1. **Quantitative Response Problem**: the following methods will be used to solve the quantitative response problem. Each method will be described step-by-step, including a discussion of any plots used to determine information vital to the development of the model such as outliers, tuning parameters, or number of components. Following the detailed explanation of each method, a conclusion will be made about the efficacy of each model relative to the group of models based on the test errors. If needed, nonlinear modeling will be investigated.
   1. Least Squares Regression
      1. Check correlations between variables
      2. Confirm conditions for linearity
      3. Multiple Linear Regression
      4. Investigate residuals plot for outliers and curve shape
      5. Checking for Collinearity
      6. Modeling with transformations (if appropriate)
      7. Calculation of test error
   2. Ridge Regression
      1. Train the ridge regression model
      2. Use cross-validation to determine best tuning parameter
      3. Calculate test error
   3. The Lasso
      1. Train the ridge regression model
      2. Use cross-validation to determine best tuning parameter
      3. Calculate test error
   4. Best Subset Selection
      1. Use validation set or cross-validation approach to determine best subset of predictors for the model
   5. Partial Least Squares
      1. Train the model using cross-validation
      2. Create validation plot to determine ideal number of components for model
      3. Calculate test error
2. **Qualitative Response Problem**: similar to the quantitative problem, the following methods will be used to create a model that predicts the response. Each method will be discussed in detail regarding how the model was developed step-by-step. The accuracy of the models will be compared using the prediction error rates.
   1. Logistic Regression
      1. Determine best predictors for logistic regression
      2. Train the model with the chosen predictors
      3. Predict the responses of the test data set
      4. Create a confusion matrix and calculate the test error rate
   2. LDA/QDA
      1. Determine best predictors for LDA/QDA
      2. Train the model with the chosen predictors
      3. Predict the responses of the test data set
      4. Create a confusion matrix for LDA and QDA and calculate the test error rates of each. Comment on which is better and what that says about the decision boundary.
   3. Naïve Bayes
      1. Determine best predictors for naïve Bayes
      2. Train the model with the chosen predictors
      3. Predict the responses of the test data set
      4. Create a confusion matrix and calculate the test error rate
   4. KNN
      1. Using the training data set, predict the responses for the test data set when k = 1.
      2. Create the confusion matrix and calculate the test error rate.
      3. Repeat steps i and ii with each value of k between 2 and 10.
      4. Plot the test error rates for all the different values of k. Decide which value of k is the best and comment on what that means.