In [16]:

```
import pandas as pd

df = pd.read_csv('iris.csv')
df = df.drop(['Id'],axis=1)
target = df['Species']
s = set()
for val in target:
    s.add(val)
s = list(s)
rows = list(range(100,150))
df = df.drop(df.index[rows])
```

In [17]:

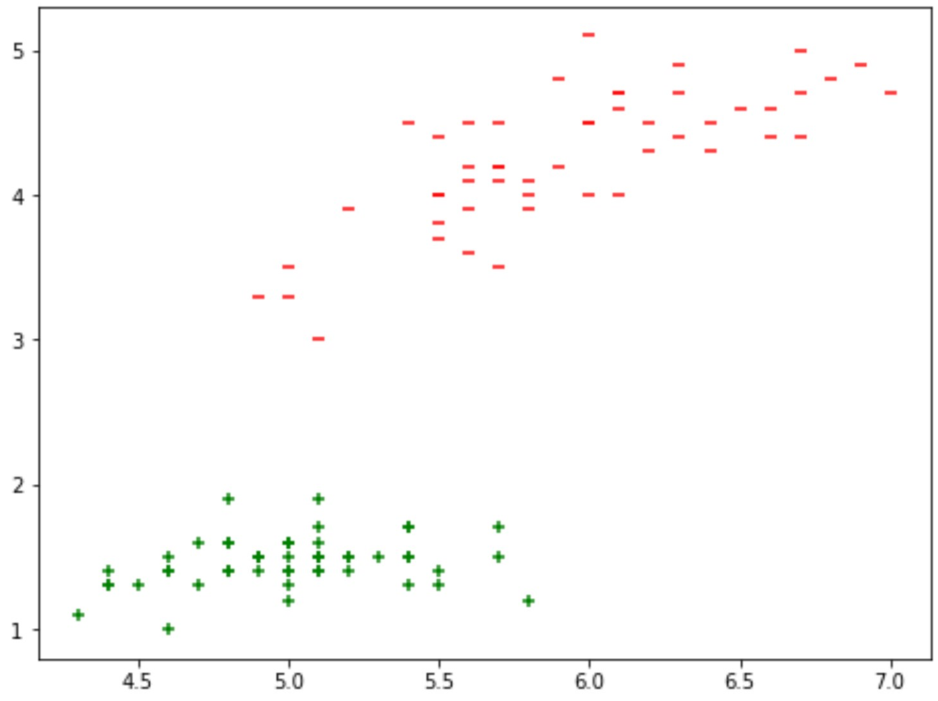
```
import matplotlib.pyplot as plt

x = df['SepalLengthCm']
y = df['PetalLengthCm']

setosa_x = x[:50]
setosa_y = y[:50]

versicolor_x = x[50:]
versicolor_y = y[50:]

plt.figure(figsize=(8,6))
plt.scatter(setosa_x,setosa_y,marker='+',color='green')
plt.scatter(versicolor_x,versicolor_y,marker='_',color='red')
plt.show()
```



In [18]:

```
from sklearn.utils import shuffle
from sklearn.model_selection import train_test_split
import numpy as np
## Drop rest of the features and extract the target values
```

```
df = df.drop(['SepalWidthCm','PetalWidthCm'],axis=1)
Y = []
target = df['Species']
for val in target:
    if(val == 'Iris-setosa'):
        Y.append(-1)
    else:
        Y.append(1)
df = df.drop(['Species'],axis=1)
X = df.values.tolist()
## Shuffle and split the data into training and test set
X, Y = shuffle(X,Y)
x_train = []
y_train = []
x_test = []
y_test = []

x_train, x_test, y_train, y_test = train_test_split(X, Y, train_size=0

x_train = np.array(x_train)
y_train = np.array(y_train)
x_test = np.array(x_test)
y_test = np.array(y_test)

y_train = y_train.reshape(90,1)
y_test = y_test.reshape(10,1)
```

In [19]:

```
## Support Vector Machine
import numpy as np

train_f1 = x_train[:,0]
train_f2 = x_train[:,1]

train_f1 = train_f1.reshape(90,1)
train_f2 = train_f2.reshape(90,1)

w1 = np.zeros((90,1))
w2 = np.zeros((90,1))

epochs = 1
alpha = 0.0001

while(epochs < 10000):
    y = w1 * train_f1 + w2 * train_f2
    prod = y * y_train
    print(epochs)
    count = 0
    for val in prod:
        if(val >= 1):
            cost = 0
            w1 = w1 - alpha * (2 * 1/epochs * w1)
            w2 = w2 - alpha * (2 * 1/epochs * w2)

        else:
            cost = 1 - val
            w1 = w1 + alpha * (train_f1[count] * y_train[count] - 2 *
            w2 = w2 + alpha * (train_f2[count] * y_train[count] - 2 *
        count += 1
    epochs += 1
```

```
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```

In [20]:

```
from sklearn.metrics import accuracy_score

## Clip the weights
index = list(range(10,90))
w1 = np.delete(w1,index)
w2 = np.delete(w2,index)

w1 = w1.reshape(10,1)
w2 = w2.reshape(10,1)
## Extract the test data features
test_f1 = x_test[:,0]
test_f2 = x_test[:,1]

test_f1 = test_f1.reshape(10,1)
test_f2 = test_f2.reshape(10,1)
## Predict
y_pred = w1 * test_f1 + w2 * test_f2
predictions = []
for val in y_pred:
    if(val > 1):
        predictions.append(1)
    else:
        predictions.append(-1)

print(accuracy_score(y_test,predictions))
```

```
1.0
```

In [21]:

```
from sklearn.svm import SVC
from sklearn.metrics import accuracy_score

clf = SVC(kernel='linear')
```

```
clf.fit(x_train,y_train)
y_pred = clf.predict(x_test)
print(accuracy_score(y_test,y_pred))
```

```
1.0

C:\Users\Kahalf\anaconda3\lib\site-packages\sklearn\utils\validation.
py:63: DataConversionWarning: A column-vector y was passed when a 1d
array was expected. Please change the shape of y to (n_samples, ), fo
r example using ravel().
  return f(*args, **kwargs)
```

In [ ]: