.labels_))
print('The Confusion matrixof K-Mean: ', sm.confusion_matrix(y, model.labels_))
plt.figure(figsize=(20, 10))
plt.subplot(1, 2, 2)
plt.scatter(X.PetalLengthCm, X.PetalWidthCm, c=colormap[model.labels_], s=40)
plt.title('K Mean Classification')
plt.xlabel('Petal Length')
plt.ylabel('Petal Width')
plt.show()
```

```
The accuracy score of K-Mean:  0.3333333333333333
The Confusion matrixof K-Mean:  [[50  0  0]
 [50  0  0]
 [50  0  0]]
```



In [42]:

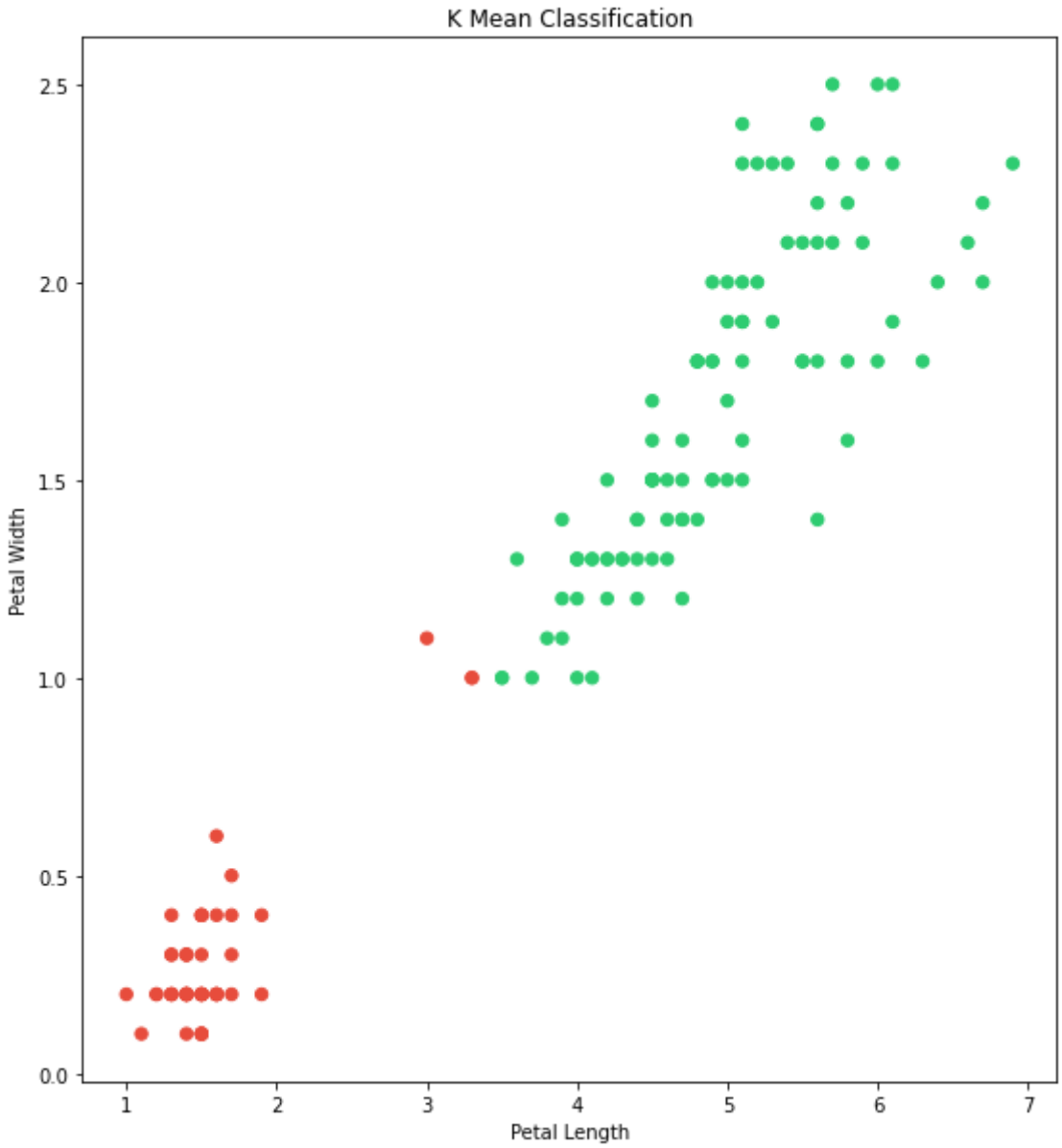
```
K = 2

