```python
import numpy
import matplotlib
from matplotlib import pyplot as plt

# -------------------------------------------------
# Basic PCA
# -------------------------------------------------
def PCA(X):
    Sigma = X.T.dot(X)/len(X)
    L,U = numpy.linalg.eigh(Sigma)

    ind = numpy.argsort(-L)

    U = U[:,ind]
    L = L[ind]

    return L,U

# -------------------------------------------------
# Print projection formula associated to 1st eigenvector
# -------------------------------------------------
def printformula(U,feature_names):

    U1 = U[:,0]
    print('z = ')
    for i in range(4):
        print(' %+6.3f * log(0.1 + %s)'%(U1[i],feature_names[i]))




def PCAplot(Z,T,target_names):

    plt.figure(figsize=(10,3))
    plt.title ('PCA plot')
    plt.xlabel('Principal Component 1')

    for i in range(3):
        plt.hist(Z[T==i],bins=numpy.linspace(-2,2,50),label=target_names[i],alpha=0.5)
    plt.legend(loc='upper right')
```