MET CS 555 Assignment 5 – 20 points

Spring, 2018

SUBMISSION REQUIREMENTS: Please submit a single document (word or PDF) for submission. Your submission should contain a summary of your results (and answers to questions asked on the homework) as well as your R code used to generate your results (please append to the end of your submission).

The data in this document is from 3 groups of students (math, chemistry, and physics) on an IQ related test. Save the data to CSV/Excel file and read the data into R. Use this data to address the following questions:

(1) How many students are in each group? Summarize the data relating to both test score and age by the student group (separately). Use appropriate numerical and/or graphical summaries. (3 points)

(2) Do the test scores vary by student group? Perform a one way ANOVA using the aov or Anova function in R to assess. Summarize the results using the 5 step procedure. If the results of the overall model are significant, perform the appropriate pairwise comparisons using Tukey's procedure to adjust for multiple comparisons and summarize these results. (7 points)

(3) Create an appropriate number of dummy variables for student group and re-run the one-way ANOVA using the lm function with the newly created dummy variables. Set chemistry students as the reference group. Confirm if the results are the same. What is the interpretation of the beta estimates from the regression model? (4 points)

(4) Re-do the one-way ANOVA adjusting for age. Focus on the output relating to the comparisons of test score by student type. Explain how this analysis differs from the analysis in step 2 above (not the results but how does this analysis differ in terms of the questions it answers as opposed to the one above). Did you obtain different results? Summarize briefly (no need to go through the 5 –step procedure here). Present the least square means and interpret these. (6 points)

group	iq	age
Physics student	34	15
Physics student	33	17
Physics student	32	15
Physics student	25	14
Physics student	36	19
Physics student	30	18
Physics student	31	16
Physics student	34	17

Physics student	29	16
Physics student	34	17
Physics student	39	16
Physics student	33	18
Physics student	39	19
Physics student	42	20
Physics student	41	20
Math student	36	20
Math student	38	28
Math student	37	22
Math student	35	18
Math student	41	19
Math student	40	23
Math student	36	19
Math student	38	16
Math student	24	18
Math student	39	20
Math student	29	19
Math student	38	20
Math student	45	23
Math student	44	24
Math student	44	22
Chemistry student	52	46
Chemistry student	46	38
Chemistry student	51	41
Chemistry student	52	39
Chemistry student	45	44
Chemistry student	49	33
Chemistry student	47	41
Chemistry student	46	36
Chemistry student	41	40
Chemistry student	47	44
Chemistry student	46	46
Chemistry student	42	38
Chemistry student	43	32
Chemistry student	47	41
Chemistry student	40	42