Name Jerry

Student Number /

STA 441s 2024 Quiz 6

1. (2 points) In your analysis of the Diet Data, you fit a model in which the explanatory variables were Diet, and weight before starting the diet. There were no interactions. You want to know whether, controlling for weight before, there is any difference in the results for Diet 2 and Diet 3.

   (a) Fill in the table below. Do not correct for multiple testing.

t, χ^2 or F Statistic (a number)	p-value (a number or range)	Reject H_0? (Yes or No)	Statistically Significant? (Yes or No)
$t = 3.18$	0.0022	Yes	Yes

   On your printout, circle the test statistic and write "Question 1" beside it.

   (b) In plain, non-statistical language, what do you conclude?

Allowing for weight before the experiment, subjects following diet 3 had lower average weight after 6 weeks, compared to subjects on Diet 2.

2. (2 points) It is quite possible that which diet is more effective (or more exactly, the relative effectiveness of the diets) might depend on the initial weight of the person. You tested this hypothesis.

   (a) Please fill in the table below.

t, χ^2 or F Statistic (a number)	p-value (a number or range)	Reject H_0? (Yes or No)	Statistically Significant? (Yes or No)
$F = 0.38$	0.6813	No	No

   On your printout, circle the test statistic and write "Question 2" beside it.

   (b) In plain, non-statistical language, what do you conclude?

There is no evidence that the relative effectiveness of the diets depends on the initial weight of the person

$$y = \beta_0 + \beta_1 x_1 + \cdots + \beta_{p-1} x_{p-1} + \epsilon \quad SST = SSR + SSE \quad R^2 = \frac{SSR}{SST}$$

$$a = \frac{R_F^2 - R_R^2}{1 - R_R^2} \qquad F = \left(\frac{n-p}{s}\right)\left(\frac{a}{1-a}\right) \qquad a = \frac{sF}{n-p+sF}$$

3. (2 points) Based on your model the Diet Data with equal slopes (Question 1), what proportion of the *remaining* variation in weight after 6 weeks is explained by weight before the experiment, once you allow for Diet? Hint: $F = t^2$. Please show some work below. You'll need a calculator. **Circle your final answer.**

$$a = \frac{1 \cdot (31.25)^2}{74 + (31.25)^2} = 0.9296$$

No + 0.139

4. (4 points) Hens (female chickens) are randomly assigned to one of three different feed types: A, B or C. The response variable is the mean weight of the eggs they lay, based on 100 eggs from each chicken. Hen's age is a covariate. Assume that the relationship between age and expected egg weight can be approximated by a straight line over the range of the data.

   (a) Write a regression equation that assumes the lines relating age and expected egg weight have the *same slope* for each feed type. Use *cell means coding.* That's indicator dummy variables with no intercept.

   $E(Y|\mathbf{x}) = \beta_1 f_1 + \beta_2 f_2 + \beta_3 f_3 + \beta_4 x$

   (b) Make a table with three rows, one for each feed type. Make columns showing how your dummy variables are defined. Add another, wider column showing expected egg weight for each feed type. The *symbols* for the dummy variables for feed type will not appear in this last column.

	f_1	f_2	f_3	$E(y\|x)$
A	1	0	0	$\beta_1 + \beta_4 x$
B	0	1	0	$\beta_2 + \beta_4 x$
C	0	0	1	$\beta_3 + \beta_4 x$

   (c) Controlling for hen's age, is egg weight related to the type of feed? Give the null hypothesis, using symbols from your regression equation.

$H_0: \beta_1 = \beta_2 = \beta_3$

STA441s24 Assignment 6: Diet Data

The CONTENTS Procedure

Data Set Name	WORK.HUNGER	**Observations**	78
Member Type	DATA	**Variables**	15
Engine	V9	**Indexes**	0
Created	02/20/2024 14:16:25	**Observation Length**	120
Last Modified	02/20/2024 14:16:25	**Deleted Observations**	0
Protection		**Compressed**	NO
Data Set Type		**Sorted**	NO
Label			
Data Representation	SOLARIS_X86_64, LINUX_X86_64, ALPHA_TRU64, LINUX_IA64		
Encoding	utf-8 Unicode (UTF-8)		

