K-means with IRIS data

In [7]:

```
from sklearn import datasets
import pandas as pd
iris = datasets.load_iris()
labels = pd.DataFrame(iris.target)
labels.columns=['labels']
data = pd.DataFrame(iris.data)
data.columns=['Sepal length','Sepal width','Petal length','Petal width']
data = pd.concat([data,labels],axis=1)

data.head()
```

Out[7]:

	Sepal length	Sepal width	Petal length	Petal width	labels
0	5.1	3.5	1.4	0.2	0
1	4.9	3.0	1.4	0.2	0
2	4.7	3.2	1.3	0.2	0
3	4.6	3.1	1.5	0.2	0
4	5.0	3.6	1.4	0.2	0

Extract feature

In [14]:

```
feature = data[ ['Sepal length','Sepal width']]
feature.head()
```

Out[14]:

	Sepal length	Sepal width
0	5.1	3.5
1	4.9	3.0
2	4.7	3.2
3	4.6	3.1
4	5.0	3.6

Create model, training & Prediction

In [15]:

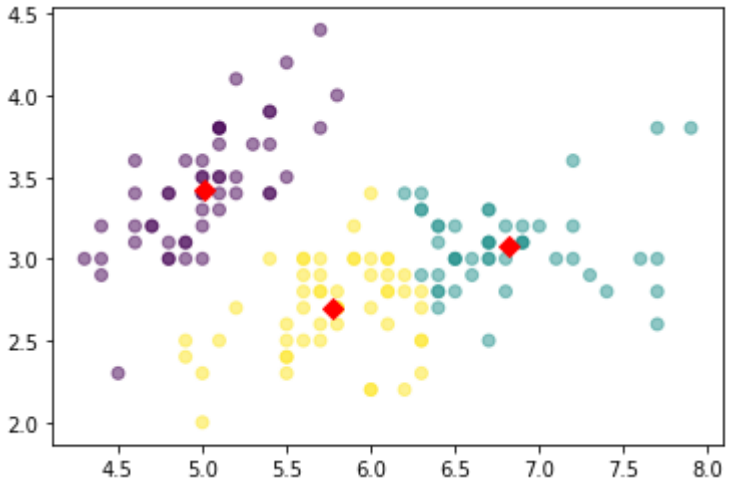
```
from sklearn.cluster import KMeans
import matplotlib.pyplot  as plt
import seaborn as sns

# create model and prediction
model = KMeans(n_clusters=3,algorithm='auto')
model.fit(feature)
predict = pd.DataFrame(model.predict(feature))
predict.columns=['predict']

# concatenate labels to df as a new column
r = pd.concat([feature,predict],axis=1)

print(r)
```

```
     Sepal length  Sepal width  predict
0             5.1          3.5        0
1             4.9          3.0        0
2             4.7          3.2        0
3             4.6          3.1        0
4             5.0          3.6        0
..            ...          ...      ...
145           6.7          3.0        1
146           6.3          2.5        2
147           6.5          3.0        1
148           6.2          3.4        1
149           5.9          3.0        2

[150 rows x 3 columns]
```

visualize result

In [16]:

```
centers = pd.DataFrame(model.cluster_centers_,columns=['Sepal length','Sepal width'])
center_x = centers['Sepal length']
center_y = centers['Sepal width']

# scatter plot
plt.scatter(r['Sepal length'],r['Sepal width'],c=r['predict'],alpha=0.5)
plt.scatter(center_x,center_y,s=50,marker='D',c='r')
plt.show()
```



Evaluate model with Cross tabuliazation

In [17]:

```
ct = pd.crosstab(data['labels'],r['predict'])
print (ct)
```

```
predict   0   1   2
labels
0        50   0   0
1         0  12  38
2         0  35  15
```

Determine number of clusters with Inertia value

In [19]:

```
ks = range(1,10)
inertias = []

for k in ks:
    model = KMeans(n_clusters=k)
    model.fit(feature)
    inertias.append(model.inertia_)   #inertia : 군집화가된 후에, 각 중심점에서 군집의 데이타간의 거

# Plot ks vs inertias
plt.plot(ks, inertias, '-o')
plt.xlabel('number of clusters, k')
plt.ylabel('inertia')
plt.xticks(ks)
plt.show()   #3-5개가 적당
```