Below are Tukey adjusted pairwise comparisons done in PROC MIXED with range tests output from Saxton's macro.

```
options ps=512 ls=88;
proc mixed data=MouseDiet cl covtest;
   Title2 'Analysis of Variance with PROC MIXED';
   class diet;
   model lifetime = diet / outp=resid1 ddfm=kr;
   repeated / group=diet;
   lsmeans diet / pdiff adjust=tukey cl;
 ods output diffs=ppp lsmeans=mmm;
 *ods listing exclude diffs lsmeans;
run;
%include 'C:\Geaghan\EXST\EXST3201\SAS\pdmix800.sas';
%pdmix800(ppp,mmm,alpha=.05,sort=yes);
run;
```

```
Chapter 5 : Mouse feeding example
Analysis of Variance with PROC MIXED

The Mixed Procedure

                  Model Information
Data Set                      WORK.MOUSEDIET
Dependent Variable            LIFETIME
Covariance Structure          Variance Components
Group Effect                  DIET
Estimation Method             REML
Residual Variance Method      None
Fixed Effects SE Method       Prasad-Rao-Jeske-
                              Kackar-Harville
Degrees of Freedom Method     Kenward-Roger

             Class Level Information
Class    Levels    Values
DIET          6    N/N85 N/R40 N/R50 NP R/R50
                   lopro

            Dimensions
Covariance Parameters             6
Columns in X                      7
Columns in Z                      0
Subjects                        349
Max Obs Per Subject               1

          Number of Observations
Number of Observations Read             349
Number of Observations Used             349
Number of Observations Not Used           0

                     Iteration History
Iteration    Evaluations    -2 Res Log Like       Criterion
        0              1      2300.34852165
        1              1      2289.27652629      0.00000000

                  Convergence criteria met.
```

Covariance Parameter Estimates

Cov Parm	Group	Estimate	Standard Error	Z Value	Pr Z	Alpha	Lower	Upper
Residual	DIET N/N85	26.2687	4.9643	5.29	<.0001	0.05	18.7234	39.5319
Residual	DIET N/R40	44.9356	8.2733	5.43	<.0001	0.05	32.2855	66.8452
Residual	DIET N/R50	60.3448	10.2001	5.92	<.0001	0.05	44.4538	86.6356
Residual	DIET NP	37.6223	7.6796	4.90	<.0001	0.05	26.1635	58.7189
Residual	DIET R/R50	44.6645	8.5172	5.24	<.0001	0.05	31.7464	67.4911
Residual	DIET lopro	48.8838	9.3218	5.24	<.0001	0.05	34.7453	73.8667

Fit Statistics

-2 Res Log Likelihood	2289.3
AIC (smaller is better)	2301.3
AICC (smaller is better)	2301.5
BIC (smaller is better)	2324.4

Null Model Likelihood Ratio Test

DF	Chi-Square	Pr > ChiSq
5	11.07	0.0500

Type 3 Tests of Fixed Effects

Effect	Num DF	Den DF	F Value	Pr > F
DIET	5	155	64.71	<.0001

Least Squares Means

Effect	DIET	Estimate	Standard Error	DF	t Value	Pr > |t|	Alpha	Lower	Upper
DIET	N/N85	32.6912	0.6789	56	48.16	<.0001	0.05	31.3313	34.0512
DIET	N/R40	45.1167	0.8654	59	52.13	<.0001	0.05	43.3850	46.8483
DIET	N/R50	42.2972	0.9219	70	45.88	<.0001	0.05	40.4585	44.1359
DIET	NP	27.4020	0.8762	48	31.27	<.0001	0.05	25.6402	29.1638
DIET	R/R50	42.8857	0.8931	55	48.02	<.0001	0.05	41.0960	44.6755
DIET	lopro	39.6857	0.9343	55	42.48	<.0001	0.05	37.8133	41.5581