Engine/Host Dependent Information	
Data Set Page Size	131072
Number of Data Set Pages	1
First Data Page	1
Max Obs per Page	1090
Obs in First Data Page	78
Number of Data Set Repairs	0
Filename	/saswork/SAS_work894B0000C774_odaws02-usw2-2.oda.sas.com/SAS_workD78B0000C774_odaws02-usw2-2.oda.sas.com/hunger.sas7bdat
Release Created	9.0401M7
Host Created	Linux
Inode Number	1207960885
Access Permission	rw-r--r--
Owner Name	u1407221
File Size	256KB
File Size (bytes)	262144

Alphabetic List of Variables and Attributes

#	Variable	Type	Len	Format	Informat	Label
3	Age	Num	8	BEST.		Age
6	Diet	Num	8	BEST.		Diet
4	Height	Num	8	BEST.		Height
1	Person	Num	8	BEST.		Person
9	d1	Num	8			
10	d2	Num	8			
11	d3	Num	8			
12	d1pre	Num	8			
13	d2pre	Num	8			
14	d3pre	Num	8			
2	gender	Char	1	$1.	$1.	gender

5	pre_weight	Num	8	BEST.		pre_weight
15	sex	Num	8			
7	weight6weeks	Num	8	BEST.		weight6weeks
8	wtloss	Num	8			Weight loss in kg.

STA441s24 Assignment 6: Diet Data
Check dummy variables

The FREQ Procedure

Frequency

Table of d1 by Diet				
	Diet(Diet)			
d1	1	2	3	Total
0	0	27	27	54
1	24	0	0	24
Total	24	27	27	78

Frequency

Table of d2 by Diet				
	Diet(Diet)			
d2	1	2	3	Total
0	24	0	27	51
1	0	27	0	27
Total	24	27	27	78

Frequency

Table of d3 by Diet				
	Diet(Diet)			
d3	1	2	3	Total
0	24	27	0	51
1	0	0	27	27
Total	24	27	27	78

Frequency

Table of sex by gender				
	gender(gender)			
sex		F	M	Total
.	2	0	0	2
0	0	0	43	43
1	0	33	0	33
Total	2	33	43	78

STA441s24 Assignment 6: Diet Data
Q3a: Regression with Just Diet

The REG Procedure
Model: MODEL1
Dependent Variable: weight6weeks weight6weeks

Number of Observations Read	78
Number of Observations Used	78

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	29.84134	14.92067	0.18	0.8328
Error	75	6102.95981	81.37280		
Corrected Total	77	6132.80115			

Root MSE	9.02069	R-Square	0.0049
Dependent Mean	68.68077	Adj R-Sq	-0.0217
Coeff Var	13.13423		

Parameter Estimates

Variable	Label	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	Intercept	1	68.48148	1.73603	39.45	<.0001
d1		1	1.09352	2.53068	0.43	0.6669
d2		1	-0.39630	2.45512	-0.16	0.8722

STA441s24 Assignment 6: Diet Data
Q3a: Regression with Just Diet

The GLM Procedure

Class Level Information

Class	Levels	Values
Diet	3	1 2 3

Number of Observations Read	78
Number of Observations Used	78

STA441s24 Assignment 6: Diet Data
Q3a: Regression with Just Diet

The GLM Procedure

Dependent Variable: weight6weeks weight6weeks

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	29.841339	14.920670	0.18	0.8328
Error	75	6102.959815	81.372798		
Corrected Total	77	6132.801154			

R-Square	Coeff Var	Root MSE	weight6weeks Mean
0.004866	13.13423	9.020687	68.68077

Source	DF	Type I SS	Mean Square	F Value	Pr > F
Diet	2	29.84133903	14.92066952	0.18	0.8328

Source	DF	Type III SS	Mean Square	F Value	Pr > F
Diet	2	29.84133903	14.92066952	0.18	0.8328

STA441s24 Assignment 6: Diet Data
Q3b: Correlation

The CORR Procedure

2 Variables:	pre_weight weight6weeks

Simple Statistics							
Variable	N	Mean	Std Dev	Sum	Minimum	Maximum	Label
pre_weight	78	72.52564	8.72334	5657	58.00000	103.00000	pre_weight
weight6weeks	78	68.68077	8.92450	5357	53.00000	103.00000	weight6weeks

