In [1]:

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

```
Matplotlib is building the font cache; this may take a moment.
```

In [2]:

```
names = ['Sepal_Length','Sepal_Width','Petal_Length','Petal_Width', 'Class']
```

In [4]:

```
dataset = pd.read_csv("8-dataset.csv", names=names)
```

In [5]:

```
X = dataset.iloc[:, :-1]
```

In [6]:

```
label = {'Iris-setosa': 0,'Iris-versicolor': 1, 'Iris-virginica': 2}
```

In [7]:

```
y = [label[c] for c in dataset.iloc[:, -1]]
```

In [8]:

```
plt.figure(figsize=(14,7))
colormap=np.array(['red','lime','black'])
```

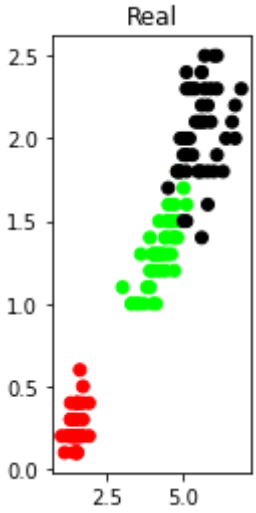
```
<Figure size 1008x504 with 0 Axes>
```

In [9]:

```
# REAL PLOT
plt.subplot(1,3,1)
plt.title('Real')
plt.scatter(X.Petal_Length,X.Petal_Width,c=colormap[y])
```

Out[9]:

```
<matplotlib.collections.PathCollection at 0x1ba338c8>
```

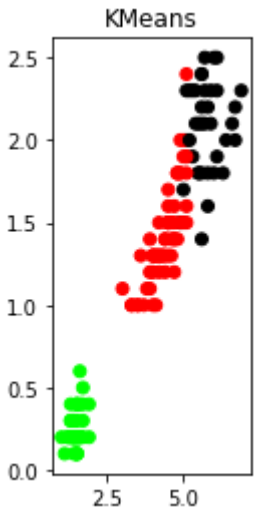


In [10]:

```
# K-PLOT
model=KMeans(n_clusters=3, random_state=0).fit(X)
plt.subplot(1,3,2)
plt.title('KMeans')
plt.scatter(X.Petal_Length,X.Petal_Width,c=colormap[model.labels_])
```

Out[10]:

```
<matplotlib.collections.PathCollection at 0x64fa248>
```



In [11]:

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

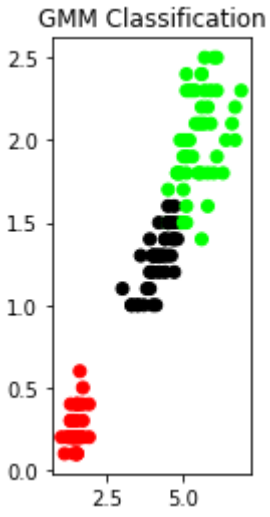
```
The accuracy score of K-Mean:  0.24
The Confusion matrixof K-Mean:
 [[ 0 50  0]
 [48  0  2]
 [14  0 36]]
```

In [12]:

```
# GMM PLOT
gmm=GaussianMixture(n_components=3, random_state=0).fit(X)
y_cluster_gmm=gmm.predict(X)
plt.subplot(1,3,3)
plt.title('GMM Classification')
plt.scatter(X.Petal_Length,X.Petal_Width,c=colormap[y_cluster_gmm])
```

Out[12]:

```
<matplotlib.collections.PathCollection at 0x1dc9bfc8>
```



In [13]:

```
print('The accuracy score of EM: ',metrics.accuracy_score(y, y_cluster_gmm))
print('The Confusion matrix of EM:\n ',metrics.confusion_matrix(y, y_cluster_gmm))
```

```
The accuracy score of EM:  0.36666666666666664
The Confusion matrix of EM:
  [[50  0  0]
 [ 0  5 45]
 [ 0 50  0]]
```

In [ ]:

```

```