Differences of Least Squares Means

Effect	DIET	_DIET	Estimate	Standard Error	DF	t Value	Pr > |t|	Adjustment	Adj P
DIET	N/N85	N/R40	-12.4254	1.0999	110	-11.30	<.0001	Tukey-Kramer	<.0001
DIET	N/N85	N/R50	-9.6060	1.1449	122	-8.39	<.0001	Tukey-Kramer	<.0001
DIET	N/N85	NP	5.2892	1.1084	93.9	4.77	<.0001	Tukey-Kramer	<.0001
DIET	N/N85	R/R50	-10.1945	1.1218	103	-9.09	<.0001	Tukey-Kramer	<.0001
DIET	N/N85	lopro	-6.9945	1.1549	101	-6.06	<.0001	Tukey-Kramer	<.0001
DIET	N/R40	N/R50	2.8195	1.2645	129	2.23	0.0275	Tukey-Kramer	0.2302
DIET	N/R40	NP	17.7146	1.2316	106	14.38	<.0001	Tukey-Kramer	<.0001
DIET	N/R40	R/R50	2.2310	1.2436	113	1.79	0.0755	Tukey-Kramer	0.4727
DIET	N/R40	lopro	5.4310	1.2735	113	4.26	<.0001	Tukey-Kramer	0.0005
DIET	N/R50	NP	14.8951	1.2719	116	11.71	<.0001	Tukey-Kramer	<.0001
DIET	N/R50	R/R50	-0.5885	1.2836	124	-0.46	0.6474	Tukey-Kramer	0.9974
DIET	N/R50	lopro	2.6115	1.3126	123	1.99	0.0489	Tukey-Kramer	0.3530
DIET	NP	R/R50	-15.4837	1.2512	103	-12.38	<.0001	Tukey-Kramer	<.0001
DIET	NP	lopro	-12.2837	1.2809	103	-9.59	<.0001	Tukey-Kramer	<.0001
DIET	R/R50	lopro	3.2000	1.2925	110	2.48	0.0148	Tukey-Kramer	0.1378

Differences of Least Squares Means

Effect	DIET	_DIET	Alpha	Lower	Upper	Adj Lower	Adj Upper
DIET	N/N85	N/R40	0.05	-14.6052	-10.2457	-15.5995	-9.2514
DIET	N/N85	N/R50	0.05	-11.8724	-7.3395	-12.9099	-6.3020
DIET	N/N85	NP	0.05	3.0883	7.4901	2.0905	8.4879
DIET	N/N85	R/R50	0.05	-12.4193	-7.9697	-13.4318	-6.9572
DIET	N/N85	lopro	0.05	-9.2855	-4.7034	-10.3273	-3.6617
DIET	N/R40	N/R50	0.05	0.3177	5.3213	-0.8295	6.4684
DIET	N/R40	NP	0.05	15.2728	20.1564	14.1606	21.2686
DIET	N/R40	R/R50	0.05	-0.2327	4.6946	-1.3578	5.8197

DIET	N/R40	lopro	0.05	2.9078	7.9541	1.7559	9.1061
DIET	N/R50	NP	0.05	12.3759	17.4143	11.2247	18.5656
DIET	N/R50	R/R50	0.05	-3.1290	1.9520	-4.2926	3.1155
DIET	N/R50	lopro	0.05	0.01326	5.2097	-1.1763	6.3993
DIET	NP	R/R50	0.05	-17.9651	-13.0022	-19.0942	-11.8731
DIET	NP	lopro	0.05	-14.8241	-9.7433	-15.9801	-8.5873
DIET	R/R50	lopro	0.05	0.6385	5.7615	-0.5298	6.9298

Chapter 5 : Mouse feeding example
Analysis of Variance with PROC MIXED

Effect=DIET ADJUSTMENT=Tukey-Kramer(P<.05) bygroup=1

Obs	DIET	Estimate	StdErr	Alpha	Lower	Upper	MSGROUP
1	N/R40	45.1167	0.8654	0.05	43.3850	46.8483	A
2	R/R50	42.8857	0.8931	0.05	41.0960	44.6755	AB
3	N/R50	42.2972	0.9219	0.05	40.4585	44.1359	AB
4	lopro	39.6857	0.9343	0.05	37.8133	41.5581	B
5	N/N85	32.6912	0.6789	0.05	31.3313	34.0512	C
6	NP	27.4020	0.8762	0.05	25.6402	29.1638	D

```
proc mixed data=Jury;
   class judge;
   model percent = judge;
   lsmeans judge / pdiff adjust=tukey CL;
  ods output diffs = ppp lsmeans=mmm;
**ods listing exclude diffs lsmeans;
run;
%include 'C:\Geaghan\EXST\EXST3201\SAS\pdmix800.sas';
%pdmix800(ppp,mmm,alpha=.05,sort=yes);
run;
```

