In [1]:
```
import pandas as pd
import seaborn as sns
import matplotlib.pyplot as plt
import numpy as np
%matplotlib inline
```

In [2]:
```
df = pd.read_csv("Classified Data",index_col=0)
```

In [4]:
```
df.head()
```

Out[4]:

	WTT	PTI	EQW	SBI	LQE	QWG	FDJ	PJF	HQE	
0	0.913917	1.162073	0.567946	0.755464	0.780862	0.352608	0.759697	0.643798	0.879422	1.231
1	0.635632	1.003722	0.535342	0.825645	0.924109	0.648450	0.675334	1.013546	0.621552	1.492
2	0.721360	1.201493	0.921990	0.855595	1.526629	0.720781	1.626351	1.154483	0.957877	1.285
3	1.234204	1.386726	0.653046	0.825624	1.142504	0.875128	1.409708	1.380003	1.522692	1.153
4	1.279491	0.949750	0.627280	0.668976	1.232537	0.703727	1.115596	0.646691	1.463812	1.419

In [6]:
```
from sklearn.preprocessing import StandardScaler
```

In [7]:
```
scaler = StandardScaler()
```

In [8]:
```
scaler.fit(df.drop('TARGET CLASS',axis =1))
```

Out[8]:
```
StandardScaler(copy=True, with_mean=True, with_std=True)
```

In [13]:
```
scaled_Features = scaler.transform(df.drop('TARGET CLASS',axis =1))
```

In [14]:
```
scaled_Features
```

Out[14]:
```
array([[-0.12354188,  0.18590747, -0.91343069, ..., -1.48236813,
        -0.9497194 , -0.64331425],
       [-1.08483602, -0.43034845, -1.02531333, ..., -0.20224031,
        -1.82805088,  0.63675862],
       [-0.78870217,  0.33931821,  0.30151137, ...,  0.28570652,
        -0.68249379, -0.37784986],
       ...,
       [ 0.64177714, -0.51308341, -0.17920486, ..., -2.36249443,
        -0.81426092,  0.11159651],
       [ 0.46707241, -0.98278576, -1.46519359, ..., -0.03677699,
         0.40602453, -0.85567   ],
       [-0.38765353, -0.59589427, -1.4313981 , ..., -0.56778932,
         0.3369971 ,  0.01034996]])
```

In [18]:
```
df_feat = pd.DataFrame(scaled_Features,columns=df.columns[:-1])
df_feat.head()
```

Out[18]:

	WTT	PTI	EQW	SBI	LQE	QWG	FDJ	PJF	HQE
0	-0.123542	0.185907	-0.913431	0.319629	-1.033637	-2.308375	-0.798951	-1.482368	-0.949719
1	-1.084836	-0.430348	-1.025313	0.625388	-0.444847	-1.152706	-1.129797	-0.202240	-1.828051
2	-0.788702	0.339318	0.301511	0.755873	2.031693	-0.870156	2.599818	0.285707	-0.682494
3	0.982841	1.060193	-0.621399	0.625299	0.452820	-0.267220	1.750208	1.066491	1.241325
4	1.139275	-0.640392	-0.709819	-0.057175	0.822886	-0.936773	0.596782	-1.472352	1.040772

In [19]:
```
# Train Split
```

In [20]:
```
from sklearn.cross_validation import train_test_split
```

In [23]:
```
X = df_feat
y = df['TARGET CLASS']
X_train, X_test, y_train, y_test = train_test_split( X, y, test_size=0.33, random
```

In [24]:
```
from sklearn.neighbors import KNeighborsClassifier
```

In [25]:
```
knn = KNeighborsClassifier(n_neighbors=5)
```

In [26]:
```
knn.fit(X_train,y_train)
```

Out[26]:
```
KNeighborsClassifier(algorithm='auto', leaf_size=30, metric='minkowski',
           metric_params=None, n_jobs=1, n_neighbors=5, p=2,
           weights='uniform')
```

In [27]:
```
pred = knn.predict(X_test)
```

In [28]:
```
from sklearn.metrics import classification_report, confusion_matrix
```

In [30]:
```
print(confusion_matrix(y_test,pred))
print(classification_report(y_test,pred))
```

```
[[168   5]
 [ 13 144]]
             precision    recall  f1-score   support

          0       0.93      0.97      0.95       173
          1       0.97      0.92      0.94       157

avg / total       0.95      0.95      0.95       330
```

