STA 570 — Spring 2012 — Dr. Charnigo

Written Assignment 5

This assignment is due on Thursday 12 April at 12 Noon. You may work in self-selected groups of two or three, submitting one copy of the assignment for the group.

[75] 1. A team of cardiologists at a local hospital is examining records for myocardial infarction patients recently transferred in from other sites. Below are lengths of stay for 10 patients transferred in from sites less than 25 miles away, for 10 patients transferred in from sites between 25 and 50 miles away, and for 10 patients transferred in from sites more than 50 miles away.

Less than 25 miles: *1, 1, 2, 4, 5*, **1, 2, 2, 3, 5**

Between 25 and 50 miles: *1, 2, 3, 5, 6*, **2, 2, 3, 4, 8**

More than 50 miles: *3, 3, 4, 7, 10*, **3, 4, 5, 8, 11**

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

[10] b. Let μ_1, μ_2, and μ_3 denote the mean lengths of stay for patients transferred in from sites less than 25 miles away, from sites between 25 and 50 miles away, and from sites more than 50 miles away respectively. Test $H_0 : \mu_1 = \mu_2 = \mu_3$ against the complementary alternative.

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

- $H_0 : \mu_3 = \mu_1$ against $H_1 : \mu_3 \neq \mu_1$
- $H_0 : \mu_3 = \mu_2$ against $H_1 : \mu_3 \neq \mu_2$

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

[10] e. Consider $H_0 : \mu_3 - 0.5\mu_1 - 0.5\mu_2 = 0$. In English words, what does this null hypothesis say?

[10] f. Using a Scheffe adjustment, test the null hypothesis in part e against its complementary alternative.

[15] g. Use the Kruskal-Wallis method to test $H_0 : \Delta_1 = \Delta_2 = \Delta_3$ against the complementary alternative, where Δ_1 through Δ_3 are the medians analogous to μ_1 through μ_3.

[25] 2. Consider the myocardial infarction data once more, but now regard the *italic* lengths of stay as arising from patients who received clot-busting therapy prior to transfer and the **bold** lengths of stay as arising from patients who did not receive clot-busting therapy prior to transfer.

[10] a. Report SST, SSA, SSB, SSAB, and SSE. (Take distance to be factor A and clot-busting therapy to be factor B.)

[15] b. Perform a two-way analysis of variance to test null hypotheses of zero interaction effects, zero main effects for distance, and zero main effects for clot-busting therapy.