Chapter 5 : Spock Conspiracy Trial

The Mixed Procedure

Model Information

Data Set	WORK.JURY
Dependent Variable	Percent
Covariance Structure	Diagonal
Estimation Method	REML
Residual Variance Method	Profile
Fixed Effects SE Method	Model-Based
Degrees of Freedom Method	Residual

Class Level Information

Class	Levels	Values
Judge	7	SPOCK A B C D E F

Dimensions

Covariance Parameters	1
Columns in X	8
Columns in Z	0
Subjects	1
Max Obs Per Subject	46

Number of Observations

Number of Observations Read	46
Number of Observations Used	46
Number of Observations Not Used	0

Covariance Parameter Estimates

Cov Parm	Estimate
Residual	47.8063

Fit Statistics

-2 Res Log Likelihood	274.0
AIC (smaller is better)	276.0
AICC (smaller is better)	276.1
BIC (smaller is better)	277.6

Type 3 Tests of Fixed Effects

Effect	Num DF	Den DF	F Value	Pr > F
Judge	6	39	6.72	<.0001

Least Squares Means

Effect	Judge	Estimate	Standard Error	DF	t Value	Pr > |t|	Alpha	Lower	Upper
Judge	SPOCK	14.6222	2.3047	39	6.34	<.0001	0.05	9.9605	19.2840
Judge	A	34.1200	3.0921	39	11.03	<.0001	0.05	27.8656	40.3744
Judge	B	33.6167	2.8227	39	11.91	<.0001	0.05	27.9072	39.3261
Judge	C	29.1000	2.3047	39	12.63	<.0001	0.05	24.4382	33.7618
Judge	D	27.0000	4.8891	39	5.52	<.0001	0.05	17.1109	36.8891
Judge	E	26.9667	2.8227	39	9.55	<.0001	0.05	21.2572	32.6761
Judge	F	26.8000	2.3047	39	11.63	<.0001	0.05	22.1382	31.4618

Differences of Least Squares Means

Effect	Judge	_Judge	Estimate	Standard Error	DF	t Value	Pr > |t|	Adjustment	Adj P
Judge	SPOCK	A	-19.4978	3.8566	39	-5.06	<.0001	Tukey-Kramer	0.0002
Judge	SPOCK	B	-18.9944	3.6441	39	-5.21	<.0001	Tukey-Kramer	0.0001
Judge	SPOCK	C	-14.4778	3.2594	39	-4.44	<.0001	Tukey-Kramer	0.0013
Judge	SPOCK	D	-12.3778	5.4051	39	-2.29	0.0275	Tukey-Kramer	0.2744
Judge	SPOCK	E	-12.3444	3.6441	39	-3.39	0.0016	Tukey-Kramer	0.0249
Judge	SPOCK	F	-12.1778	3.2594	39	-3.74	0.0006	Tukey-Kramer	0.0098
Judge	A	B	0.5033	4.1868	39	0.12	0.9049	Tukey-Kramer	1.0000
Judge	A	C	5.0200	3.8566	39	1.30	0.2007	Tukey-Kramer	0.8470
Judge	A	D	7.1200	5.7848	39	1.23	0.2258	Tukey-Kramer	0.8777

Judge	A	E	7.1533	4.1868	39	1.71	0.0955	Tukey-Kramer	0.6146
Judge	A	F	7.3200	3.8566	39	1.90	0.0651	Tukey-Kramer	0.4936
Judge	B	C	4.5167	3.6441	39	1.24	0.2226	Tukey-Kramer	0.8742
Judge	B	D	6.6167	5.6454	39	1.17	0.2483	Tukey-Kramer	0.9003
Judge	B	E	6.6500	3.9919	39	1.67	0.1038	Tukey-Kramer	0.6418
Judge	B	F	6.8167	3.6441	39	1.87	0.0689	Tukey-Kramer	0.5110
Judge	C	D	2.1000	5.4051	39	0.39	0.6997	Tukey-Kramer	0.9997
Judge	C	E	2.1333	3.6441	39	0.59	0.5616	Tukey-Kramer	0.9969
Judge	C	F	2.3000	3.2594	39	0.71	0.4846	Tukey-Kramer	0.9915
Judge	D	E	0.03333	5.6454	39	0.01	0.9953	Tukey-Kramer	1.0000
Judge	D	F	0.2000	5.4051	39	0.04	0.9707	Tukey-Kramer	1.0000
Judge	E	F	0.1667	3.6441	39	0.05	0.9638	Tukey-Kramer	1.0000

