STAT 420
2GR, 2UG

Spring 2017

Homework 6

(Due Friday, March 17, by 4:00 p.m.)

Please submit your assignment *on paper*, following the Guidelines for Homework Write-Ups and Submissions. Please include your name (with your last name underlined), and your NetID at the top of the first page.

1. In order to compare the average GPA for the members of three activity clubs at a university, four students were randomly chosen from each club, and the results are given in the following table:

Club					y_j	s_j^2
Drama ($j = 1$)	1.8	0.9	1.5	2.4	1.65	0.39
Writing ($j = 2$)	2.4	3.3	3.9	3.6	3.30	0.42
Statistics ($j = 3$)	2.1	2.4	3.0	3.9	2.85	0.63

Assume the three populations of GPAs are normally distributed with equal variances.

(a) Recall (from Homework 5):

Source of Variation	*Sum of Squares*	*Degrees of Freedom*	*Mean Square*	*Test Statistic*
Source	SS	DF	MS	F
Between	5.82	$J - 1 = 2$	2.91	6.0625
Within	4.32	$N - J = 9$	0.48	
Total	10.14	$N - 1 = 11$		

(b) Use a computer and the ANOVA F test to test $H_0: \mu_1 = \mu_2 = \mu_3$ at the 5% level of significance. Include a printout and mark (circle or highlight) the test statistic and the p-value.

(c) Construct a 95% confidence interval for: i) $\mu_2 - \mu_1$; ii) $\mu_3 - \mu_1$; iii) $\mu_2 - \mu_3$. [*Do NOT use a computer.*]

(d) Use Tukey's pairwise comparison procedure to construct 95% confidence intervals for all three possible pairwise differences of means (as listed in (c): i), ii), and iii)). [*Do NOT use a computer*.]

(e) Use a computer and Tukey's pairwise comparison procedure to construct 95% confidence intervals for all three possible pairwise differences of means. Include a printout.

(f) Use a 95% confidence level and Scheffé's multiple comparison procedure to compare the average GPA for the Writing club with average GPA for the Drama club. [*Do NOT use a computer*.]

(g) Use a 95% confidence level and Bonferroni's method of pairwise comparison to compare the average GPA for the Writing club with the average GPA for the Drama club. [*You may need to use a computer, i.e. R/R Studio, to calculate the critical value(s) needed in the Bonferroni's method. However, Do NOT use a computer for any other parts in (g).*]

(h) Use a 95% confidence level and Scheffé's multiple comparison procedure to compare the average GPA for the Writing and Statistics clubs with the average GPA for the Drama club. [*Do NOT use a computer*.]

Hint: $\frac{\mu_2 + \mu_3}{2} - \mu_1$.

(i) Use the Kruskal-Wallis test to test $H_0: \mu_1 = \mu_2 = \mu_3$ at the 5% level of significance. Report the value of the test statistic, the critical value(s), and the decision. [*Do NOT use a computer, and show your work*.]

(j) Use a computer and the Kruskal-Wallis test to test $H_0: \mu_1 = \mu_2 = \mu_3$ at the 5% level of significance. Include a printout and mark (circle or highlight) the test statistic and the p-value.