Name:_____
MyID:_____

**Assignment 5**
**Part I**

§ Read the following and answer questions 1-3:

You are interested in the impact of alcohol on speech production. You want to explore the effect that three 16 ounce glasses of beer, champagne, red wine, and water have on the ability to speak coherently. Forty individuals between the ages of 21 and 29 years old volunteer for your study (giving you 10 people in each group). Each individual is asked to talk about their family after drinking the alcoholic beverage to measure their speech production. The outcome variable for this study was the number of words the individual spoke clearly and coherently when asked about their family.

**Data for Questions 1-3 can be found in the file alcohol.sav**

1. Complete the ANOVA table below for the analysis

| Source | SS | df | MS | F |
|---|---|---|---|---|
| Between | | | | |
| Within | | | | |
| Total | | | | |

2. Interpret the results – what can you conclude from the table above? Be sure to state (in words) the null hypothesis, whether it was reject or not, and what your conclusions are in terms of the effect of alcohol on speech.

3. Which of the following would you use to see if there are differences between all possible paired comparisons of beverages?
    a. T-test with Bonferroni correction
    b. Dunnett's test
    c. Fisher's LSD
    d. Tukey's test
    e. Newman-Keuls

4. Perform all paired comparisons using the test chosen above in SPSS. Fill in the following table:

| Comparison | Mean Difference | Adjusted p-value | Reject $H_0$? |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

5. Summarize the results.

§ The following questions are from your textbook (Keppel & Wickens):

1. (Question 6.5 in the textbook) You have run an experiment with four groups and 11 subjects per group. An analysis of variance gives a significant result. You wish to test a comparison $\psi$, so you calculate its F ratio and obtain F=7.0.
   a. Assume that you planned the experiment to test this contrast. What is the critical value for F at the 0.05 level? Is it significant?
   b. Assume that you noticed this effect when you were looking through the data after completing the study. Test the contrast using Scheffe's method at the 0.05 level.
   c. Explain the discrepancy between the two answers. Why should a result be significant or not depending on when you decide to look at it?

## Part II: SPSS

A researcher wonders if English language learners miss math test questions not because of their lack of mathematics ability but rather because of the language in the test questions. The researcher takes a set of math items and modifies the set in 4 different ways to make 4 different versions of the test.

One test was modified to have simplified sentence structures, one was modified to have all present tense verbs, one has sentences chunked into more manageable sections, and one has had illustrations added to accompany the item context.

The researcher then randomly assigns 100 English language learners so that a group of 20 students takes each of the 5 versions of the test (4 modified versions and 1 unmodified version). He wants to compare their scores on the different versions of the test. The data is located in the file modifications.sav on eLC. Using SPSS, answer the following questions.

1. Record the means and standard deviations for each group. Use the Variable View Values to determine which modification type corresponds to each test number.

| Test Number | Modification Type | Mean | Standard Deviation |
|---|---|---|---|
| 1 | | | |
| 2 | | | |
| 3 | | | |
| 4 | | | |
| 5 | | | |

2. He planned to compare simplified sentence and present tense verbs tests groups with the unmodified test group a priori.
   (1) In order to control for family-wise error using the Bonferroni adjustment, what should be your error rate for these contrasts if you want to keep alpha=.05?
   (2) Record the adjusted p-values for the significantly different groups.

3. The other researcher is interested in comparing the scores on each type of modified test with the unmodified test. Run the analysis.
   (1) What analysis should you run to do this?
   (2) Which groups are significantly different?

4. Now run all possible pairwise comparisons using the Tukey and Scheffe procedures.
   (1) Using a family-wise Type-I error rate of 0.05, record the significant comparison p-values for each significant test.