Differences of Least Squares Means

Effect	Judge	_Judge	Alpha	Lower	Upper	Adj Lower	Adj Upper
Judge	SPOCK	A	0.05	-27.2984	-11.6971	-31.4809	-7.5147
Judge	SPOCK	B	0.05	-26.3653	-11.6235	-30.3174	-7.6715
Judge	SPOCK	C	0.05	-21.0705	-7.8850	-24.6054	-4.3502
Judge	SPOCK	D	0.05	-23.3106	-1.4450	-29.1725	4.4169
Judge	SPOCK	E	0.05	-19.7153	-4.9735	-23.6674	-1.0215
Judge	SPOCK	F	0.05	-18.7705	-5.5850	-22.3054	-2.0502
Judge	A	B	0.05	-7.9652	8.9719	-12.5058	13.5124
Judge	A	C	0.05	-2.7806	12.8206	-6.9631	17.0031
Judge	A	D	0.05	-4.5809	18.8209	-10.8547	25.0947
Judge	A	E	0.05	-1.3152	15.6219	-5.8558	20.1624
Judge	A	F	0.05	-0.4806	15.1206	-4.6631	19.3031
Judge	B	C	0.05	-2.8542	11.8876	-6.8063	15.8396
Judge	B	D	0.05	-4.8023	18.0356	-10.9248	24.1582
Judge	B	E	0.05	-1.4244	14.7244	-5.7537	19.0537
Judge	B	F	0.05	-0.5542	14.1876	-4.5063	18.1396
Judge	C	D	0.05	-8.8328	13.0328	-14.6947	18.8947
Judge	C	E	0.05	-5.2376	9.5042	-9.1896	13.4563
Judge	C	F	0.05	-4.2927	8.8927	-7.8276	12.4276
Judge	D	E	0.05	-11.3856	11.4523	-17.5082	17.5748
Judge	D	F	0.05	-10.7328	11.1328	-16.5947	16.9947
Judge	E	F	0.05	-7.2042	7.5376	-11.1563	11.4896

Chapter 5 : Spock Conspiracy Trial

Effect=Judge Method=Tukey-Kramer(P<.05) Set=1

Obs	Judge	Estimate	Standard Error	Alpha	Lower	Upper	Letter Group
1	A	34.1200	3.0921	0.05	27.8656	40.3744	A
2	B	33.6167	2.8227	0.05	27.9072	39.3261	A
3	C	29.1000	2.3047	0.05	24.4382	33.7618	A
4	D	27.0000	4.8891	0.05	17.1109	36.8891	AB
5	E	26.9667	2.8227	0.05	21.2572	32.6761	A
6	F	26.8000	2.3047	0.05	22.1382	31.4618	A
7	SPOCK	14.6222	2.3047	0.05	9.9605	19.2840	B

Discrimination against the handicapped example (Ramsey & Schafer, 2002, Section 6.1).

```
/*
An actor appears in 5 videotaped job interviews.
The only difference in each of the 5 interview is the actor
   appears with a different handicap in each videotape.
   The handicaps are Amputee, Crutches, Hearing, Wheelchair and No handicap
Evaluations by 70 students, 14 randomly assigned to each interview
We want to know if the interviews are evaluated differently.
The score is the assessment of the applicants qualifications.
*/

dm'log;clear;output;clear';
options nodate nocenter nonumber ps=512 ls=132;
ODS HTML style=minimal rs=none
body='C:\Geaghan\Current\EXST3201\Fall2005\SAS\Discrimination01.html' ;

Title1 'Chapter 6 : Discrimination example';
filename input 'C:\Geaghan\Current\EXST3201\Datasets\ASCII\CASE0601.csv';

data Discrimination; length handicap $ 10;
   infile input missover DSD dlm="," firstobs=2;
  input score handicap $;
datalines;

proc print data=Discrimination; run;
```