Pearson Correlation Coefficients, N = 78 Prob > |r| under H0: Rho=0		
	pre_weight	weight6weeks
pre_weight pre_weight	1.00000	0.95845 <.0001
weight6weeks weight6weeks	0.95845 <.0001	1.00000

STA441s24 Assignment 6: Diet Data
Q3b: Correlation

Rsq
0.9186264

STA441s24 Assignment 6: Diet Data

Q3c: Regression with Diet and weight before

The REG Procedure

Number of Observations Read	78
Number of Observations Used	78

Descriptive Statistics

Variable	Sum	Mean	Uncorrected SS	Variance	Standard Deviation	Label
Intercept	78.00000	1.00000	78.00000	0	0	Intercept
pre_weight	5657.00000	72.52564	416137	76.09674	8.72334	pre_weight
d1	24.00000	0.30769	24.00000	0.21578	0.46453	
d2	27.00000	0.34615	27.00000	0.22927	0.47882	
weight6weeks	5357.10000	68.68077	374063	79.64677	8.92450	weight6weeks

---

STA441s24 Assignment 6: Diet Data
Q3c: Regression with Diet and weight before

The REG Procedure
Model: MODEL1
Dependent Variable: weight6weeks weight6weeks

Number of Observations Read	78
Number of Observations Used	78

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	5703.02798	1901.00933	327.32	<.0001
Error	74	429.77318	5.80775		
Corrected Total	77	6132.80115			

Root MSE	2.40993	R-Square	0.9299
Dependent Mean	68.68077	Adj R-Sq	0.9271
Coeff Var	3.50888		

Parameter Estimates

Variable	Label	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	Intercept	1	-4.53044	2.38165	-1.90	0.0610
pre_weight	pre_weight	1	0.99161	0.03173	31.25	<.0001
d1		1	1.84182	0.67651	2.72	0.0081
d2		1	2.10109	0.66075	3.18	0.0022

Question 1

STA441s24 Assignment 6: Diet Data

Q3c: Regression with Diet and weight before

The REG Procedure
Model: MODEL1

Test Diet Results for Dependent Variable weight6weeks				
Source	DF	Mean Square	F Value	Pr > F
Numerator	2	34.64168	5.96	0.0040
Denominator	74	5.80775		

STA441s24 Assignment 6: Diet Data
Q3c: Regression with Diet and weight before

The REG Procedure
Model: MODEL1

Test oneVStwo Results for Dependent Variable weight6weeks				
Source	DF	Mean Square	F Value	Pr > F
Numerator	1	0.84833	0.15	0.7034
Denominator	74	5.80775		

STA441s24 Assignment 6: Diet Data
Q3c(v): Bonferroni-corrected p-values

oneVStwo	oneVSthree	twoVSthree
1	0.0243	0.0066

STA441s24 Assignment 6: Diet Data
Q3c(vi): Mean weight corrected for weight before the experiment

Diet1	Diet2	Diet3
69.22853	69.4878	67.38671

STA441s24 Assignment 6: Diet Data
Q3c(vi): Mean weight corrected for weight before the experiment

The GLM Procedure

Class Level Information		
Class	Levels	Values
Diet	3	1 2 3

Number of Observations Read	78

Number of Observations Used	78

STA441s24 Assignment 6: Diet Data
Q3c(vi): Mean weight corrected for weight before the experiment

The GLM Procedure

Dependent Variable: weight6weeks weight6weeks

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	5703.027975	1901.009325	327.32	<.0001
Error	74	429.773179	5.807746		
Corrected Total	77	6132.801154			

R-Square	Coeff Var	Root MSE	weight6weeks Mean
0.929922	3.508881	2.409926	68.68077

Source	DF	Type I SS	Mean Square	F Value	Pr > F
pre_weight	1	5633.744615	5633.744615	970.04	<.0001
Diet	2	69.283360	34.641680	5.96	0.0040

Source	DF	Type III SS	Mean Square	F Value	Pr > F
pre_weight	1	5673.186636	5673.186636	976.83	<.0001
Diet	2	69.283360	34.641680	5.96	0.0040

STA441s24 Assignment 6: Diet Data
Q3c(vi): Mean weight corrected for weight before the experiment