model = KMeans(n_clusters=K)
model.fit(X)

print('The accuracy score of K-Mean: ', sm.accuracy_score(y, model.labels_))
print('The Confusion matrixof K-Mean: ', sm.confusion_matrix(y, model.labels_))

plt.figure(figsize=(20, 10))
plt.subplot(1, 2, 2)
plt.scatter(X.PetalLengthCm, X.PetalWidthCm, c=colormap[model.labels_], s=40)
plt.title('K Mean Classification')
plt.xlabel('Petal Length')
plt.ylabel('Petal Width')
plt.show()
```

```
The accuracy score of K-Mean:  0.6466666666666666
The Confusion matrixof K-Mean:  [[50  0  0]
 [ 3 47  0]
 [ 0 50  0]]
```



In [35]:

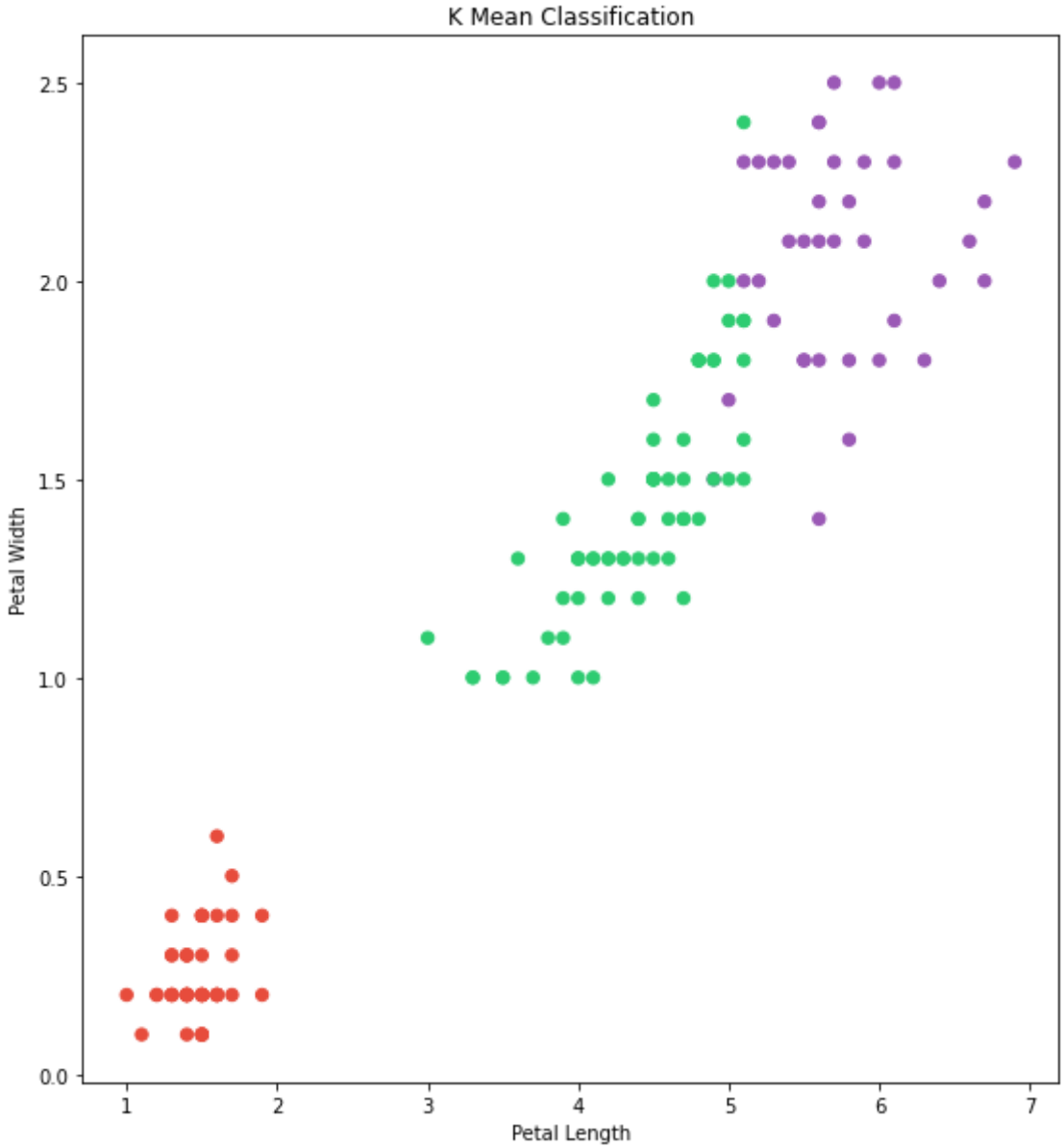
```
K = 3