Chapter 6 : Discrimination example

Obs	handicap	score
1	NONE	1.90000
2	NONE	2.50000
3	NONE	3.00000
4	NONE	3.60000
5	NONE	4.10000
6	NONE	4.20000
7	NONE	4.90000
8	NONE	5.10000
9	NONE	5.40000
10	NONE	5.90000
11	NONE	6.10000
12	NONE	6.70000
13	NONE	7.40000
14	NONE	7.80000
15	AMPUTEE	1.90000
16	AMPUTEE	2.50000
17	AMPUTEE	2.60000
18	AMPUTEE	3.20000
19	AMPUTEE	3.60000
20	AMPUTEE	3.80000
21	AMPUTEE	4.00000
22	AMPUTEE	4.60000
23	AMPUTEE	5.30000
24	AMPUTEE	5.50000
25	AMPUTEE	5.80000
26	AMPUTEE	5.90000
27	AMPUTEE	6.10000
28	AMPUTEE	7.20000
29	CRUTCHES	3.70000
30	CRUTCHES	4.00000
31	CRUTCHES	4.30000
32	CRUTCHES	4.30000
33	CRUTCHES	5.10000
34	CRUTCHES	5.80000
35	CRUTCHES	6.00000
36	CRUTCHES	6.20000
37	CRUTCHES	6.30000
38	CRUTCHES	6.40000
39	CRUTCHES	7.40000
40	CRUTCHES	7.40000
41	CRUTCHES	7.50000
42	CRUTCHES	8.50000
43	HEARING	1.40000
44	HEARING	2.10000
45	HEARING	2.40000
46	HEARING	2.90000
47	HEARING	3.40000
48	HEARING	3.70000
49	HEARING	3.90000
50	HEARING	4.20000
51	HEARING	4.30000
52	HEARING	4.70000
53	HEARING	5.50000
54	HEARING	5.80000
55	HEARING	5.90000
56	HEARING	6.50000
57	WHEELCHAIR	1.70000
58	WHEELCHAIR	2.80000
59	WHEELCHAIR	3.50000
60	WHEELCHAIR	4.70000
61	WHEELCHAIR	4.80000
62	WHEELCHAIR	5.00000
63	WHEELCHAIR	5.30000
64	WHEELCHAIR	6.10000
65	WHEELCHAIR	6.10000
66	WHEELCHAIR	6.20000
67	WHEELCHAIR	6.40000
68	WHEELCHAIR	7.20000
69	WHEELCHAIR	7.40000
70	WHEELCHAIR	7.60000

```
proc mixed data=Discrimination order=data;
   class handicap;
   model score = handicap;
   repeated / group=handicap;
   lsmeans handicap / pdiff adjust=dunnett;
run;
```

Chapter 6 : Discrimination example

The Mixed Procedure

Model Information

Data Set	WORK.DISCRIMINATION
Dependent Variable	score
Covariance Structure	Variance Components
Group Effect	handicap
Estimation Method	REML
Residual Variance Method	None
Fixed Effects SE Method	Model-Based
Degrees of Freedom Method	Between-Within

Class Level Information

Class	Levels	Values
handicap	5	NONE AMPUTEE CRUTCHES HEARING WHEELCHAIR

Dimensions

Covariance Parameters	5
Columns in X	6
Columns in Z	0
Subjects	70
Max Obs Per Subject	1

Number of Observations

Number of Observations Read	70
Number of Observations Used	70
Number of Observations Not Used	0

Iteration History

Iteration	Evaluations	-2 Res Log Like	Criterion
0	1	261.40673324	
1	1	260.68354737	0.00000000

Convergence criteria met.

Covariance Parameter Estimates

Cov Parm	Group	Estimate
Residual	handicap NONE	3.2169
Residual	handicap AMPUTEE	2.5145
Residual	handicap CRUTCHES	2.1957
Residual	handicap HEARING	2.3488
Residual	handicap WHEELCHAIR	3.0565

Fit Statistics

-2 Res Log Likelihood	260.7
AIC (smaller is better)	270.7
AICC (smaller is better)	271.7
BIC (smaller is better)	281.9

Null Model Likelihood Ratio Test

DF	Chi-Square	Pr > ChiSq
4	0.72	0.9484

Type 3 Tests of Fixed Effects

Effect	Num DF	Den DF	F Value	Pr > F
handicap	4	65	3.27	0.0167

Least Squares Means

Effect	handicap	Estimate	Standard Error	DF	t Value	Pr > |t|
handicap	NONE	4.9000	0.4794	65	10.22	<.0001
handicap	AMPUTEE	4.4286	0.4238	65	10.45	<.0001
handicap	CRUTCHES	5.9214	0.3960	65	14.95	<.0001
handicap	HEARING	4.0500	0.4096	65	9.89	<.0001
handicap	WHEELCHAIR	5.3429	0.4672	65	11.43	<.0001

