DSC 423: Data Analysis and Regression
Assignment 02: Simple Linear Regression

Your submission must include your name and student ID. Your submission must include the honor statement: "I have completed this work independently. The solutions given are entirely my own work." Your submission must be submitted as a PDF.

1. Short Essay (20 pts.) For each of these questions, your audience are persons that are not experts in statistics. Write with complete sentences and paragraphs. Cite any references that you use.
   a. (10 pts.) Imagine you fit a regression model to a dataset and find that R-squared = 0.69. Is this a good regression model or not? If you cannot tell, what additional information do you need? Explain.
   b. (10 pts.) Research and then explain the "regression fallacy". Provide at least one example.

2. QUASAR (30 pts.) -- A quasar is a distant celestial object (at least four billion light-years away) that provides a powerful source of radio energy. The Astronomical Journal (July 1995) reported on a study of 90 quasars detected by a deep space survey. The survey enabled astronomers to measure several different quantitative characteristics of each quasar, including:

   > X1 - Redshift
   > X2 - Line Flux
   > X3 - Line Luminosity
   > X4 - AB1450 Magnitude
   > X5 - Absolute Magnitude
   > Y1 - Rest frame Equivalent Width

   a. (10 pts.) Use R to perform a regression analysis on the QUASAR dataset (found on the D2L). For each of the explanatory variables create a regression model and copy/paste it into your submission.
   b. (10 pts.) Evaluate your models. For each discuss how well they predict the dependent variable. Your description should begin by reporting basic facts about your model; but should also include an analysis of the findings.
   c. (10 pts.) Of the models you built, what is the "best" model? Explain. Assume your audience is a fellow DSC423 student.