Homework Assignment-9

POM 500 Statistical Analysis

Note: Attempt all questions as per rubric. Problems including case study has a weightage of 10 marks each. The maximum you can score is 50. Use Excel function wherever possible.

Problem-1

Halls, Inc. has three stores located in three different areas. Random samples of the sales of the three stores (In $1,000) are shown below.

Store 1	Store 2	Store 3
46	34	33
47	36	31
45	35	35
42	39	
45		

At 95% confidence, test to see if there is a significant difference in the average sales of the three stores.

Problem-2

A manufacturer of cereal is considering 3 alternative box colors – red, yellow, and blue. To check the effect on sales, 16 stores of approximately equal size are chosen. Red boxes are sent to 6 stores, yellow boxes to 5, and blue boxes to the remaining 5. The following results (in tens of boxes) are obtained:

Red	Yellow	Blue
43	52	61
52	37	29
59	38	38
76	64	53
61	74	79
81		

Analyze this data and draw appropriate conclusions.

Problem-3

An automobile dealer conducted a test to determine whether the time needed to complete a minor engine tune-up depends on whether a computerized engine analyzer or an electronic analyzer is used. Because tune-up time varies among compact, intermediate, and full-sized cars, the three types of cars were used as blocks in the experiment. The data (time in minutes) was obtained as follows.

		Analyzer	
		Computerized	Electronic
Car	Compact	50	42
	Intermediate	55	44
	Full-sized	63	46

Use α = .05 to test for any significant differences. What is the p-value? What is your conclusion?

Problem-4

An agricultural experiment designed to assess differences in yields of corn for 4 different varieties, using 3 different fertilizers, produced the results (in bushels per acre) as below:

		Variety			
		A	B	C	D
Fertilizer	I	86	88	77	84
		85	89	80	81
	II	92	91	81	93
		90	94	77	94
	III	75	80	83	79
		71	77	83	78

Analyze this data and draw appropriate conclusions.

Case Study: TourisTopia Travel

TourisTopia Travel (Triple T) is an online travel agency that specializes in trips to exotic locations around the world for groups of ten or more travelers. Triple T's marketing manager has been working on a major revision of the homepage of Triple T's website. The content for the homepage has been selected and the only remaining decisions involve the selection of the background color (white, green, or pink) and the type of font (Arial, Calibri, or Tahoma).

Triple T's IT group has designed prototype homepages featuring every combination of these background colors and fonts, and it has implemented computer code that will randomly direct each Triple T website visitor to one of these prototype homepages. For three weeks, the prototype homepage to which each visitor was directed and the amount of time in seconds spent at Triple T's website during each visit were recorded. Ten visitors to each of the prototype homepages were then selected randomly; the complete data set for these visitors is available in the datafile named ***TourisTopia***.

Triple T wants to use these data to determine if the time spent by visitors to Triple T's website differs by background color or font. It would also like to know if the time spent by visitors to the Triple T website differs by different combinations of background color and font.

Managerial Report:

Prepare a managerial report that addresses the following issues.

1. Use descriptive statistics to summarize the data from Triple T's study. Based on descriptive statistics, what are your preliminary conclusions about whether the time spent by visitors to the Triple T website differs by background color or font? What are your preliminary conclusions about whether time spent by visitors to the Triple T website differs by different combinations of background color and font?

2. Has Triple T used an observational study or a controlled experiment? Explain.

3. Use the data from Triple T's study to test the hypothesis that the time spent by visitors to the Triple T website is equal for the three background colors. Include both factors and their interaction in the ANOVA model, and use $\alpha = 0.05$.

4. Use the data from Triple T's study to test the hypothesis that the time spent by visitors to the Triple T website is equal for the three fonts. Include both factors and their interaction in the ANOVA model, and use $\alpha = 0.05$.

5. Use the data from Triple T's study to test the hypothesis that time spent by visitors to the Triple T website is equal for the nine combinations of background color and font. Include both factors and their interaction in the ANOVA model, and use $\alpha = 0.05$.

6. Do the results of your analysis of the data provide evidence that the time spent by visitors to the Triple T website differs by background color, font, or combination of background color and font? What is your recommendation?