```
/*  SAS program for a factorial experiment    */
/*  with two random factors, using PROC GLM.  */
/*  Data are from the text, Example 17.2, p.  */
/*  987.  Response is amount of calcium       */
/*  measured in a standardized preparation    */
/*  containing 10 mg calcium.  Random factor  */
/*  ASSAY is assay method, random factor LAB  */
/*  is laboratory.                            */

options nocenter ls=72;
data;
  input y assay lab  @@;
  cards;
  10.9 1 1 10.9 1 1 10.5 1 2 9.8 1 2 9.7 1 3 10.0 1 3
  11.3 2 1 11.7 2 1 9.4 2 2 10.2 2 2 8.8 2 3 9.2 2 3
  11.8 3 1 11.2 3 1 10.0 3 2 10.7 3 2 10.4 3 3 10.7 3 3
  ;
proc glm;
  class assay lab;
  model y=lab assay lab*assay;
  random lab assay alb*assay / test;
run;
```

```
The GLM Procedure

   Class Level Information

Class         Levels    Values

assay              3    1 2 3

lab                3    1 2 3

Number of observations    18
Dependent Variable: y
                                        Sum of
Source                      DF        Squares    Mean Square   F Value

Model                        8    10.76000000     1.34500000      9.76

Error                        9     1.24000000     0.13777778

Corrected Total             17    12.00000000

Source                  Pr > F

Model                   0.0013

Error
Corrected Total
```

R-Square	Coeff Var	Root MSE	y Mean
0.896667	3.569080	0.371184	10.40000

Source	DF	Type I SS	Mean Square	F Value
lab	2	7.56000000	3.78000000	27.44
assay	2	1.56000000	0.78000000	5.66
assay*lab	4	1.64000000	0.41000000	2.98

Source	Pr > F
lab	0.0001
assay	0.0256
assay*lab	0.0803

Source	DF	Type III SS	Mean Square	F Value
lab	2	7.56000000	3.78000000	27.44
assay	2	1.56000000	0.78000000	5.66
assay*lab	4	1.64000000	0.41000000	2.98

Source	Pr > F
lab	0.0001
assay	0.0256
assay*lab	0.0803

Source	Type III Expected Mean Square
lab	Var(Error) + 2 Var(assay*lab) + 6 Var(lab)
assay	Var(Error) + 2 Var(assay*lab) + 6 Var(assay)
assay*lab	Var(Error) + 2 Var(assay*lab)

Tests of Hypotheses for Random Model Analysis of Variance

Dependent Variable: y

Source	DF	Type III SS	Mean Square	F Value
lab	2	7.560000	3.780000	9.22
assay	2	1.560000	0.780000	1.90
Error: MS(assay*lab)	4	1.640000	0.410000	

Source	Pr > F
lab	0.0318
assay	0.2627

Error: MS(assay*lab)

Source	DF	Type III SS	Mean Square	F Value
assay*lab	4	1.640000	0.410000	2.98
Error: MS(Error)	9	1.240000	0.137778	

Source	Pr > F
assay*lab	0.0803

Error: MS(Error)