The GLM Procedure
Least Squares Means
Adjustment for Multiple Comparisons: Bonferroni

Diet	weight6weeks LSMEAN	LSMEAN Number
1	69.2285720	1
2	69.4878480	2
3	67.3867547	3

Least Squares Means for Effect Diet
t for H0: LSMean(i)=LSMean(j) / Pr > |t|

Dependent Variable: weight6weeks

i/j	1	2	3
1		-0.38219 1.0000	2.722532 0.0242
2	0.382189 1.0000		3.179869 0.0065
3	-2.72253 0.0242	-3.17987 0.0065	

STA441s24 Assignment 6: Diet Data
Q3(ix) Proportion of remaining variation two ways

FullReduced	FromF
0.1385412	0.1387337

STA441s24 Assignment 6: Diet Data
Q3d Test Sex, Age and Height

The REG Procedure
Model: MODEL1
Dependent Variable: weight6weeks weight6weeks

Number of Observations Read	78
Number of Observations Used	76
Number of Observations with Missing Values	2

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	6	4466.45403	744.40900	126.97	<.0001
Error	69	404.53268	5.86279		
Corrected Total	75	4870.98671			

Root MSE	2.42132	R-Square	0.9170
Dependent Mean	68.34342	Adj R-Sq	0.9097
Coeff Var	3.54287		

Parameter Estimates

Variable	Label	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	Intercept	1	-3.35354	6.15163	-0.55	0.5874
sex		1	0.41835	0.90411	0.46	0.6450
Age	Age	1	0.00898	0.02857	0.31	0.7541
Height	Height	1	0.00731	0.02756	0.27	0.7917
pre_weight	pre_weight	1	0.95189	0.05502	17.30	<.0001
d1		1	1.77348	0.69045	2.57	0.0124
d2		1	1.65121	0.72456	2.28	0.0258

STA441s24 Assignment 6: Diet Data
Q3d Test Sex, Age and Height

The REG Procedure
Model: MODEL1

Test SexAgeHt Results for Dependent Variable weight6weeks				
Source	DF	Mean Square	F Value	Pr > F
Numerator	3	0.97870	0.17	0.9183
Denominator	69	5.86279		

STA441s24 Assignment 6: Diet Data
Q3e Test Equal Slopes (Interaction)

The REG Procedure
Model: MODEL1
Dependent Variable: weight6weeks weight6weeks

Number of Observations Read	78
Number of Observations Used	78

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	5	5707.55447	1141.51089	193.27	<.0001
Error	72	425.24668	5.90620		
Corrected Total	77	6132.80115			

Root MSE	2.43027	R-Square	0.9307
Dependent Mean	68.68077	Adj R-Sq	0.9258
Coeff Var	3.53850		

Parameter Estimates						
Variable	Label	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	Intercept	1	-7.91452	4.63725	-1.71	0.0922
pre_weight	pre_weight	1	1.03757	0.06266	16.56	<.0001
d1		1	7.08933	6.41503	1.11	0.2728
d2		1	6.23158	5.74446	1.08	0.2816
d1pre		1	-0.07153	0.08706	-0.82	0.4140
d2pre		1	-0.05646	0.07846	-0.72	0.4741

STA441s24 Assignment 6: Diet Data
Q3e Test Equal Slopes (Interaction)

The REG Procedure
Model: MODEL1

Test EqSlopes Results for Dependent Variable weight6weeks

Source	DF	Mean Square	F Value	Pr > F
Numerator	2	2.26325	0.38	0.6831
Denominator	72	5.90620		

