# Coding Assignment 1

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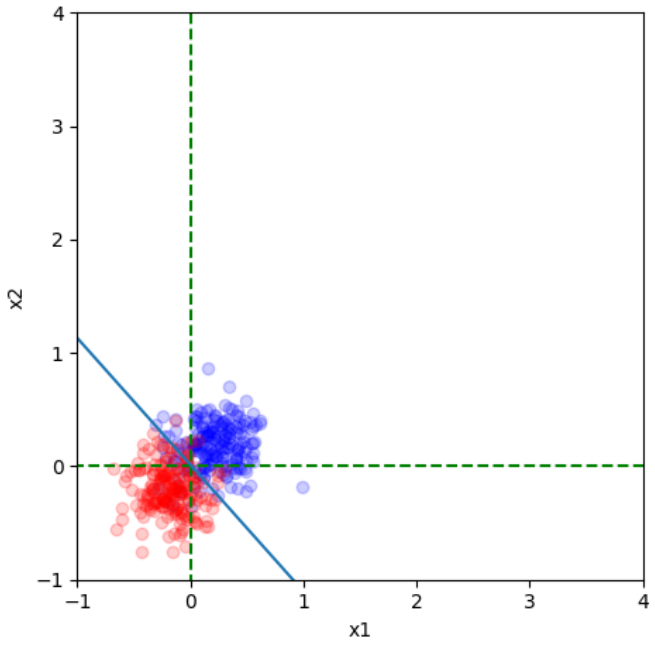
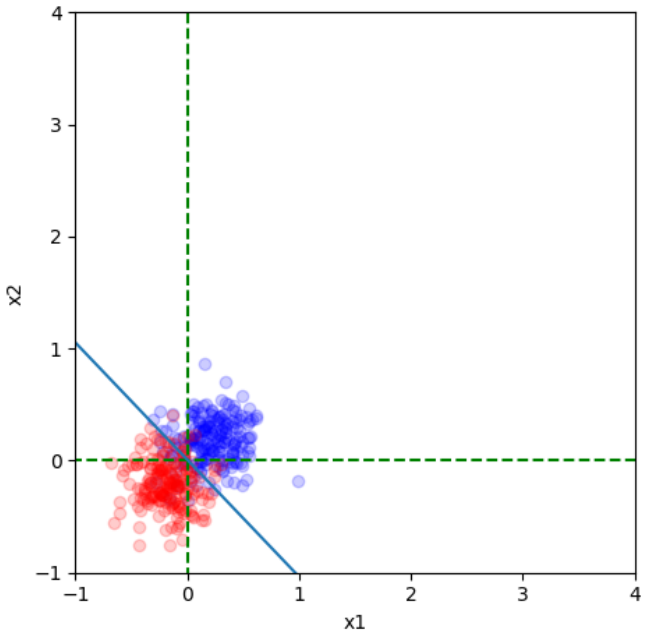
## Problem 1:

```
Training accuracy of linear regression on Dataset A: 0.92
Training accuracy of logistic regression on Dataset A: 0.92
Training accuracy of linear regression on Dataset B: 0.75
Training accuracy of logistic regression on Dataset B: 0.91
```

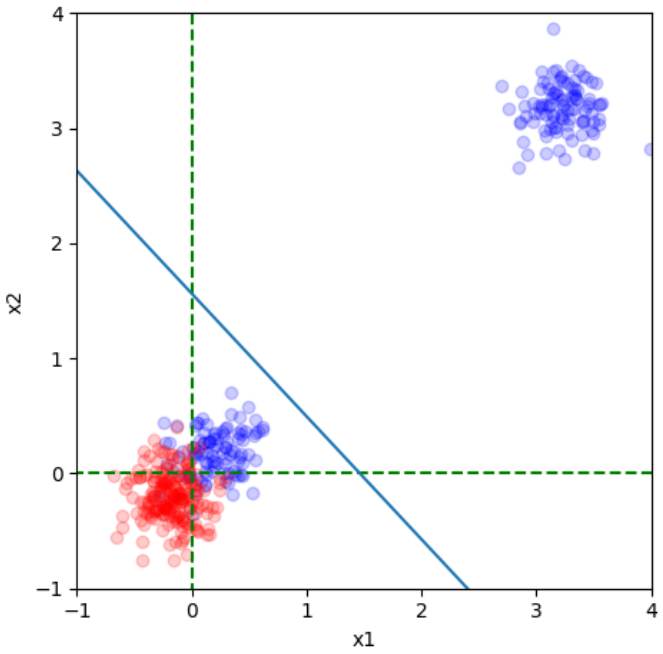
Decision boundaries of linear regression on Dataset A:



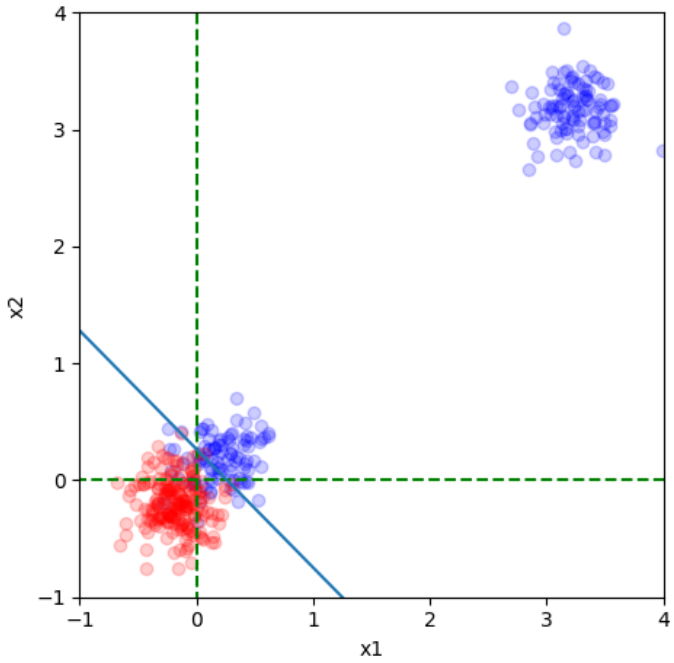

Decision boundaries of logistic regression on Dataset A:



Decision boundaries of linear regression on Dataset B:




Decision boundaries of logistic regression on Dataset B:

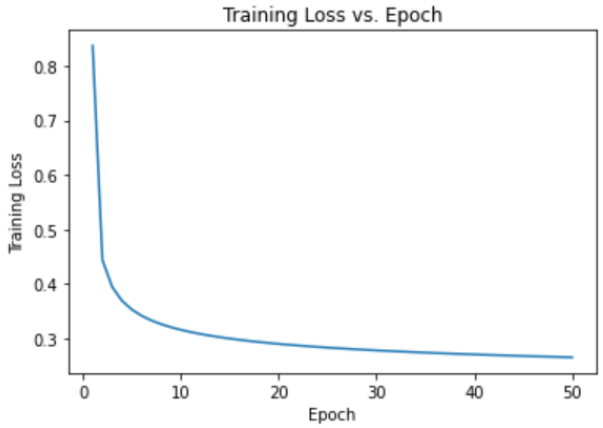



**Problem 2:**

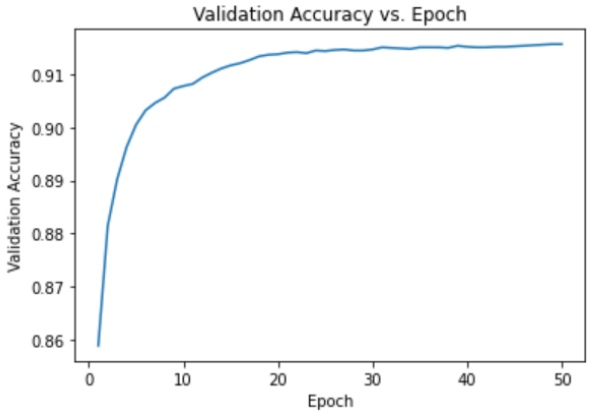
1)

```
The number of epoch that yields the best validation performance is: 48
The validation performance (accuracy) in this epoch is: 0.9157
The test performance (accuracy) in this epoch is: 0.9227
```

The learning curve of the training cross-entropy loss :




The learning curve of the validation accuracy :



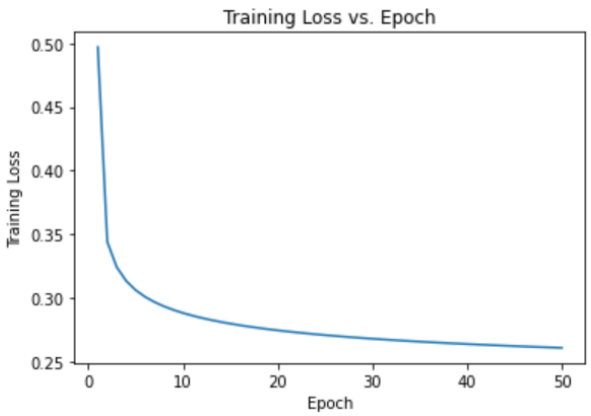

2)

Q: What will happen if the learning rate is getting larger?

A: Suppose the learning rate is 1 which is 10 times larger than the original setting. The gradient may oscillate back and forth near the minimum, and may even fail to converge. From the plot below, the model to converge too quickly to a suboptimal solution. Therefore, we should be careful when we setting the learning rate.

```
The number of epoch that yields the best validation performance is: 42
The validation performance (accuracy) in this epoch is: 0.9101
The test performance (accuracy) in this epoch is: 0.9164
```

The learning curve of the training cross-entropy loss :




The learning curve of the validation accuracy :