MATH 204 - EXERCISES 2

These exercises are not for assessment

1 Download the SOIL.SAV dataset from the course website at

`www.math.mcgill.ca/~dstephens/204/Data/Soil.sav`

(a) Repeat the analysis in SPSS assuming a randomized block design (RBD) as in lectures.
(b) Carry out an analysis using an ANOVA F-test under an assumption of a completely randomized design (CRD), that is, ignoring the block structure. Compare the results with those from (a).

2 Download the LYMPHO.SAV dataset from the course website at

`www.math.mcgill.ca/~dstephens/204/Data/Lympho.sav`

These data were also obtained under a randomized block design in an animal experiment.

Experiment: Three drugs that were thought to affect lymphocyte production were included in an experiment along with a placebo drug (a control that has no physiological properties). To control for potential variation among experimental units (mice), it was decided to **block** together mice from the same litter (same mother and father and born at the same time). Five ($b = 5$) litters of mice were used where four ($k = 4$) mice were selected from each litter, then one of the four drugs was randomly assigned to each mouse within each litter.

After a sufficient period of time, a blood sample was drawn from each mouse and the number of lymphocytes per cubic millimeter was determined. The **response** data are represented as thousands of lymphocytes per cubic millimeter. The experiment was *blinded*, that is, the precise allocation of drug to animal was not known to the technician carrying out the experiment. In the table below, the letters indicate which drug treatment (A,B,C or D) was allocated to which mouse in each litter.

	Mouse within litter			
Litter	1	2	3	4
1	(B) 6.7	(C) 7.1	(D) 6.7	(A) 7.1
2	(D) 5.4	(A) 6.1	(C) 5.8	(B) 5.1
3	(C) 6.2	(B) 5.9	(A) 6.9	(D) 5.7
4	(B) 5.1	(D) 5.2	(C) 5.0	(A) 5.6
5	(C) 6.2	(B) 5.8	(D) 5.3	(A) 6.4

Analyze these data using SPSS, and report the results.

Reference: Mead, R., R.N. Curnow, and A.M. Hasted. 1993. *Statistical Methods in Agriculture and Experimental Biology*. Chapman and Hall, London, p65 - 66.

Note: Also try exercises 10.54 - 10.69 from McClave & Sincich.