HW 3- ANOVA

1. (6pt) Use the data from Problem 1 in HW2.

   (a) (3pt) Compute 95% simultaneous confidence intervals for the differences in response between the four different diets using the Bonferroni method. (Hint: $\bar{Y}_{i\bullet} - \bar{Y}_{j\bullet} \pm t_{\frac{\gamma}{2g}}(n - k)SE(\bar{Y}_{i\bullet} - \bar{Y}_{j\bullet})$ where g is the number of pairwise difference)

   (b) (3pt) Test for all pairs of factor level means whether or not they differ using the Scheffe's procedure with $\alpha = 0.05$. Set up groups of factor levels whose means do not differ.

2. (Data in file softdrink.txt) A soft-drink manufacturer uses five agents (1, 2, 3, 4, 5) to handle the premium distributions for its various products. The marketing director desired to study the timeliness with which the premiums are distributed. Twenty transactions for each agent were selected at random and the time lapse (in days) for handling each transaction was determined. Assume the one way anova model is appropriate.

   (a) (2pt) Obtain the analysis of variance table and test whether or not the mean time lapse differs for the five agents. Use $\gamma = 0.05$.

   (b) (2pt) What is the least significant difference equal to when comparing agents 1 and 5? That is, what is the value of LSD_{15} when $\gamma = 0.05$.

   (c) (2pt) Test for all pairs of factor level means whether or not they differ using the Bonferroni procedure with $\gamma = 0.05$. Set up groups of factor levels whose means do not differ.

   (d) (2pt) Test for all pairs of factor level means whether or not they differ using the Scheffe's procedure with $\gamma = 0.05$. Set up groups of factor levels whose means do not differ.

   (e) (2pt)The marketing director wishes to compare the mean time lapses for agents 1, 3 and 5. Obtain the pairwise confidence interval for all pairwise comparisons among these three treatment means using the Bonferroni procedure with a 90% family confidence coefficient. Interpret your result.

   (f) (2pt) Agents 1 and 2 distribute merchandise only, agents 3 and 4 distribute cash-value coupons only and agent 5 distributes both merchandise and coupons. Estimate the contrast
   $$L = \frac{\mu_1 + \mu_2}{2} - \frac{\mu_3 + \mu_4}{2}$$
   using a 95% confidence interval. Interpret your result.

   (g) (2pt) Estimate the following comparisons with a 95% confidence interval using the Bonferroni method
   $$L_1 = \mu_1 - \mu_2, L_2 = \frac{\mu_1 + \mu_2}{2} - \mu_5, L_3 = \frac{\mu_3 + \mu_4}{2} - \mu_5.$$