

Assignment 4: due on November 15, 2019
SUPPLY CHAIN AND BUSINESS TECHNOLOGY MANAGEMENT
JOHN MOLSON SCHOOL OF BUSINESS

BSTA 450/BTM 695	Fall 2019
Course title:	STATISTICAL MODELS FOR DATA ANALYSIS
	Section A, MB 3.430; Wednesdays, 11h45-14h30
	Section AA, MB S1.115; Mondays, 17h45-20h15
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Overview

Work on this assignment individually and submit your work on Moodle. Create a pdf file from your answers and include it in a zip file with the SAS EG project. Submit it on Moodle.

Tasks

1. **Automobile collisions:** The number of collision claims (COLLISION) reported for 1984-1986 cars are listed for 9 car categories: small two-door, midsize two-door, large two-door, small four-door, midsize four-door, large four-door, small station wagons and vans, midsize station wagons and vans, large station wagons and vans, in a file named CRASH9. The CRASH9 is provided on Moodle.
 - a. In excel convert the data to the format which is appropriate for SAS EG (the data should have 2 columns with names CARCLAS and CRASH).
 - b. Using the classification variable (CARCLAS), run an ANOVA in SAS EG for the number of collisions.
 - c. Determine whether there is a difference in the average number of collisions for different types of cars. Use a 5% level of significance. State the hypotheses to be tested, the decision rule, the test statistic, and your decision.

2. **Detergents:** An experiment was designed to study the performance of 4 different detergents in cleaning cloths. The following cleanness readings (higher= cleaner) were obtained with specially designed equipment for three different types of common stains. In this example we are interested in the detergents. The 3 type pf stains may have effect, but we are not interested.

	Stain 1	Stain 2	Stain 3
Detergent 1	45	43	51
Detergent 2	47	46	52
Detergent 3	48	50	55
Detergent 4	42	37	49

- a. What are the treatment and block in this example?
 - b. Determine whether there is a treatment effect. Use a 5% level of significance. State the hypotheses to be tested, the decision rule, the test statistic, and your decision.
 - c. Determine whether there is a block effect. Use a 5% level of significance. State the hypotheses to be tested, the decision rule, the test statistic, and your decision.
 - d. Use SAS EG, to double check your calculations for parts b and c. (You should run the ANOVA in SAS EG and compare it with your calculations).
3. **Weight Loss:** How to lose weight effectively? Do diets really work and what about exercise? In order to find out, participants were assigned to one of 3 diets and one of 3 exercise levels. After two months, participants were asked how many kilos they had lost. The data is provided in weightloss.csv on Moodle.
- a. Use SAS EG to create a histogram of the weight loss. Interpret your result.
 - b. Create a summary statistics table and report the mean, standard deviation and number of participants in each treatment. What is the total number of participants?
 - c. Is there any significant interaction between diet and exercise? Use a 5% level of significance. State the hypotheses to be tested, the decision rule, the test statistic, and your decision.
 - d. Does diet affect the weight loss? Use a 5% level of significance. State the hypotheses to be tested, the decision rule, the test statistic, and your decision.
 - e. Does exercise affect the weight loss? Use a 5% level of significance. State the hypotheses to be tested, the decision rule, the test statistic, and your decision.
4. **Rajasthan Police:** Read the RajasthanPolice.pdf paper on Moodle and answer the following questions.
- a. What is the objective of the study and what statistical method(s) have they used?
 - b. How many different treatments they have in their study? What are those?
 - c. How was the data collected?
 - d. What were the conclusions?

Guidelines

- Use SAS EG for this exercise.
- **The CRASH9, weightless dataset can be found on the course website.**
- The RajasthanPolice.pdf paper is under the GoodReads.