Differences of Least Squares Means

Effect	handicap	_handicap	Estimate	Standard Error	DF	t Value	Pr>|t|	Adjustment	Adj P
handicap	AMPUTEE	NONE	-0.4714	0.6398	65	-0.74	0.4639	Dunnett	0.8606
handicap	CRUTCHES	NONE	1.0214	0.6218	65	1.64	0.1053	Dunnett	0.2846
handicap	HEARING	NONE	-0.8500	0.6305	65	-1.35	0.1823	Dunnett	0.4513
handicap	WHEELCHAIR	NONE	0.4429	0.6694	65	0.66	0.5106	Dunnett	0.8989

```
options ps=512 ls=89;
Title2 'Analysis wtih PROC MIXED';
proc mixed data=Discrimination order=data;
   class handicap;
   model score = handicap;
   lsmeans handicap / pdiff;
   lsmeans handicap / pdiff adjust=tukey;
   lsmeans handicap / pdiff adjust=scheffe;
   lsmeans handicap / pdiff adjust=bon;
 ods output diffs=ppp lsmeans=mmm;
 ***ods listing exclude diffs lsmeans;
run;
%include 'C:\Geaghan\EXST\EXST3201\Fall2005\SAS\pdmix800.sas';
%pdmix800(ppp,mmm,alpha=.05,sort=yes);
run;
```

Chapter 6 : Discrimination example
Analysis wtih PROC MIXED

The Mixed Procedure

Model Information

Data Set	WORK.DISCRIMINATION
Dependent Variable	score
Covariance Structure	Diagonal
Estimation Method	REML
Residual Variance Method	Profile
Fixed Effects SE Method	Model-Based
Degrees of Freedom Method	Residual

Class Level Information

Class	Levels	Values
handicap	5	NONE AMPUTEE CRUTCHES HEARING WHEELCHAIR

Dimensions

Covariance Parameters	1
Columns in X	6
Columns in Z	0
Subjects	1
Max Obs Per Subject	70

Number of Observations

Number of Observations Read	70
Number of Observations Used	70
Number of Observations Not Used	0

Covariance Parameter Estimates

Cov Parm	Estimate
Residual	2.6665

Fit Statistics

-2 Res Log Likelihood	261.4
AIC (smaller is better)	263.4
AICC (smaller is better)	263.5
BIC (smaller is better)	265.6

Type 3 Tests of Fixed Effects

Effect	Num DF	Den DF	F Value	Pr > F
handicap	4	65	2.86	0.0301

Least Squares Means

Effect	handicap	Estimate	Standard Error	DF	t Value	Pr > |t|
handicap	NONE	4.9000	0.4364	65	11.23	<.0001
handicap	AMPUTEE	4.4286	0.4364	65	10.15	<.0001
handicap	CRUTCHES	5.9214	0.4364	65	13.57	<.0001
handicap	HEARING	4.0500	0.4364	65	9.28	<.0001
handicap	WHEELCHAIR	5.3429	0.4364	65	12.24	<.0001
handicap	NONE	4.9000	0.4364	65	11.23	<.0001
handicap	AMPUTEE	4.4286	0.4364	65	10.15	<.0001
handicap	CRUTCHES	5.9214	0.4364	65	13.57	<.0001
handicap	HEARING	4.0500	0.4364	65	9.28	<.0001
handicap	WHEELCHAIR	5.3429	0.4364	65	12.24	<.0001
handicap	NONE	4.9000	0.4364	65	11.23	<.0001
handicap	AMPUTEE	4.4286	0.4364	65	10.15	<.0001
handicap	CRUTCHES	5.9214	0.4364	65	13.57	<.0001
handicap	HEARING	4.0500	0.4364	65	9.28	<.0001
handicap	WHEELCHAIR	5.3429	0.4364	65	12.24	<.0001
handicap	NONE	4.9000	0.4364	65	11.23	<.0001
handicap	AMPUTEE	4.4286	0.4364	65	10.15	<.0001
handicap	CRUTCHES	5.9214	0.4364	65	13.57	<.0001
handicap	HEARING	4.0500	0.4364	65	9.28	<.0001
handicap	WHEELCHAIR	5.3429	0.4364	65	12.24	<.0001