Question 2

```
1          OPTIONS NONOTES NOSTIMER NOSOURCE NOSYNTAXCHECK;
72
73         /******************** 441s24HW6diet.sas **************************/
74         title 'STA441s24 Assignment 6: Diet Data';
75
76         proc import datafile="/home/u1407221/441s24/data/Diet.xlsx"
77                     out=diet dbms=xlsx replace;
78                     getnames=yes;
79         /* Input data file is Diet.xlsx
80            Ouput data table is called diet.
81            dbms=xlsx The input file is an Excel spreadsheet.
82                      Necessary to read an Excel spreadsheet directly under unix/linux
83                      Works in PC environment too except for Excel 4.0 spreadsheets
84                      If there are multiple sheets, use sheet="sheet1" or something.
85            replace If the data table already exists, replace it.  Use this!
86            getnames=yes   Use column names as variable names. Beware of embedded,
87                           leading and trailing blanks.
88            By default, blanks in a spreadsheet are missing.  */
89
90         /*  proc print;  */
91

NOTE: One or more variables were converted because the data type is not supported by the V9 engine. For more details, run with
      options MSGLEVEL=I.
NOTE: The import data set has 78 observations and 7 variables.
NOTE: WORK.DIET data set was successfully created.
NOTE: PROCEDURE IMPORT used (Total process time):
      real time           0.01 seconds
      user cpu time       0.01 seconds
      system cpu time     0.01 seconds
      memory              3334.81k
      OS Memory           30716.00k
      Timestamp           02/20/2024 07:16:24 PM
      Step Count                        44  Switch Count  4
      Page Faults                       0
      Page Reclaims                     825
      Page Swaps                        0
      Voluntary Context Switches        32
      Involuntary Context Switches      0
      Block Input Operations            0
      Block Output Operations           264


92         data hunger;
93              set diet;
94              wtloss = pre_weight - weight6weeks;
95              label wtloss = "Weight loss in kg.";
96              /* Make indicator dummy variables */
97              if diet=1 then d1=1;
98                 else if diet=. then d1=.;
99                 else d1=0;
100             if diet=2 then d2=1;
101                else if diet=. then d2=.;
102                else d2=0;
103             if diet=3 then d3=1;
104                else if diet=. then d3=.;
105                else d3=0;
106             d1pre = d1*pre_weight;
107             d2pre = d2*pre_weight;
108             d3pre = d3*pre_weight;
109             if gender = "M" then sex=0;
110                else if gender="F" then sex=1;
111

NOTE: There were 78 observations read from the data set WORK.DIET.
NOTE: The data set WORK.HUNGER has 78 observations and 15 variables.
NOTE: DATA statement used (Total process time):
      real time           0.00 seconds
      user cpu time       0.00 seconds
      system cpu time     0.00 seconds
      memory              959.53k
      OS Memory           28588.00k
      Timestamp           02/20/2024 07:16:24 PM
      Step Count                        45  Switch Count  2
      Page Faults                       0
      Page Reclaims                     134
      Page Swaps                        0
      Voluntary Context Switches        11
```

```
      Involuntary Context Switches      0
      Block Input Operations            0
      Block Output Operations           272


112         proc contents;
113
114         /* Variables are now
115               Person gender Age Height pre_weight Diet weight6weeks d1 d2 d3 sex   */
116

NOTE: PROCEDURE CONTENTS used (Total process time):
      real time           0.06 seconds
      user cpu time       0.07 seconds
      system cpu time     0.00 seconds
      memory              3541.65k
      OS Memory           29612.00k
      Timestamp           02/20/2024 07:16:24 PM
      Step Count                        46  Switch Count  0
      Page Faults                       0
      Page Reclaims                     287
      Page Swaps                        0
      Voluntary Context Switches        2
      Involuntary Context Switches      1
      Block Input Operations            0
      Block Output Operations           40


117         proc freq;
118              title2 'Check dummy variables';
119              tables (d1-d3) * diet / norow nocol nopercent missing;
120              tables sex * gender / norow nocol nopercent missing;
121

NOTE: There were 78 observations read from the data set WORK.HUNGER.
NOTE: PROCEDURE FREQ used (Total process time):
      real time           0.05 seconds
      user cpu time       0.05 seconds
      system cpu time     0.00 seconds
      memory              1513.37k
      OS Memory           30128.00k
      Timestamp           02/20/2024 07:16:24 PM
      Step Count                        47  Switch Count  5
      Page Faults                       0
