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ICS 663 - Homework 1  
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## Implementation

I used R (<http://r-project.org>) to implement linear and quadratic discriminant analysis. It is designed to be capable of working in an arbitrary number of dimensions, although it was only tested with two.

## Installation and System Setup

Setup should be fairly straightforward. First, install R from the link above. Then open/execute `hw1.R`, which runs all required tasks for the assignment (including creating the plots). It would be ideal to run the script from the commandline using the syntax shown below. The output should be something like this:

```
$ R --no-save --slave < hw1.R
Reading data...
Training...
TRAIN ERROR:
      Case 1 : 0.120000
      Case 2 : 0.133333
      Case 3 : 0.100000
Testing...
TEST ERROR:
      Case 1 : 0.115500
      Case 2 : 0.110817
      Case 3 : 0.098903
Generating plots...
null device
      1
null device
      1
null device
      1
```

It takes a while for this to complete, mostly because painting the decision regions is a costly process. If you'd like to speed it up, you can decrease the resolution in `plots.R`:

```
( ... )
15      # Resolution / brush size for decision regions
16      dr_resolution = 0.01, dr_brush_size = 1 )
( ... )
```

Change `dr_resolution` to `~0.1` and `dr_brush_size` to `~2` and it will be about 100x faster.

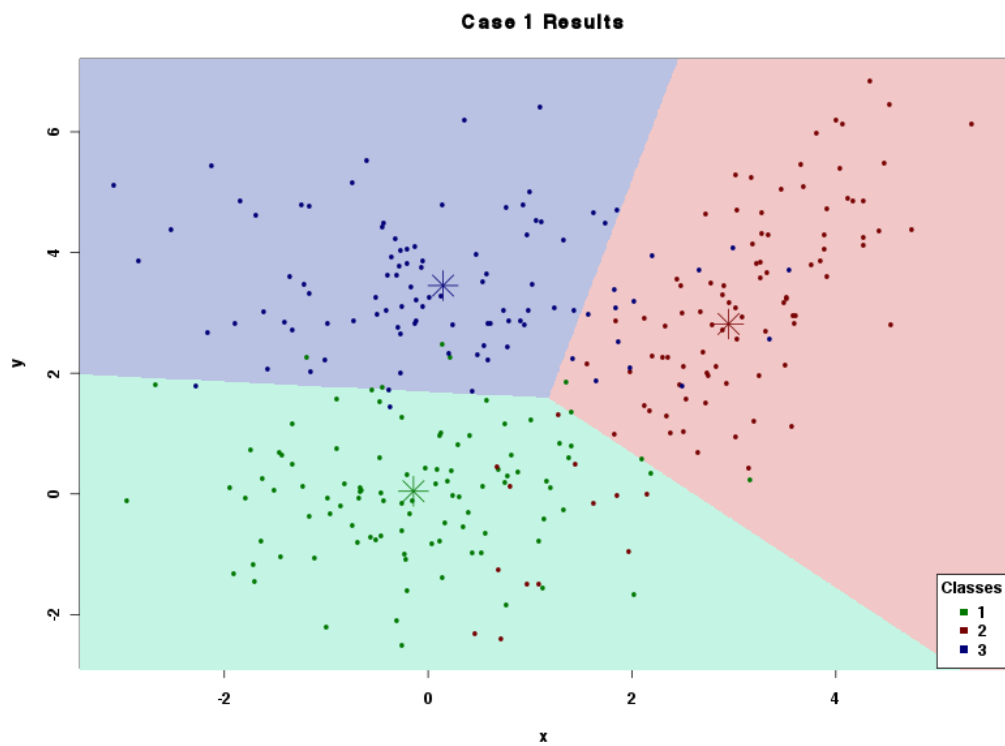
## Results

The error rates (1 - accuracy) are shown above, but for the sake of being organized, I'll repeat them here:

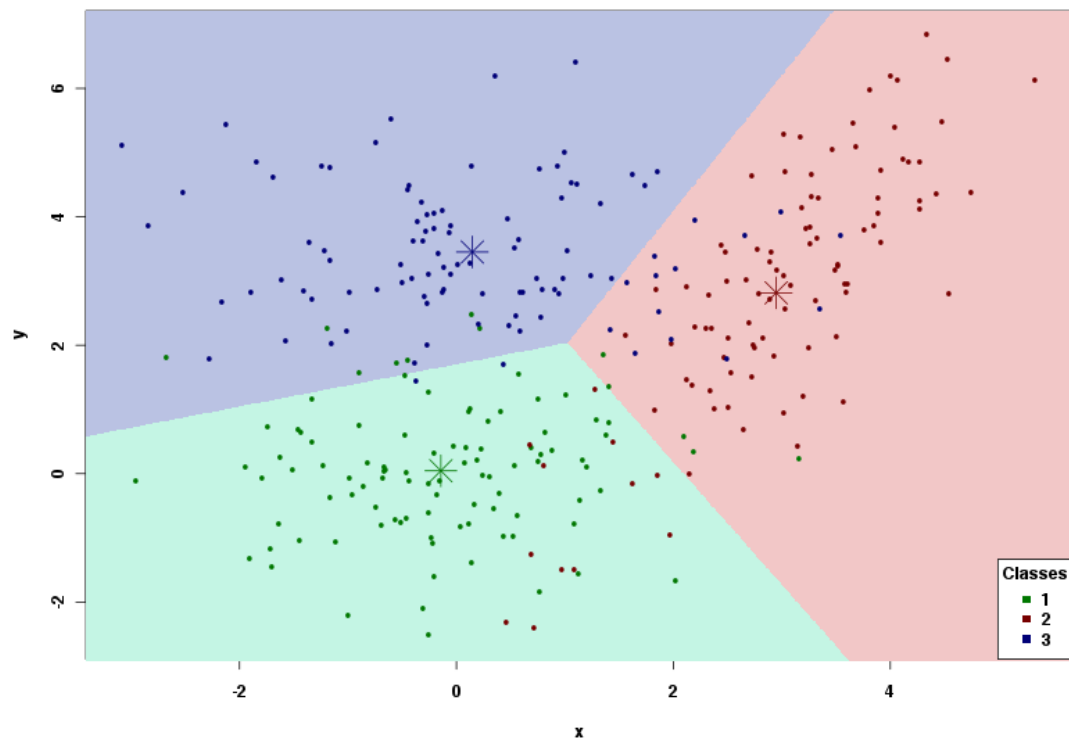
Train Error	Test Error
0.12	0.1155
0.13	0.1108
0.10	0.0989

## Plots

In each of the plots, the mean is indicated with the large star. The points in each category are colored with one of red, green, or blue. The decision regions are painted light red, green and blue for the respective categories.



**Case 2 Results**



**Case 3 Results**