Differences of Least Squares Means

Effect	handicap	_handicap	Estimate	Standard Error	DF	t Value	Pr > |t|
handicap	NONE	AMPUTEE	0.4714	0.6172	65	0.76	0.4477
handicap	NONE	CRUTCHES	-1.0214	0.6172	65	-1.65	0.1028
handicap	NONE	HEARING	0.8500	0.6172	65	1.38	0.1732
handicap	NONE	WHEELCHAIR	-0.4429	0.6172	65	-0.72	0.4756
handicap	AMPUTEE	CRUTCHES	-1.4929	0.6172	65	-2.42	0.0184
handicap	AMPUTEE	HEARING	0.3786	0.6172	65	0.61	0.5418
handicap	AMPUTEE	WHEELCHAIR	-0.9143	0.6172	65	-1.48	0.1433
handicap	CRUTCHES	HEARING	1.8714	0.6172	65	3.03	0.0035
handicap	CRUTCHES	WHEELCHAIR	0.5786	0.6172	65	0.94	0.3520
handicap	HEARING	WHEELCHAIR	-1.2929	0.6172	65	-2.09	0.0401
handicap	NONE	AMPUTEE	0.4714	0.6172	65	0.76	0.4477
handicap	NONE	CRUTCHES	-1.0214	0.6172	65	-1.65	0.1028
handicap	NONE	HEARING	0.8500	0.6172	65	1.38	0.1732
handicap	NONE	WHEELCHAIR	-0.4429	0.6172	65	-0.72	0.4756
handicap	AMPUTEE	CRUTCHES	-1.4929	0.6172	65	-2.42	0.0184
handicap	AMPUTEE	HEARING	0.3786	0.6172	65	0.61	0.5418
handicap	AMPUTEE	WHEELCHAIR	-0.9143	0.6172	65	-1.48	0.1433
handicap	CRUTCHES	HEARING	1.8714	0.6172	65	3.03	0.0035
handicap	CRUTCHES	WHEELCHAIR	0.5786	0.6172	65	0.94	0.3520
handicap	HEARING	WHEELCHAIR	-1.2929	0.6172	65	-2.09	0.0401
handicap	NONE	AMPUTEE	0.4714	0.6172	65	0.76	0.4477
handicap	NONE	CRUTCHES	-1.0214	0.6172	65	-1.65	0.1028
handicap	NONE	HEARING	0.8500	0.6172	65	1.38	0.1732
handicap	NONE	WHEELCHAIR	-0.4429	0.6172	65	-0.72	0.4756
handicap	AMPUTEE	CRUTCHES	-1.4929	0.6172	65	-2.42	0.0184
handicap	AMPUTEE	HEARING	0.3786	0.6172	65	0.61	0.5418
handicap	AMPUTEE	WHEELCHAIR	-0.9143	0.6172	65	-1.48	0.1433
handicap	CRUTCHES	HEARING	1.8714	0.6172	65	3.03	0.0035
handicap	CRUTCHES	WHEELCHAIR	0.5786	0.6172	65	0.94	0.3520
handicap	HEARING	WHEELCHAIR	-1.2929	0.6172	65	-2.09	0.0401
handicap	NONE	AMPUTEE	0.4714	0.6172	65	0.76	0.4477
handicap	NONE	CRUTCHES	-1.0214	0.6172	65	-1.65	0.1028
handicap	NONE	HEARING	0.8500	0.6172	65	1.38	0.1732
handicap	NONE	WHEELCHAIR	-0.4429	0.6172	65	-0.72	0.4756
handicap	AMPUTEE	CRUTCHES	-1.4929	0.6172	65	-2.42	0.0184
handicap	AMPUTEE	HEARING	0.3786	0.6172	65	0.61	0.5418
handicap	AMPUTEE	WHEELCHAIR	-0.9143	0.6172	65	-1.48	0.1433
handicap	CRUTCHES	HEARING	1.8714	0.6172	65	3.03	0.0035
handicap	CRUTCHES	WHEELCHAIR	0.5786	0.6172	65	0.94	0.3520
handicap	HEARING	WHEELCHAIR	-1.2929	0.6172	65	-2.09	0.0401

Differences of Least Squares Means

Effect	handicap	_handicap	Adjustment	Adj P
handicap	NONE	AMPUTEE		.
handicap	NONE	CRUTCHES		.
handicap	NONE	HEARING		.
handicap	NONE	WHEELCHAIR		.
handicap	AMPUTEE	CRUTCHES		.
handicap	AMPUTEE	HEARING		.
handicap	AMPUTEE	WHEELCHAIR		.
handicap	CRUTCHES	HEARING		.
handicap	CRUTCHES	WHEELCHAIR		.
handicap	HEARING	WHEELCHAIR		.
handicap	NONE	AMPUTEE	Tukey	0.9400
handicap	NONE	CRUTCHES	Tukey	0.4686
handicap	NONE	HEARING	Tukey	0.6443
handicap	NONE	WHEELCHAIR	Tukey	0.9517
handicap	AMPUTEE	CRUTCHES	Tukey	0.1233
handicap	AMPUTEE	HEARING	Tukey	0.9725
handicap	AMPUTEE	WHEELCHAIR	Tukey	0.5781
handicap	CRUTCHES	HEARING	Tukey	0.0278
handicap	CRUTCHES	WHEELCHAIR	Tukey	0.8812
handicap	HEARING	WHEELCHAIR	Tukey	0.2348
handicap	NONE	AMPUTEE	Scheffe	0.9642
handicap	NONE	CRUTCHES	Scheffe	0.6051
handicap	NONE	HEARING	Scheffe	0.7545
handicap	NONE	WHEELCHAIR	Scheffe	0.9715
handicap	AMPUTEE	CRUTCHES	Scheffe	0.2238
handicap	AMPUTEE	HEARING	Scheffe	0.9840
handicap	AMPUTEE	WHEELCHAIR	Scheffe	0.7007
handicap	CRUTCHES	HEARING	Scheffe	0.0682
handicap	CRUTCHES	WHEELCHAIR	Scheffe	0.9265
handicap	HEARING	WHEELCHAIR	Scheffe	0.3656
handicap	NONE	AMPUTEE	Bonferroni	1.0000
handicap	NONE	CRUTCHES	Bonferroni	1.0000
handicap	NONE	HEARING	Bonferroni	1.0000
handicap	NONE	WHEELCHAIR	Bonferroni	1.0000
handicap	AMPUTEE	CRUTCHES	Bonferroni	0.1838
handicap	AMPUTEE	HEARING	Bonferroni	1.0000
handicap	AMPUTEE	WHEELCHAIR	Bonferroni	1.0000
handicap	CRUTCHES	HEARING	Bonferroni	0.0349
handicap	CRUTCHES	WHEELCHAIR	Bonferroni	1.0000
handicap	HEARING	WHEELCHAIR	Bonferroni	0.4010

Chapter 6 : Discrimination example
Analysis wtih PROC MIXED

Effect=handicap Method=Bonferroni(P<.05) Set=4

Obs	handicap	Estimate	Standard Error	Letter Group
1	CRUTCHES	5.9214	0.4364	A
2	WHEELCHAIR	5.3429	0.4364	AB
3	NONE	4.9000	0.4364	AB
4	AMPUTEE	4.4286	0.4364	AB
5	HEARING	4.0500	0.4364	B

Effect=handicap Method=LSD(P<.05) Set=1

Obs	handicap	Estimate	Standard Error	Letter Group
6	CRUTCHES	5.9214	0.4364	A
7	WHEELCHAIR	5.3429	0.4364	AB
8	NONE	4.9000	0.4364	ABC
9	AMPUTEE	4.4286	0.4364	BC
10	HEARING	4.0500	0.4364	C

Effect=handicap Method=Scheffe(P<.05) Set=3

Obs	handicap	Estimate	Standard Error	Letter Group
11	CRUTCHES	5.9214	0.4364	A
12	WHEELCHAIR	5.3429	0.4364	A
13	NONE	4.9000	0.4364	A
14	AMPUTEE	4.4286	0.4364	A
15	HEARING	4.0500	0.4364	A

Effect=handicap Method=Tukey(P<.05) Set=2

Obs	handicap	Estimate	Standard Error	Letter Group
16	CRUTCHES	5.9214	0.4364	A
17	WHEELCHAIR	5.3429	0.4364	AB
18	NONE	4.9000	0.4364	AB
19	AMPUTEE	4.4286	0.4364	AB
20	HEARING	4.0500	0.4364	B