Assignment 3
ADM 2304

Question 1:

a) There is one factor, which is the row the student is sitting in. There are three treatments, front, middle, and back.

b)

Analysis of Variance

Source	DF	Adj SS	Adj MS	F-Value	P-Value
Factor	2	1901.52	950.758	5.90	0.0093
Error	21	3386.32	161.253		
Total	23	5287.83			

Ho: uf = um = ub
Ha: Not all seat row means equal

Fstat = MSF / MSE = 950.758 / 161.253 = 5.90
Alpha = 0.05
Dfn =2
Dfd = 21
Fcrit = 3.4668

Sine Fstat > Fcrit we reject Ho. There is sufficient that not all seat row means are equal

c)

Means

Factor	N	Mean	StDev	95% CI
Front	7	75.714	17.632	(65.733, 85.696)
Middle	9	67.111	10.948	(58.308, 75.914)
Back	8	53.500	8.960	(44.163, 62.837)

Pooled StDev = 12.6986

SSE = 17.632 ^2 x (7-1) + 10.948^2 (9-1) + 8.960^2 (8-1) = 3386.32
Dfe = N – k = (7+9+8) – 3 = 21

MSE = SSE / Dfe = 3386.32 / 21 = 161.253

d)
CI = (xbar 1 – xbar2) +/- Tcrit x s x sqrt (1/n1 + 1/n2)

Means

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Pooled StDev = 12.6986

Model Summary

S	R-sq	R-sq(adj)	R-sq(pred)
12.6986	35.96%	29.86%	15.15%

J = 3
Alpha = 0.05
Alpha / 2J = 0.05 / 2(3) = 0.00833
Dfe = 21
Inverse of the Cumulative Probability