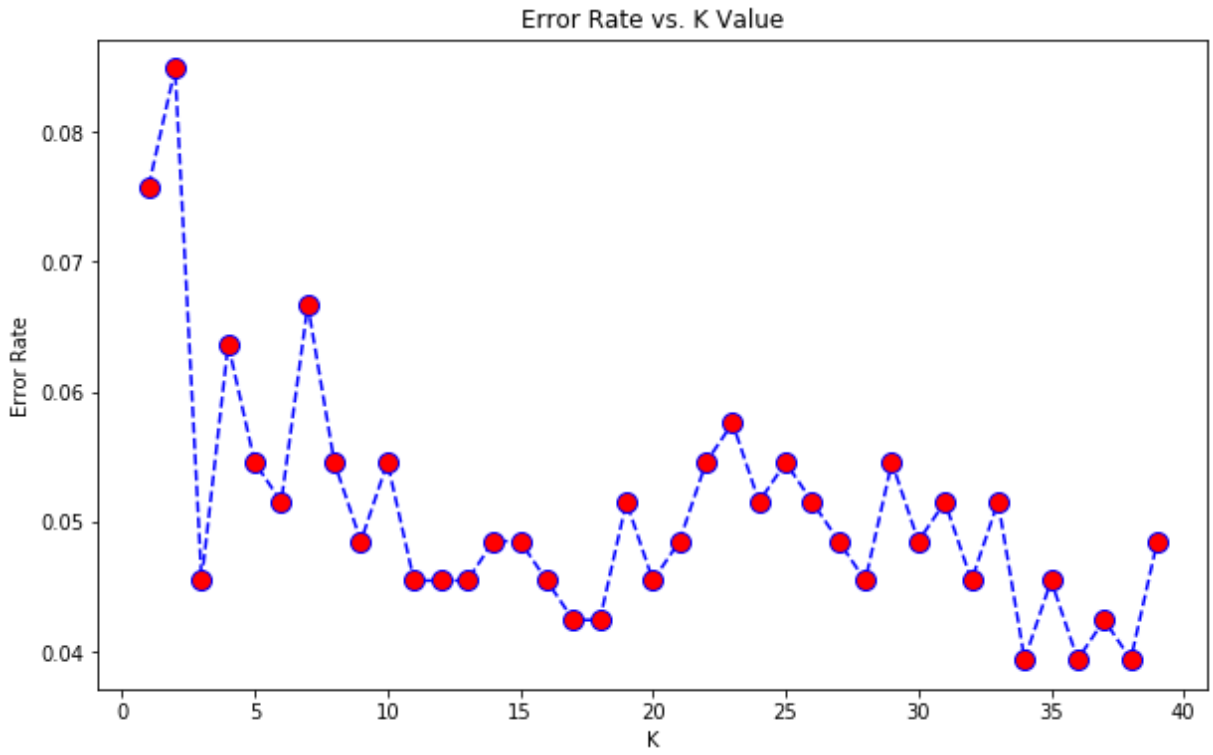
In [40]:
```
error_rate = []

# Will take some time
for i in range(1,40):

    knn = KNeighborsClassifier(n_neighbors=i)
    knn.fit(X_train,y_train)
    pred_i = knn.predict(X_test)
    error_rate.append(np.mean(pred_i != y_test))
```

In [41]:
```
plt.figure(figsize=(10,6))
plt.plot(range(1,40),error_rate,color='blue', linestyle='dashed', marker='o',
         markerfacecolor='red', markersize=10)
plt.title('Error Rate vs. K Value')
plt.xlabel('K')
plt.ylabel('Error Rate')
```

Out[41]:
```
Text(0,0.5,'Error Rate')
```



In [42]:
```
knn = KNeighborsClassifier(n_neighbors=18)
knn.fit(X_train,y_train)
pred = knn.predict(X_test)
print(confusion_matrix(y_test,pred))
print('\n')
print(classification_report(y_test,pred))
```

```
[[169   4]
 [ 10 147]]


             precision    recall  f1-score   support

          0       0.94      0.98      0.96       173
          1       0.97      0.94      0.95       157

avg / total       0.96      0.96      0.96       330
```

In [ ]:
```

```