HW1 IE 598

In [1]:
```
#Our first machine learning model
#Garreta and Moncecchi pp 10-20
#uses Iris database and SGD classifier
import sklearn
```

In [2]:
```
from sklearn import datasets
iris = datasets.load_iris()
X_iris, y_iris = iris.data, iris.target
```

In [3]:
```
from sklearn.model_selection import train_test_split
from sklearn import preprocessing
# Get dataset with only the first two attributes
X, y = X_iris[:, :2], y_iris
# Split the dataset into a training and a testing set
# Test set will be the 25% taken randomly
X_train, X_test, y_train, y_test = train_test_split(X, y,test_size=0.25, random_state=33)
# Standardize the features
scaler = preprocessing.StandardScaler().fit(X_train)
X_train = scaler.transform(X_train)
X_test = scaler.transform(X_test)
```

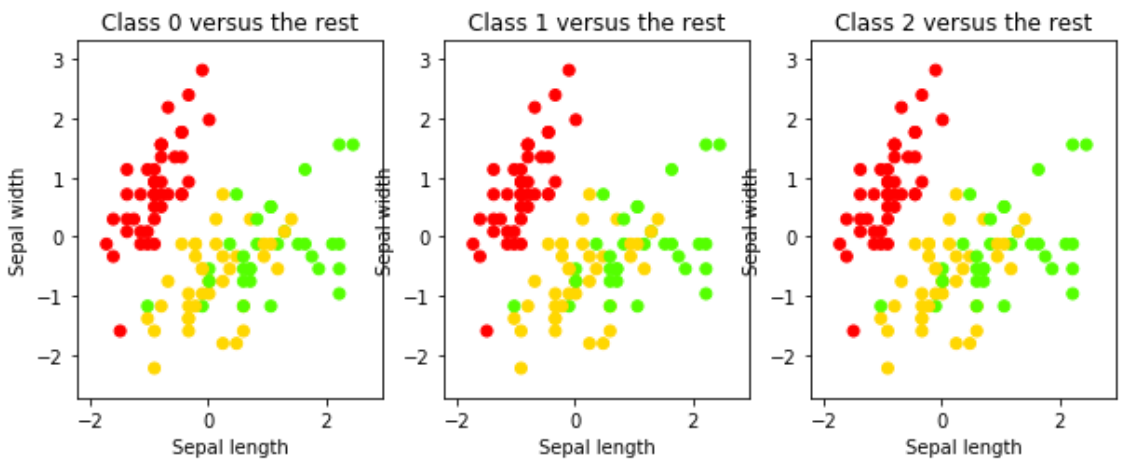
In [4]:
```
import matplotlib.pyplot as plt
colors = ['red', 'greenyellow', 'blue']
#it doesnt like "xrange" changed to "range"
for i in range(len(colors)):
    xs = X_train[:, 0][y_train == i]
    ys = X_train[:, 1][y_train == i]
    plt.scatter(xs, ys, c=colors[i])
plt.legend(iris.target_names)
plt.xlabel('Sepal length')
plt.ylabel('Sepal width')
```

Out[4]:
```
Text(0, 0.5, 'Sepal width')
```

In [5]:
```
#found a typo here... incorrect from book followed by corrected code
#from sklearn.linear_modelsklearn._model import SGDClassifier
from sklearn.linear_model import SGDClassifier
clf = SGDClassifier()
clf.fit(X_train, y_train)
```

Out[5]:
```
SGDClassifier(alpha=0.0001, average=False, class_weight=None,
              early_stopping=False, epsilon=0.1, eta0=0.0, fit_intercept=True,
              l1_ratio=0.15, learning_rate='optimal', loss='hinge',
              max_iter=1000, n_iter_no_change=5, n_jobs=None, penalty='l2',
              power_t=0.5, random_state=None, shuffle=True, tol=0.001,
              validation_fraction=0.1, verbose=0, warm_start=False)
```

In [6]:
```
import numpy as np
x_min, x_max = X_train[:, 0].min() - .5, X_train[:, 0].max() + .5
y_min, y_max = X_train[:, 1].min() - .5, X_train[:, 1].max() + .5
#error in case Xs or xs
Xs = np.arange(x_min, x_max, 0.5)
fig, axes = plt.subplots(1, 3)
fig.set_size_inches(10, 6)
for i in [0, 1, 2]:
    axes[i].set_aspect('equal')
    axes[i].set_title('Class '+ str(i) + ' versus the rest')
    axes[i].set_xlabel('Sepal length')
    axes[i].set_ylabel('Sepal width')
    axes[i].set_xlim(x_min, x_max)
    axes[i].set_ylim(y_min, y_max)
     #error here need plt.
    plt.sca(axes[i])
    plt.scatter(X_train[:, 0], X_train[:, 1], c=y_train, cmap=plt.cm.prism)
    ys = (-clf.intercept_[i] - Xs * clf.coef_[i, 0]) / (clf.coef_[i, 1])
    #plt.plot(xs, ys, hold=True)
```



In [7]:
```
from sklearn import metrics
y_train_pred = clf.predict(X_train)
print( metrics.accuracy_score(y_train, y_train_pred))
y_pred = clf.predict(X_test)
print( metrics.accuracy_score(y_test, y_pred) )
print( metrics.classification_report(y_test, y_pred, target_names=iris.target_names) )
print( metrics.confusion_matrix(y_test, y_pred) )
```

```
0.8035714285714286
0.7368421052631579
              precision    recall  f1-score   support

      setosa       1.00      1.00      1.00         8
  versicolor       0.53      0.73      0.62        11
   virginica       0.80      0.63      0.71        19

    accuracy                           0.74        38
   macro avg       0.78      0.79      0.77        38
weighted avg       0.76      0.74      0.74        38

[[ 8  0  0]
 [ 0  8  3]
 [ 0  7 12]]
```

In [8]:
```
print("My name is Farbod Baharkoush")
print("My NetID is: fbahar2")
print("I hereby certify that I have read the University policy on Academic Integrity and that I am not in violation.")
```

```
My name is Farbod Baharkoush
My NetID is: fbahar2
I hereby certify that I have read the University policy on Academic Integrity and that I am not in violation.
```

In [ ]:

In [ ]:

In [ ]:

In [ ]:

In [ ]:

In [ ]: