

Instructions: This exam is in two parts: Part I is to be completed partly at home using the materials posted in the course for the at-home portion and you will answer questions about that work during the in-class portion of the exam; Part II is to be completed entirely in class. You may not use cell phones, and you may only access internet resources you are specifically directed to use.

At home, prepare for questions in Part I using R. Open the data file entitled **325exam1data.xlsx** posted in Blackboard. Complete the calculations noted below. You will be asked for additional analysis and interpretation of this data in the in-class portion of the test. Print out the results of your analysis and code, and bring the pages with you to the exam. You will submit all this work along with the in-class exam.

Use the data on employment experience at the Beta Technology company to complete the following tasks.

1. Import the data in the file into R and removed the Employee column (it is not a variable).
2. Create a correlation table of the variables. Make a correlation plot (type is of your choice), or a pairplot.
3. Create a simple linear regression model between age and salary. Create appropriate graphs for diagnostic testing of assumptions, and identify potential outliers.
4. Create a multiple variable model of salary using all available variables. Use appropriate automated selection techniques. Compare the result to manual backward selection. In your backward selection, stop only when all the coefficients are significant at the 0.05 level.
5. Construct diagnostic plots for your machine selected model and your manually selected model (these may be the same). Identify any potential problems with model assumptions, outliers and influential points.
6. Construct a confidence interval for the gender variable coefficient.
7. Construct a prediction interval for an employee with gender 1, age 40, 15 years of prior experience, 5 years of beta experience (and thus 20 years of total experience) and education level 6.