Apply EM algorithm to cluster a set of data stored in a .CSV file. Use the same data set for clustering using k-Means algorithm. Compare the results of these two algorithms and comment on the quality of clustering. You can add Java/Python ML library classes/API in the program.

Program7.py

```
import matplotlib.pyplot as plt
from sklearn.datasets import load_iris
import pandas as pd
import numpy as np
np.random.seed(2)

iris = load_iris()
x = pd.DataFrame(iris.data)
y = pd.DataFrame(iris.target)
colormap = np.array(['red', 'blue', 'green'])

from sklearn.cluster import KMeans
kmeans = KMeans(n_clusters=3).fit(x)

plt.subplot(1, 2, 2)
plt.title("KMeans")
plt.scatter(x[2], x[3], c=colormap[kmeans.labels_])

import sklearn.metrics as sm

print('K Means Accuracy:', sm.accuracy_score(y, kmeans.labels_))

from sklearn.mixture import GaussianMixture
gm = GaussianMixture(n_components=3).fit(x)
ycluster = gm.predict(x)

plt.subplot(1, 2, 1)
plt.title("EM")
plt.scatter(x[2], x[3], c=colormap[ycluster])

print('EM Accuracy:', sm.accuracy_score(y, ycluster))
print('Confusion Matrix:\n', sm.confusion_matrix(y, ycluster))
```

OUTPUT

K Means Accuracy: 0.8933333333333333

EM Accuracy: 0.9666666666666667

Confusion Matrix:

[[50 0 0]

[0 45 5]

[0 0 50]]