model = KMeans(n_clusters=K)
model.fit(X)

print('The accuracy score of K-Mean: ', sm.accuracy_score(y, model.labels_))
print('The Confusion matrixof K-Mean: ', sm.confusion_matrix(y, model.labels_))

plt.figure(figsize=(20, 10))
plt.subplot(1, 2, 2)
plt.scatter(X.PetalLengthCm, X.PetalWidthCm, c=colormap[model.labels_], s=40)
plt.title('K Mean Classification')
plt.xlabel('Petal Length')
plt.ylabel('Petal Width')
plt.show()
```

```
The accuracy score of K-Mean:  0.8933333333333333
The Confusion matrixof K-Mean:  [[50  0  0]
 [ 0 48  2]
 [ 0 14 36]]
```



In [34]:

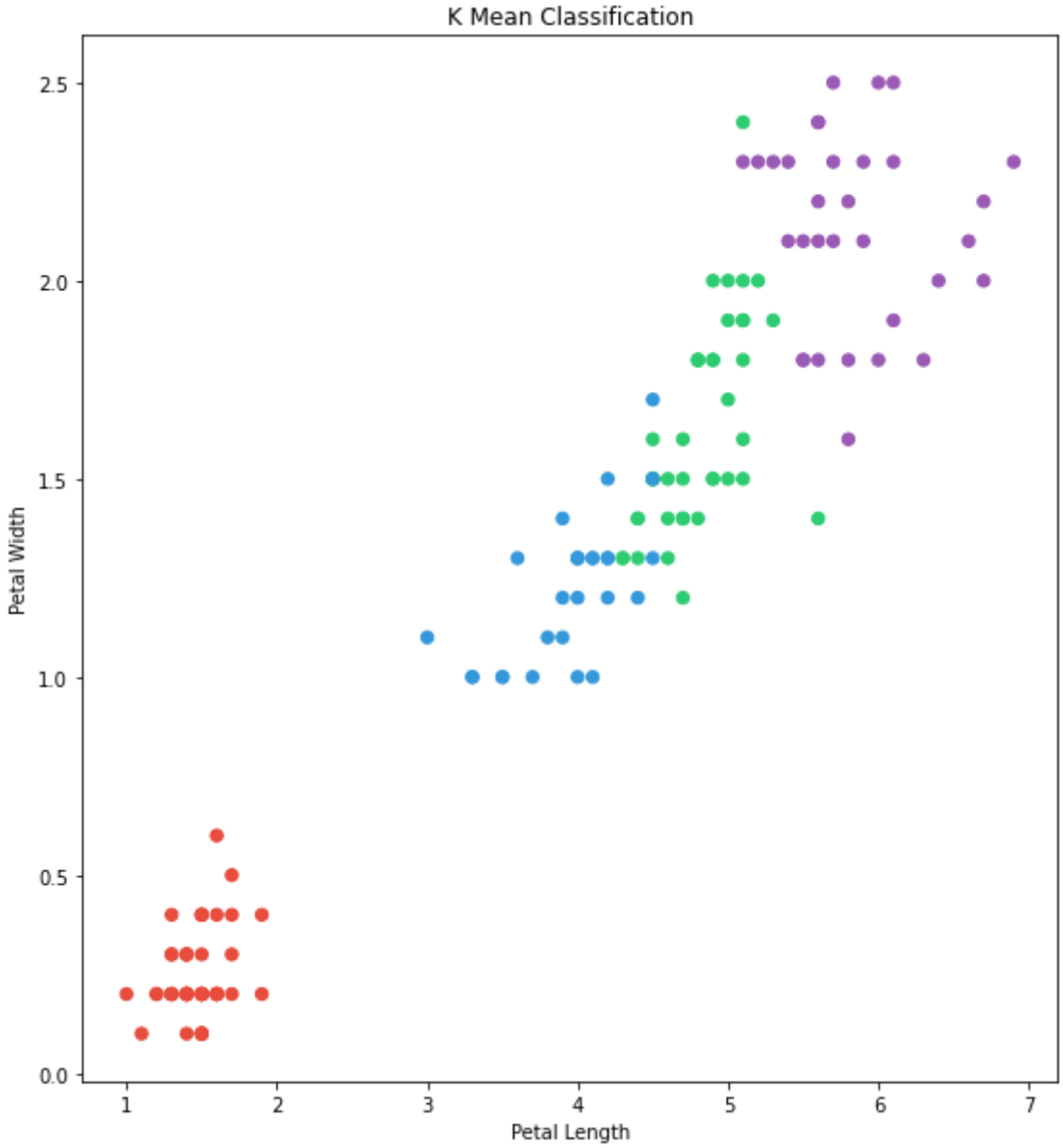
```
K = 4

model = KMeans(n_clusters=K)
model.fit(X)

print('The accuracy score of K-Mean: ', sm.accuracy_score(y, model.labels_))
print('The Confusion matrixof K-Mean: ', sm.confusion_matrix(y, model.labels_))

plt.figure(figsize=(20, 10))
plt.subplot(1, 2, 2)
plt.scatter(X.PetalLengthCm, X.PetalWidthCm, c=colormap[model.labels_], s=40)
plt.title('K Mean Classification')
plt.xlabel('Petal Length')
plt.ylabel('Petal Width')
plt.show()
```

