2413, Machine Learning, Homework 2
Due Date: 30/10/2013
Universität Bern

Question 1 (3 points) Complete the face classification problem attached to this document, providing a functions that performs the training of a multivariate normal distribution parameters.

You are required to:

- Implement a functions that learns the parameters of a multivariate normal distribution. You are required to implement a function:

```
function [phi, mu0, mu1, Sigma] = GDATrain_YourName
( DataTrain, LabelsTrain )
% Your code here
```

Where you have to substitute "YourName" with your name and surname in capital letters. Add comments in your code to explain the most important parts of your algorithm.

- Explain the classification results obtained by the classifier, and compare it with the results of the previous homework.

Question 2 (2 points) Suppose we want to classify a piece of music in two classes: *happy*, *sad*. Our feature vector x will be in $\mathbf{R}^n$, where n is the number of notes in the music sheet. Each element x_i can get a number from 1 to 12, to represent the different notes (including alterations). We won't consider the duration of the notes or pauses. Derive the expression of $p(x_i = k|y = 1)$ for the case of a Naive Bayes classifier.