      Page Reclaims                     366
      Page Swaps                        0
      Voluntary Context Switches        34
      Involuntary Context Switches      1
      Block Input Operations            0
      Block Output Operations           544


122         proc reg plots=none data=hunger; /* Suppress diagnostic plots for now*/
123              title2 'Q3a: Regression with Just Diet';
124              model weight6weeks = d1 d2;
125

NOTE: PROCEDURE REG used (Total process time):
      real time           0.04 seconds
      user cpu time       0.04 seconds
      system cpu time     0.00 seconds
      memory              2427.87k
      OS Memory           31936.00k
      Timestamp           02/20/2024 07:16:25 PM
      Step Count                        48  Switch Count  2
      Page Faults                       0
      Page Reclaims                     315
      Page Swaps                        0
      Voluntary Context Switches        21
      Involuntary Context Switches      1
      Block Input Operations            0
      Block Output Operations           56


126         proc glm plots=none data=hunger;
127              class diet;
128              model weight6weeks = diet;
129
```

```
NOTE: PROCEDURE GLM used (Total process time):
      real time           0.04 seconds
      user cpu time       0.04 seconds
      system cpu time     0.00 seconds
      memory              1746.81k
      OS Memory           31416.00k
      Timestamp           02/20/2024 07:16:25 PM
      Step Count                        49  Switch Count  2
      Page Faults                       0
      Page Reclaims                     229
      Page Swaps                        0
      Voluntary Context Switches        13
      Involuntary Context Switches      0
      Block Input Operations            0
      Block Output Operations           320


130        proc corr data=hunger;
131             title2 "Q3b: Correlation";
132             var pre_weight weight6weeks;
133

NOTE: PROCEDURE CORR used (Total process time):
      real time           0.02 seconds
      user cpu time       0.03 seconds
      system cpu time     0.00 seconds
      memory              888.65k
      OS Memory           30376.00k
      Timestamp           02/20/2024 07:16:25 PM
      Step Count                        50  Switch Count  1
      Page Faults                       0
      Page Reclaims                     59
      Page Swaps                        0
      Voluntary Context Switches        10
      Involuntary Context Switches      0
      Block Input Operations            0
      Block Output Operations           16


134        proc iml;
NOTE: IML Ready
135             Rsq = 0.95845**2;
135      !                        print Rsq;
136
NOTE: Exiting IML.
NOTE: PROCEDURE IML used (Total process time):
      real time           0.00 seconds
      user cpu time       0.01 seconds
      system cpu time     0.00 seconds
      memory              496.34k
      OS Memory           30116.00k
      Timestamp           02/20/2024 07:16:25 PM
      Step Count                        51  Switch Count  0
      Page Faults                       0
      Page Reclaims                     61
      Page Swaps                        0
      Voluntary Context Switches        0
      Involuntary Context Switches      0
      Block Input Operations            0
      Block Output Operations           8


137        proc reg plots=none data=hunger simple;
138             title2 'Q3c: Regression with Diet and weight before';
139             model weight6weeks = pre_weight d1 d2;
140             Diet: test d1=d2=0;
141             oneVStwo: test d1=d2;
142

NOTE: PROCEDURE REG used (Total process time):
      real time           0.07 seconds
      user cpu time       0.07 seconds
      system cpu time     0.00 seconds
      memory              2400.93k
      OS Memory           31936.00k
      Timestamp           02/20/2024 07:16:25 PM
      Step Count                        52  Switch Count  2
      Page Faults                       0
      Page Reclaims                     267
```

```
      Page Swaps                        0
      Voluntary Context Switches        20
      Involuntary Context Switches      0
      Block Input Operations            0
      Block Output Operations           80


143        proc iml;
NOTE: IML Ready
144             title2 "Q3c(v): Bonferroni-corrected p-values";
145             oneVStwo = 3*0.7034;
145       !                           oneVSthree = 3*0.0081;
145       !                                                    twoVSthree = 3*0.0022;
146             oneVStwo = min(oneVStwo,1);
147             print oneVStwo oneVSthree twoVSthree;
148
NOTE: Exiting IML.
NOTE: PROCEDURE IML used (Total process time):
      real time           0.00 seconds
      user cpu time       0.01 seconds
      system cpu time     0.00 seconds
      memory              513.62k
      OS Memory           30116.00k
      Timestamp           02/20/2024 07:16:25 PM
      Step Count                        53  Switch Count  1