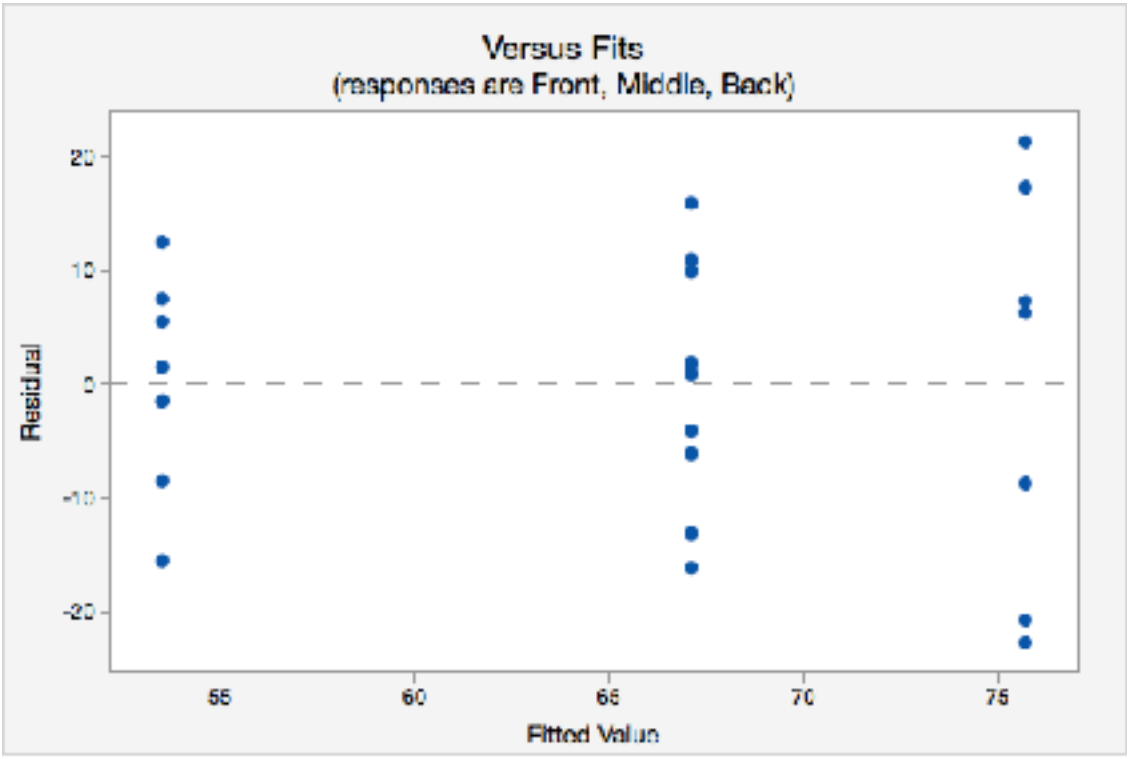
$P(X \leq x)$	x
0.008333	-2.60137

CI (F-M) = (75.714–67.111) +/- 2.60137x 12.6986 x sqrt (1/7 + 1/9)
= (-8.0444, 25.2505)
Since the interval contains a value of 0, there is not a significant difference in the mean scores of students sitting in the front and the middle.

CI (F-B) = (75.714–53.500) +/- 2.60137x 12.6986 x sqrt (1/7 + 1/8)
=(5.1174, 39.31059)
Since the interval does not contain a value of 0, there is a significant difference in the mean scores of students sitting in the front and the back. We can conclude that students in the front do better than students in the back.

CI (M-B) = (67.111-53.500) +/- 2.60137x 12.6986 x sqrt (1/9+ 1/8)
=(-2.4405, 29.6625)
Since the interval contains a value of 0, there is not a significant difference in the mean scores of students sitting in the middle and the back.

e)



1. Normality assumption = 2s = 2(12.6986) = 25.3972. There are no points outside of two SD's. Assumption valid.
2. Equal Variance assumption = the spread of the residuals appears to be constant. Assumption Valid.
3. Independence assumption = there is no pattern in the residuals; they appear to be random and independent. Assumption valid.

Question 2:

Ho: Factors program and cost do not interact
Ha: Factors program and cost do interact

Fstat = MSI / MSE = 11.1528/ 6.6250 = 1.68
Alpha = 0.05
Dfn =3
Dfd = 16
Fcrit = 3.2389

Sine Fstat < Fcrit we fail to reject Ho. There is not sufficient evidence of interaction between cost and program.

d) Our conclusion in C does not agree with our analysis in B. The interaction plot in B is based on sample information we must still do a test for interaction on the population like in part C to determine if the interaction truly exists.

e)
Ho: uA= uB= uC = uD (no main effect)
Ha: Not all program means equal (main effect)

Fstat = MSFA/ MSE = 27.0417/ 6.6250 = 4.08
Alpha = 0.05
Dfn =3
Dfd = 16
Fcrit = 3.2389

Since Fstat > Fcrit we reject Ho. There is sufficient evidence that not all program means are equal. There is main effect due to program.

f)
Ho: u>150= u<150 (no main effect)
Ha: Not all cost means equal (main effect)

Fstat = MSFB/ MSE = 92.0417/6.6250 = 13.89
Alpha = 0.05
Dfn =1
Dfd = 16
Fcrit = 4.4940

Since Fstat > Fcrit we reject Ho. There is sufficient evidence that not all cost means are equal. There is main effect due to cost.

g)

CI = (xbar 1 – xbar2) +/- Tcrit x s x sqrt (1/n1 + 1/n2)

Model Summary

S	R-sq	R-sq(adj)	R-sq(pred)
2.57391	66.09%	51.26%	23.71%

Means

Term	Fitted Mean	SE Mean
InsurProg		
A	69.833	1.051
B	67.333	1.051
C	71.000	1.051
D	72.333	1.051

