STA 580 — Fall 2008 — Dr. Charnigo

Written Assignment 5

This assignment is due on Thursday 20 November at 5:20 p.m. You may work in self-selected groups of two or three, in which case you may hand in one copy of the assignment for the group.

[70] 1. The data in the table below represent the hours of relief provided by five different pain relievers administered to 25 subjects experiencing fevers. Brands 1 and 2 contain aspirin; the others do not.

Brand 1	Brand 2	Brand 3	Brand 4	Brand 5
5.5	8.4	3.6	4.5	6.8
4.4	7.9	4.8	6.0	8.7
6.2	6.2	2.9	5.1	7.5
4.5	5.8	5.7	3.3	5.9
3.6	7.3	5.2	4.6	8.0

[10] a. Report Between SS and Within SS.

[10] b. Test $H_0 : \mu_1 = \mu_2 = \mu_3 = \mu_4 = \mu_5$ against the complementary alternative, where μ_1 through μ_5 are population means defined in the natural way.

[10] c. Perform these three follow-up tests without any adjustment of the significance level for multiple pairwise comparisons:

- $H_0 : \mu_5 = \mu_3$ against $H_1 : \mu_5 \neq \mu_3$
- $H_0 : \mu_5 = \mu_4$ against $H_1 : \mu_5 \neq \mu_4$
- $H_0 : \mu_4 = \mu_3$ against $H_1 : \mu_4 \neq \mu_3$

[10] d. Repeat part c with a Bonferroni adjustment for multiple pairwise comparisons. [You do not need to adjust the significance level for all possible pairwise comparisons, just for the three that are actually being made.]

[10] e. Formulate null and alternative hypotheses by which you could investigate whether aspirin had an effect on the mean duration of relief.

[10] f. Using a Scheffe adjustment, perform the hypothesis test suggested by your answer to part e.

[10] g. Use the Kruskal-Wallis method to test $H_0 : \Delta_1 = \Delta_2 = \Delta_3 = \Delta_4 = \Delta_5$ against the complementary alternative, where Δ_1 through Δ_5 are population medians defined in the natural way.

[30] 2. Hyperactivity in children is often treated by one or both of two approaches: counseling and medication. The following attention span data are from an experiment designed to evaluate the effectiveness of these approaches.

	Medication	No Medication
Counseling	10.0, 11.8, 9.5, 12.4, 8.0	8.8, 7.3, 6.1, 9.9, 10.4
No Counseling	9.5, 8.2, 7.0, 10.3, 6.5	4.2, 6.3, 4.9, 6.7, 7.8

[10] a. Report SST, SSA, and SSB. [Take counseling to be factor A and medication to be factor B.]

[10] b. Report $SSAB$ and SSE.

[10] c. Perform a two-way analysis of variance. Are you able to conclude that there are nonzero main effects for counseling? nonzero main effects for medication? nonzero interaction effects?