      Page Faults                       0
      Page Reclaims                     57
      Page Swaps                        0
      Voluntary Context Switches        11
      Involuntary Context Switches      0
      Block Input Operations            0
      Block Output Operations           0


149        proc iml;
NOTE: IML Ready
150             title2 "Q3c(vi): Mean weight corrected for weight before the experiment";
151             xbar1 = 72.52564;
152             Diet1 = -4.53044 + 0.99161*xbar1 + 1.84182;
153             Diet2 = -4.53044 + 0.99161*xbar1 + 2.10109;
154             Diet3 = -4.53044 + 0.99161*xbar1;
155             print Diet1 Diet2 Diet3;
156
NOTE: Exiting IML.
NOTE: PROCEDURE IML used (Total process time):
      real time           0.00 seconds
      user cpu time       0.01 seconds
      system cpu time     0.00 seconds
      memory              512.81k
      OS Memory           30116.00k
      Timestamp           02/20/2024 07:16:25 PM
      Step Count                        54  Switch Count  1
      Page Faults                       0
      Page Reclaims                     55
      Page Swaps                        0
      Voluntary Context Switches        11
      Involuntary Context Switches      0
      Block Input Operations            0
      Block Output Operations           0


157        proc glm plots=none data=hunger;
158             class diet;
159             model weight6weeks = pre_weight diet;
160             lsmeans diet / pdiff tdiff adjust = bon;
161

NOTE: PROCEDURE GLM used (Total process time):
      real time           0.06 seconds
      user cpu time       0.06 seconds
      system cpu time     0.00 seconds
      memory              2090.28k
      OS Memory           31416.00k
      Timestamp           02/20/2024 07:16:25 PM
      Step Count                        55  Switch Count  2
      Page Faults                       0
      Page Reclaims                     309
      Page Swaps                        0
      Voluntary Context Switches        14
```

```
      Involuntary Context Switches      0
      Block Input Operations            0
      Block Output Operations           328


162        proc iml;
NOTE: IML Ready
163             title2 "Q3(ix) Proportion of remaining variation two ways";
164             RsqRed = 0.9186264;
164      !                          RsqFull = 0.9299;
165             FullReduced = (RsqFull-RsqRed)/(1-RsqRed);
166             F = 5.96;
166      !              FromF = 2*F/(74+2*F);
167             print FullReduced FromF;
168
NOTE: Exiting IML.
NOTE: PROCEDURE IML used (Total process time):
      real time           0.00 seconds
      user cpu time       0.01 seconds
      system cpu time     0.00 seconds
      memory              518.78k
      OS Memory           30116.00k
      Timestamp           02/20/2024 07:16:25 PM
      Step Count                        56  Switch Count  1
      Page Faults                       0
      Page Reclaims                     59
      Page Swaps                        0
      Voluntary Context Switches        8
      Involuntary Context Switches      0
      Block Input Operations            0
      Block Output Operations           8


169        proc reg plots=none data=hunger;
170             title2 'Q3d Test Sex, Age and Height';
171             model weight6weeks = sex age height pre_weight d1 d2;
172             SexAgeHt: test sex=age=height=0;
173

NOTE: PROCEDURE REG used (Total process time):
      real time           0.04 seconds
      user cpu time       0.05 seconds
      system cpu time     0.01 seconds
      memory              2414.53k
      OS Memory           32192.00k
      Timestamp           02/20/2024 07:16:25 PM
      Step Count                        57  Switch Count  2
      Page Faults                       0
      Page Reclaims                     302
      Page Swaps                        0
      Voluntary Context Switches        22
      Involuntary Context Switches      0
      Block Input Operations            0
      Block Output Operations           72


174        proc reg plots=none data=hunger;
175             title2 'Q3e Test Equal Slopes (Interaction)';
176             model weight6weeks = pre_weight d1 d2 d1pre d2pre;
177             EqSlopes: test d1pre=d2pre=0;
178
179        run;

180        quit;

NOTE: PROCEDURE REG used (Total process time):
      real time           0.04 seconds
      user cpu time       0.05 seconds
      system cpu time     0.00 seconds
      memory              2471.28k
      OS Memory           32192.00k
      Timestamp           02/20/2024 07:16:25 PM
      Step Count                        58  Switch Count  2
      Page Faults                       0
      Page Reclaims                     273
      Page Swaps                        0
      Voluntary Context Switches        21
      Involuntary Context Switches      0
      Block Input Operations            0
```

```
       Block Output Operations           136


181
182
183
184        OPTIONS NONOTES NOSTIMER NOSOURCE NOSYNTAXCHECK;
196
```