In [1]:
```
import numpy as np
import matplotlib.pyplot as plt
import glob
%matplotlib inline
```

In [13]:
```
# Use glob.glob() to read in the names of all the '*.csv' files
files = glob.glob('*.csv')
print(files[0])
```

```
Teff8649logg4.824.csv
```

In [37]:
```
# Write code to read in the data in the first file. You can use the
# "loadtxt" command with the appropriate values set for "skiprows" and "delimite
# Store the values in the columns labelled "Mag" and "Magerr" in variable names
# of your own choosing.
Mag, Magerr = np.loadtxt(files[0], delimiter=',', skiprows=1, usecols=(1,2), unp
print(Mag)
```

```
[15.81 15.91 15.99 15.96 15.97 15.97 15.97 15.95 16.02 16.01 15.99 16.
 15.93 15.92 15.91 15.9  15.97 15.98 15.96 15.98 15.91 15.92 15.94 15.93
 15.97 15.97 15.96 15.95 15.98 15.96 15.97 15.96 15.96 15.96 15.97 15.97
 15.94 15.95 15.96 15.96 15.94 15.93 15.93 15.96 15.93 15.94 15.93 15.94
 15.95 15.96 15.96 15.94 15.97 15.98 15.98 15.97 15.99 16.01 15.98 15.98]
```

In [34]:
```
# Write a function that takes as arguments the list "Mag" and the list "Magerr"
# the previous cell. Calculate the standard deviation of "Mag", and divide it by
# average of "Magerr", and return this value. Test this on the data from the fil
# the cell above to make sure it doesn't cause an error.
def testVariance(magnitude, mag_error):
    return np.std(magnitude)/np.mean(mag_error)
print(testVariance(Mag, Magerr))
```

```
0.5490235630376121
```

In [44]:
```
# To help simplify this lab a little, we provide the function below. If you call
# with one of the names of the *.csv files, it will pull out the part of the nam
# that gives the Teff of the star (as well as its log g value) and return them.
#
def get_vals(fname):
    Teff = fname[4:8]
    logg = fname[12:17]
    Teff = float(Teff)
    logg = float(logg)
    return Teff,logg
```

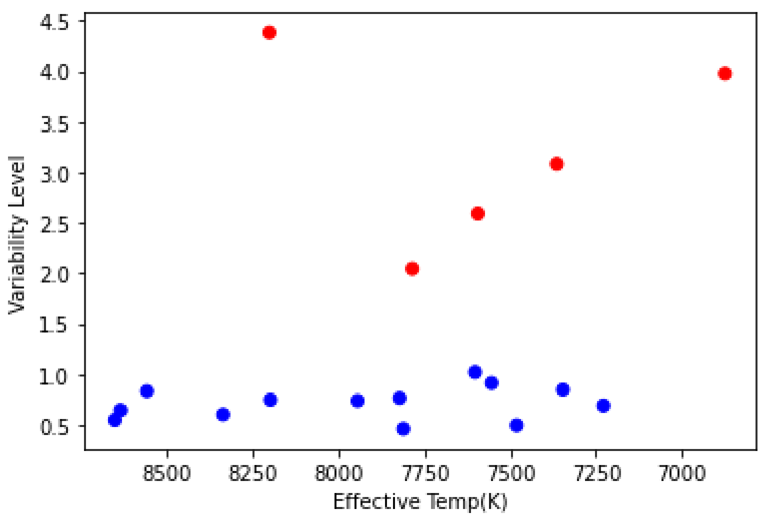
In [46]:
```
# Now, write a for loop that goes through the full list of files. Build up in st
# the loop does. First, have it print out the name of each file. Then add in the
# "get_vals()" command to calculate the temperature and gravity contained in eac
# Now, go back and add in the loadtxt command, so that you read in the list of m
# the errors on the magnitudes for each star. Finally, call the function that yo
# divides the standard deviation of the magnitudes by "Magerr" to calculate the
# that each object possesses.
```

```
T_eff = []
var_metric = []
for file in files:
    Mag, Magerr = np.loadtxt(file, delimiter=',', skiprows=1, usecols=(1,2), unp
    T_eff.append(get_vals(file)[0])
    var_metric.append(testVariance(Mag, Magerr))
    print(file, get_vals(file), testVariance(Mag, Magerr))
```

```
Teff8649logg4.824.csv (8649.0, 4.824) 0.5490235630376121
Teff8633logg5.129.csv (8633.0, 5.129) 0.6449346819210732
Teff8197logg5.568.csv (8197.0, 5.568) 0.7475710513448904
Teff7943logg5.611.csv (7943.0, 5.611) 0.7382399057454555
Teff7228logg4.838.csv (7228.0, 4.838) 0.6908349079083015
Teff8557logg5.061.csv (8557.0, 5.061) 0.8334910077218349
Teff7602logg4.986.csv (7602.0, 4.986) 1.0200889253761465
Teff7785logg5.040.csv (7785.0, 5.04) 2.045056493131193
Teff7364logg4.906.csv (7364.0, 4.906) 3.084745983085907
Teff7822logg5.350.csv (7822.0, 5.35) 0.7647380749518917
Teff7811logg5.354.csv (7811.0, 5.354) 0.4622742524925437
Teff8335logg4.938.csv (8335.0, 4.938) 0.6028100016438537
Teff7554logg5.012.csv (7554.0, 5.012) 0.9137991505869875
Teff7346logg4.987.csv (7346.0, 4.987) 0.8482494724622464
Teff7594logg4.929.csv (7594.0, 4.929) 2.5924168436988726
Teff8200logg4.820.csv (8200.0, 4.82) 4.383257998002345
Teff7481logg5.056.csv (7481.0, 5.056) 0.49680598973864654
Teff6875logg5.344.csv (6875.0, 5.344) 3.9757492192329686
```

In [62]:

```
# Make a scatter plot (Google "plt.scatter()") of this: Plot variability (y-axis
# Once you have it looking the way you want, save a copy to disk (Google "plt.sa
color = np.where(np.array(var_metric)<1.2,'b','r')
mark = []
h = plt.scatter(T_eff,var_metric, c=color)
plt.gca().invert_xaxis()
plt.xlabel('Effective Temp(K)')
plt.ylabel('Variability Level')
plt.savefig("Lab2Plot")
```




In [ ]:

```
# Also, save a PDF copy of your Jupyter Notebook to disk (in the notebook menu d
# and when the preview shows up do "File > Export as PDF" from the Safari menu *
# Submit both the PDF of the figure and the notebook on Canvas...
```