Sheet#3 Probabilistic Classification

1. Written Problems:

Answer exercises
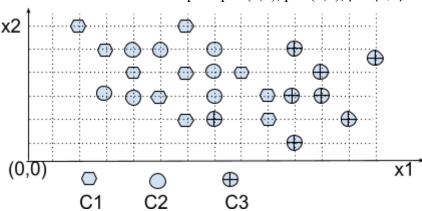Q1, Q2, Q3 from the book.
pages 478, 479

2. Coding

    a. Use the Face-data set we used in Assignment 1.
    b. Implement your Naive Bayes Classifier. You have now a long feature vector.
    c. Report Classification Accuracy.
    d. Show the confusion matrix and the error cases. Discuss.
    e. Appy Naive Bayes on the first 40 Components using PCA.
    f. Compare results with what you obtained in c,d.

3. Midterm2 Question [Laptops were allowed]

    a. Compute the prior for the three classes.
    b. Compute the mean and covariance matrix for C1, C2 and C3
    c. Use Full-Bayes classifier to classify the samples
       p1=(6,5) p2=(9,4) ,p3=(8,5)
    d. Use the Naive Bayes classifier to classify the samples (6 points)
       p1=(6,5), p2=(9,4), p3=(8,5)
    e. Suppose we have a new feature for each instance defined as below
       If a point is inside the rectangle specified by the (0,0) and (x,y) then the feature value will equal IN, otherwise the feature value will equal OUT. Let us have three regions defined as above using the endpoints (3,2), (6,4) and (9,6).
       Use the Naive Bayes classifier on the three new features defined on e part to label the samples p1=(6,5), p2=(9,4), p3=(8,5)