BUS 735: Business Decision Making and Research
Instructor: Dr. James Murray
Worksheet: Multiple Regression

Learning Objectives:

- LO2: Be able to construct and use multiple regression models to construct and test hypotheses considering complex relationships among multiple variables.
- LO6: Be able to use standard computer packages such as R to conduct the quantitative analyses.
- LO7: Have a sound familiarity of various statistical and quantitative methods in order to be able to approach a business decision problem and be able to select appropriate methods to answer the question.

Directions: Work in groups of up to four people and answer the following questions. All papers will be collected, but only one member's paper will be randomly selected and graded and all members of the group will receive the same grade.

By signing below, you agree that the following work represents the efforts of everyone in the group, and you are willing to accept as your own grade for the group project the grade earned from this representation of your group's work. Every member must agree to these terms to earn a non-zero grade for this assignment.

Signature Group Member 1	Print Name	Date
Signature Group Member 2	Print Name	Date
Signature Group Member 3	Print Name	Date
Signature Group Member 4	Print Name	Date

The data set below includes data on 178 recently sold houses including the selling price (in thousands of dollars), the size of the house (in square feet), the number of bedrooms, whether or not the house is on a corner lot (1=corner lot, 0=otherwise) and the age of the house in years.

You can download and load the data with the following command:
`load(url("http://murraylax.org/datasets/house.RData"))`

Develop a regression model that predicts selling price based on the other variables in the data set.

1. Estimate the regression equation and write down the estimated equation.

2. What is your prediction for the average selling price of a house that is on a corner lot, has 3 bedrooms, is 2412 square feet, and is 18 years old?

3. What percentage of the variability in selling price is explained by your explanatory variables?

4. Test the hypothesis that the size of the house influences selling price, given the other explanatory variables in the model.

5. Report and interpret a 95% confidence interval for the difference in selling prices for houses on corner lots versus other houses.

6. Test the hypothesis that at least one of the explanatory variables included in the model help explain selling price.

7. Is there a potential for a multicolinearity problem in your regression models? What pair of variables may lead to multicolinearity? Compute the Pearson correlation coefficient for this pair of variables, test the hypothesis that the correlation is different from zero, and discuss the implications for your model estimates.