```
The accuracy score of K-Mean:  0.7066666666666667
The Confusion matrixof K-Mean:  [[50  0  0  0]
 [ 0 24  0 26]
 [ 0 17 32  1]
 [ 0  0  0  0]]
```



In [96]:

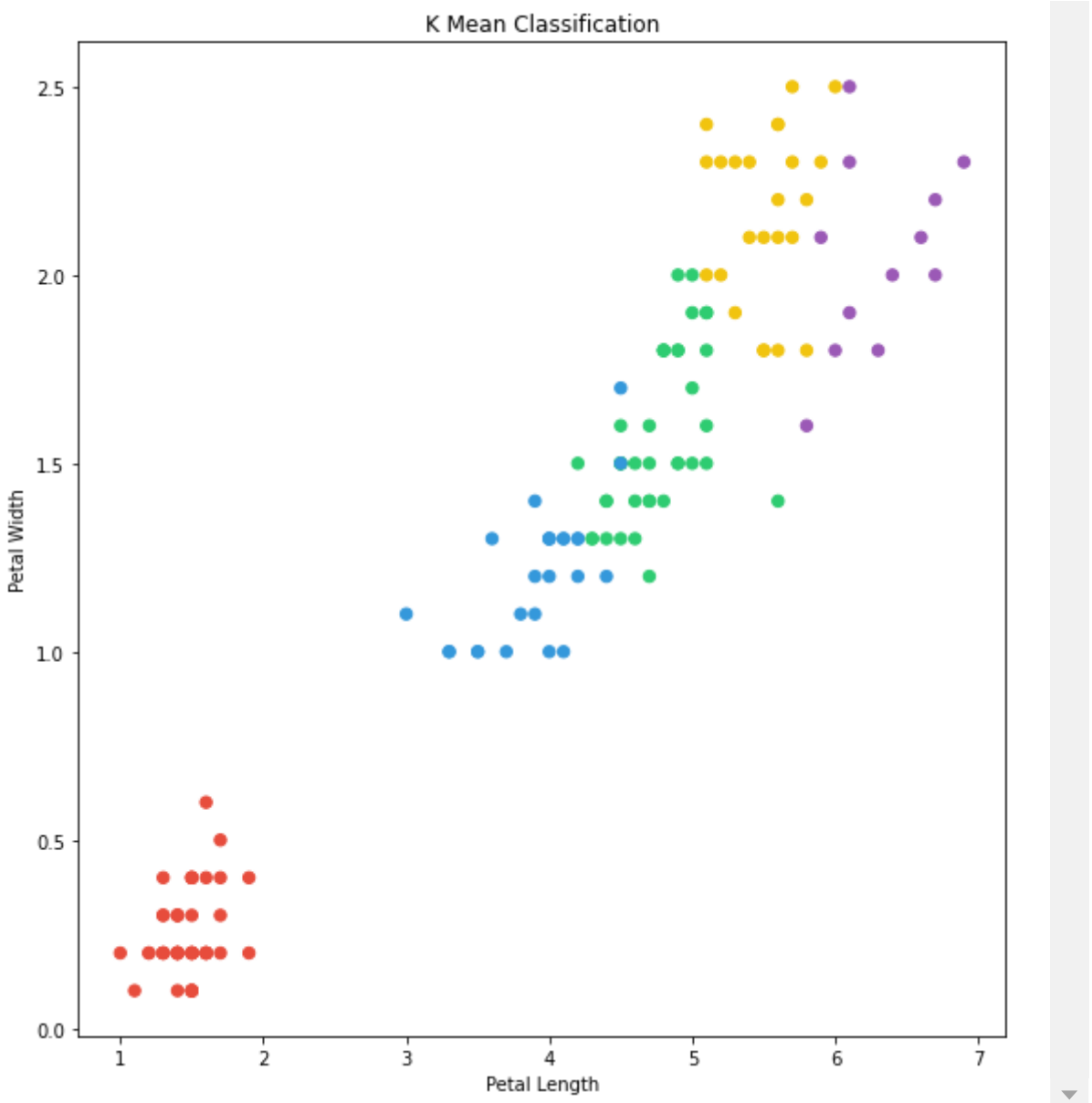
```
K = 5

model = KMeans(n_clusters=K)
model.fit(X)

print('The accuracy score of K-Mean: ', sm.accuracy_score(y, model.labels_))
print('The Confusion matrixof K-Mean: ', sm.confusion_matrix(y, model.labels_))

plt.figure(figsize=(20, 10))
plt.subplot(1, 2, 2)
plt.scatter(X.PetalLengthCm, X.PetalWidthCm, c=colormap[model.labels_], s=40)
plt.title('K Mean Classification')
plt.xlabel('Petal Length')
plt.ylabel('Petal Width')
plt.show()
```

```
The accuracy score of K-Mean:  0.5866666666666667
The Confusion matrixof K-Mean:  [[50  0  0  0  0]
 [ 0 26  0 24  0]
 [ 0 13 12  1 24]
 [ 0  0  0  0  0]
 [ 0  0  0  0  0]]
```


K Mean Classification
Petal Width
Petal Length
0.0
0.5
1.0
1.5
2.0
2.5
1
2
3
4
5
6
7