J = 6
Alpha = 0.05
Alpha / 2J = 0.05 / 2(6) = 0.0041667
Dfe = 16
Tcrit= 3.00830

Inverse of the Cumulative Probability

P(X ≤ x)	x
0.004167	-3.00830

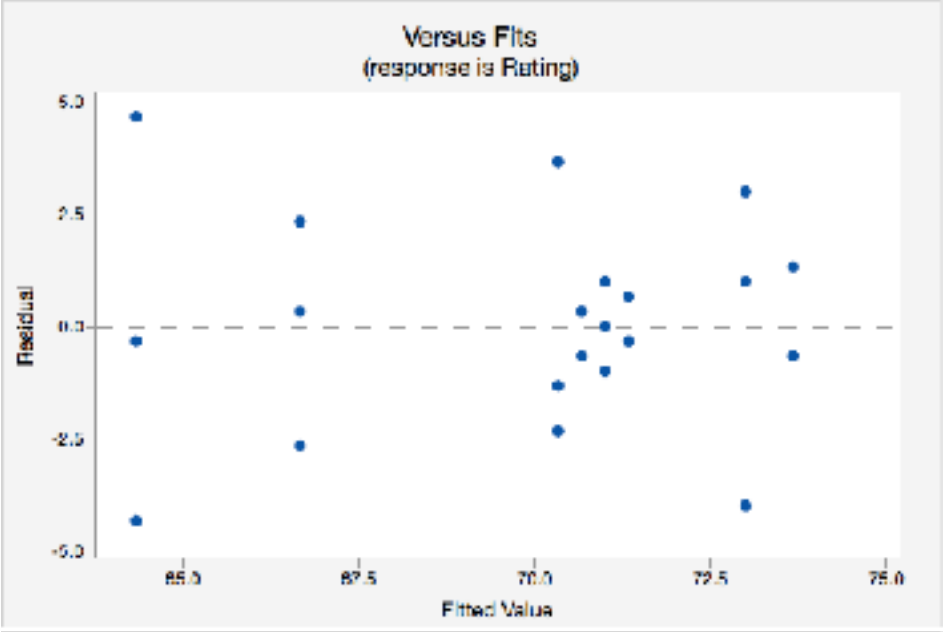
CI (A-B) = (69.833 – 67.333) +/- 3.00830 x 2.57391x sqrt (1/6 + 1/6)
= (69.833 – 67.333) +/- 4.4705
= (-1.9705, 6.9705)
Since the interval contains a value of 0, there is not a significant difference in the mean scores of programmes A and B.

CI (A-C) = (69.833 –71.000) +/- 4.4705
= (-5.6375, 3.3035)
Since the interval contains a value of 0, there is not a significant difference in the mean scores of programmes A and C.

CI (A-D) = (69.833 –72.333) +/- 4.4705
= (-6.9705, 1.9705)
Since the interval contains a value of 0, there is not a significant difference in the mean scores of programmes A and D.

CI (B-C) = (67.333–71.000) +/- 4.4705
= (-8.1375, 0.8035)
Since the interval contains a value of 0, there is not a significant difference in the mean

g)

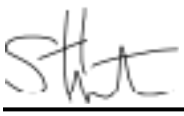


1. Normality assumption = 2s = 2(2.57391) =5.14782. There are no points outside of two SD's. Assumption valid.
2. Equal Variance assumption = the spread of the residuals does not appear to be constant. Assumption not Valid.
3. Independence assumption = there is no pattern in the residuals; they appear to be random and independent. Assumption valid.

Not all anova assumptions valid

PERSONAL ETHICS STATEMENT

Individual Assignment: By signing this Statement, I am attesting to the fact that I have reviewed the entirety of my attached work and that I have applied all the appropriate rules of quotation and referencing in use at the Telfer School of Management at the University of Ottawa, as well as adhered to the fraud policies outlined in the Academic Regulations in the University's Undergraduate Studies Calendar. Academic Fraud Webpage



Signature

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_____March 18, 2015_____ Date

____7736970_____ Student Number