

## Lab 9.6.4

Team 17

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### Lab 9.6.4 SVM with Multiple Classes

To add an extra set of classes for our model, we need to grab the existing data from Lab 9.6.2.

```
x = matrix(rnorm (200 * 2), ncol = 2)
x[1:100,] = x[1:100,] + 2
x[101:150,] = x[101:150,] - 2
y = c(rep(1,150), rep(2,50))
```

If the response is a factor containing more than two levels, then the `svm()` function will perform multi-class classification using the one-versus-one approach. We explore that setting here by generating a third class of observations.

```
set.seed(1)
x = rbind(x, matrix(rnorm (50 * 2), ncol = 2))
y = c(y, rep(0, 50))
x[y == 0,2] = x[y == 0, 2] + 2
dat = data.frame(x = x, y = as.factor(y))
par(mfrow = c(1,1))
plot(x, col = (y + 1))
```

We now fit an SVM to the data:

```
library(e1071) # Library that contains svm function
svmfit = svm(y~, data = dat, kernel = "radial", cost=10, gamma = 1)
plot(svmfit, dat)
```