

STAT 514
Exam I — Fall 1994

Name _____

- 1) Orit Hezrani is studying methods for teaching Blissymbols. (Blissymbols are graphic symbols which can augment or replace spoken language). She is using a laptop computer to teach the symbols. There will be five groups of students who will be studied. One factor is active vs. passive learning. Another factor is order: elements before compounds vs. elements and compounds mixed. (Say order 1 and order 2).

Group 1 — control i.e. receives no instruction

Group 2 — active learning and order 1

Group 3 — passive learning and order 2

Group 4 — passive learning and order 1

Group 5 — active learning and order 2

At the end of the experiment all students were tested on their knowledge. Orit wants to know several things. What is the difference of instruction vs. no instruction? Is there a difference between active and passive learning? Is there an order effect? Does order and active-passive interact?

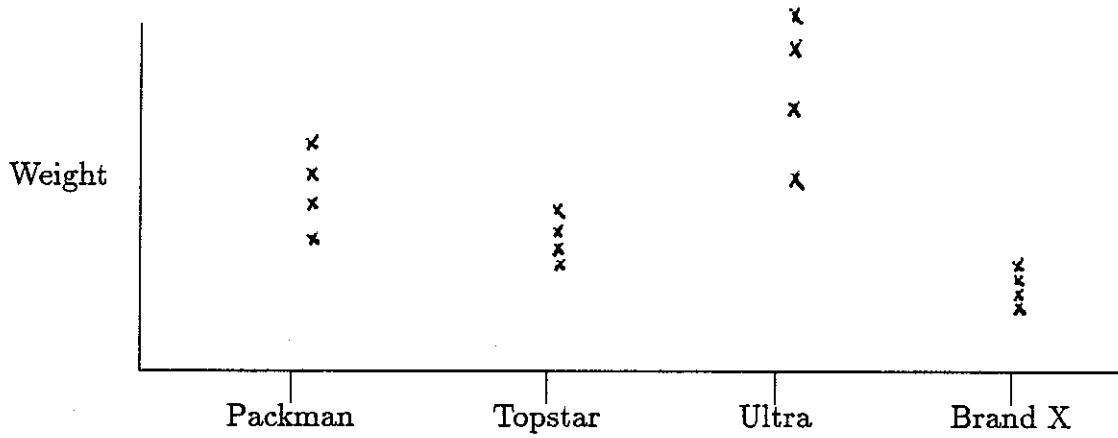
- a) Find a set of orthogonal contrasts which answer Orit's questions.

b) How do these contrasts differ from doing SNK?

c) How does the contrast no instruction vs. instruction differ from Dunnett's test?

d) Write out the ANOVA table with d.f.

2) Dr. Tom planted four varieties of broccoli in his garden last year. Packman, Topstar, Ultra and Brand X. At harvest he weighed each head. Joe Blow was asked to analyze the data. The first thing Joe did was to plot the data.



a) Given this plot, what one thing should Joe *definitely* do?

b) What will Joe then *probably* want to do given the result of what he does in a)?

- 3) An experiment studying the compressive strength of concrete involved three sources (random) of aggregate, two mixing machines (randomly selected) and four curing times, 24, 48, 72 and 96 hours. Analysis of the data yields the following ANOVA table.

Source	df	SS
S	2	256
M	1	180
C	3	523
S*M	2	26
S*C	6	78
M*C	3	42
S*M*C	6	32
error	24	51

- a) Work out the EMS with the algorithm.

b) Do the correct F -tests at the 5% level?

c) Would I need to do any range tests? Why?

4) Given the output from a SAS program:

a) What one thing would you definitely want to do?

b) Given the result of what you suggested in a), how might you want to redo the analysis?