QSCI 482 Winter HW8 Key

1a, 5pts

i	Compare crispy to chewy
ii	Compare Expensive to Inexpensive
iii	Compare Brand A to Brand B
iv	Compare chewy expensive to chewy inexpensive

1b, 5pts

	1 Brand A Chewy Expensive	2 Brand A Crispy Expensive	3 Brand B Chewy Inexpensve	4 Brand B Crispy Inexpensive	5 Brand C Chewy Expensive	6 Brand D Crispy Inexpensive
i	1	-1	1	-1	1	-1
ii	1	1	-1	-1	1	-1
iii	1	1	-1	-1	0	0
iv	1/2	0	-1	0	1/2	0

1c, 5pts
i   sqrt(MSE * sum(c^2/20))
           sqrt(1.37 * 6/20)
                  0.641

2a, 10pts
No effect of A
Small effect of B
Interaction present

2b, 10pts
No effect of A
Small effect of B
Interaction present

3a, 5pts
Ho: $X_{ijl} = \mu + \varepsilon_{ijl}$
Ha: $X_{ijl} = \mu + \alpha_i + \beta_j + (\alpha\beta)_{ij} + \varepsilon_{ijl}$

3b, 20pts

SOV	Df	SS	MS	F ratio	F	P	
h2o	1	1178.1	1178.1	MSh2o/MSE	19.723	0.000251	***
age	4	1321.1	330.3	MSage/MSE	5.529	0.003645	**
h2o:age	4	208.9	52.2	MSh2o:age/MSE	0.874	0.496726	
Residuals	20	1194.7	59.7				

F crit h2o = F 0.10(1), 1, 20 = 2.97
F crit age = F 0.01(1), 4, 20 = 2.25
F crit interaction = F 0.10(1), 4, 20 = 2.25

3c, 5pts
Both main effects, h2o and age, significantly affect the germination of barley.
 There is no interaction between the main factors.
Compare the meansmain factors, ie the 2 water levels, and the 5 ages, separetely.
 The first test will comapre 4 ml h2o with 8ml h2o means. The next will comapare the 5 levels of age.

4a, 15pts
Ho: Xijl = μ + εijl
Ha: Xijl = μ +αi + βj + (αβ)ij + εijl

SOV	Df	SS	MS	F ratio	F	P
fertilizer	1	4.3	4.33	MSfert/MSE	7.123	0.015652 *
irrigation	2	317.1	158.56	MSirrig/MSfert:irrig	24	0.04 *
fertilizer:irrig	2	12.7	6.33	MSfert:irrig/MSE	10.395	0.000998 ***
Residuals	18	11	0.61			

4b, 15pts
F crit irrig = F 0.05(1), 3, 3 = 9.28
F crit fert = F 0.05(1), 1, 18 = 4.41
F crit int = F 0.05(1), 2, 18 = 3.55

4c, 5pts
Fertilizer and irrigation both affect yeild of poplar. In addition, there is interaciton between the factors.
It is not appropriate to do S-N-K on the 3 irrigaiton means
              since there is interaction we must consider all 9 means separately