You have examined how the performance of a model varies with increasing model complexity, and can describe the potential pitfall of complex models becoming overfit to the training data. In this module, you will explore a very simple, but extremely effective technique for automatically coping with this issue. This method is called "ridge regression". You start out with a complex model, but now fit the model in a manner that not only incorporates a measure of fit to the training data, but also a term that biases the solution away from overfitted functions. To this end, you will explore symptoms of overfitted functions and use this to define a quantitative measure to use in your revised optimization objective. You will derive both a closed-form and gradient descent algorithm for fitting the ridge regression objective; these forms are small modifications from the original algorithms you derived for multiple regression. To select the strength of the bias away from overfitting, you will explore a general-purpose method called "cross validation".

You will implement both cross-validation and gradient descent to fit a ridge regression model and select the regularization constant.