

Name: \_\_\_\_\_  
 MyID: \_\_\_\_\_

**Assignment 4**  
**Part I**

§ Read the following and answer questions 1-5:

The Atlanta Braves play baseball games at 1pm, 4pm, 7pm, and 10pm (EST). You want to determine if the average number of runs the Braves score varies by the game time.

The group means are displayed in the table below:

Game Time	Average number of runs scored
1 pm	3.2
4 pm	2.3
7 pm	1.9
10 pm	3.7

1. You would like to perform a contrast to compare the means between groups 2 (game time at 4 pm) and 4 (game time at 10 pm). Circle each of the following sets of coefficients that you could use for this contrast.

- a. (1, 2, 1, -2)
- b. (0, 1, 0, -1)
- c. ( $\frac{1}{2}$ , 0,  $-\frac{1}{2}$ , 0)
- d. (0, -1, 0, 1)
- e. (0,  $\frac{1}{4}$ , 0,  $-\frac{1}{4}$ )
- f. (0,  $-\frac{1}{2}$ , 0,  $-\frac{1}{2}$ )

2. You would like to perform a contrast to compare the 1 pm game time (group 1) with the two night game times (groups 3 and 4).

- a. Symbolically write the null hypothesis for this contrast using  $\mu_i$ 's.
- b. Rewrite the null hypothesis using  $\Psi$ .
- c. Write the set of coefficients you would like to use for this contrast.
- d. Calculate  $\hat{\Psi}$ .

3. You would like to perform a contrast between the earliest game time and the latest game time using the coefficients (1, 0, 0, -1). Write a contrast that is orthogonal to this contrast and verify that they are orthogonal.

4. Sketch a plot of the average number of runs scored by the game time. Does the data look linear? Quadratic? Cubic?
5. What coefficients could you use to test whether the relationship among the means you observed using a plot in Question 4 exists?

## **Part II: SPSS**

1. Upload the data file homework4.sav into SPSS. Run the following contrasts:
  - a. Contrast Drug A and Drug B
  - b. Contrast Drug B and Control
  - c. Contrast Control to the mean of Drug A and Drug B
2. What are the appropriate coefficients for (a) and (b) and (c)?
3. What are the t- statistic and the p-value for each contrast? What are your conclusions based on the analyses?
4. Produce the 'Means Plot' for this data set, will you run a trend analysis on this data? In a very brief statement, explain why or why not.