The manova2 data

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The data:

```
low 34 10
low 29 14
low 35 11
low 32 13
high 33 14
high 38 12
high 34 13
high 35 14
```

The SAS code and output:

```
data manova2;
  infile "manova2.dat";
  input fertilizer $ yield weight;

proc discrim can list out=fred;
  class fertilizer;
  var yield weight;

proc print data=fred;

run;
```

```
The DISCRIM Procedure
Total Sample Size        8          DF Total                 7
Variables                2          DF Within Classes        6
Classes                  2          DF Between Classes       1

Number of Observations Read              8
Number of Observations Used              8

                          Class Level Information
              Variable                                                  Prior
fertilizer    Name        Frequency       Weight    Proportion    Probability
```

```
high          high                4       4.0000      0.500000       0.500000
low           low                 4       4.0000      0.500000       0.500000

Pooled Covariance Matrix Information
               Natural Log of the
 Covariance    Determinant of the
Matrix Rank     Covariance Matrix
          2               1.22255

The DISCRIM Procedure
Pairwise Generalized Squared Distances Between Groups
 2          _   _       -1  _   _
D (i|j) = (X - X )' COV   (X - X )
            i   j           i   j

Generalized Squared Distance to fertilizer
From
fertilizer          high           low
high                   0      12.11656
low             12.11656             0

The DISCRIM Procedure
Canonical Discriminant Analysis
                            Adjusted    Approximate        Squared
           Canonical      Canonical       Standard      Canonical
         Correlation    Correlation          Error    Correlation
       1    0.895289       0.892147       0.075010       0.801542
                                                    Test of H0: The canonical correlations
                  Eigenvalues of Inv(E)*H              current row and all that follow are
                    = CanRsq/(1-CanRsq)
                                                  Likelihood Approximate
         Eigenvalue Difference Proportion Cumulative      Ratio     F Value Num DF Den DF Pr
       1     4.0389               1.0000     1.0000 0.19845779       10.10      2      5 0.
NOTE: The F statistic is exact.

The DISCRIM Procedure
Canonical Discriminant Analysis
Total Canonical Structure
Variable              Can1
yield             0.572987
weight            0.495570

Between Canonical Structure
Variable              Can1
yield             1.000000
weight            1.000000
```

```
Pooled Within Canonical Structure
Variable              Can1
yield             0.297366
weight            0.246343

The DISCRIM Procedure
Canonical Discriminant Analysis
Total-Sample Standardized Canonical Coefficients
Variable              Can1
yield          1.997145424
weight         1.884468331

Pooled Within-Class Standardized Canonical Coefficients
Variable              Can1
yield          1.851698615
weight         1.824149648

Raw Canonical Coefficients
Variable              Can1
yield          0.766676064
weight         1.251356335

Class Means on Canonical Variables
fertilizer              Can1
high             1.740442790
low             -1.740442790

The DISCRIM Procedure
Linear Discriminant Function
                _     -1 _                                -1 _
Constant = -.5 X' COV   X      Coefficient Vector = COV   X
                j        j                                  j

Linear Discriminant Function for fertilizer
Variable          high           low
Constant    -943.76534    -798.70399
yield         33.60736      30.93865
weight        53.68098      49.32515

The DISCRIM Procedure
Classification Results for Calibration Data: WORK.MANOVA2
Resubstitution Results using Linear Discriminant Function
Generalized Squared Distance Function
 2         _       -1   _
D (X) = (X-X )' COV  (X-X )
```

```
 j          j            j
Posterior Probability of Membership in Each fertilizer
                   2                    2
Pr(j|X) = exp(-.5 D (X)) / SUM exp(-.5 D (X))
                   j        k           k
```

Posterior Probability of Membership in fertilizer

Obs	From fertilizer	Classified into fertilizer	high	low
1	low	low	0.0000	1.0000
2	low	low	0.0012	0.9988
3	low	low	0.0232	0.9768
4	low	low	0.0458	0.9542
5	high	high	0.9818	0.0182
6	high	high	0.9998	0.0002
7	high	high	0.9089	0.0911
8	high	high	0.9999	0.0001

```
The DISCRIM Procedure
Classification Summary for Calibration Data: WORK.MANOVA2
Resubstitution Summary using Linear Discriminant Function
Generalized Squared Distance Function
 2         _       -1   _
D (X) = (X-X )' COV  (X-X )
 j          j            j
Posterior Probability of Membership in Each fertilizer
                   2                    2
Pr(j|X) = exp(-.5 D (X)) / SUM exp(-.5 D (X))
                   j        k           k

Number of Observations and Percent Classified into fertilizer
From
fertilizer         high          low        Total
high                  4            0            4
                 100.00         0.00       100.00
low                   0            4            4
                   0.00       100.00       100.00
Total                 4            4            8
                  50.00        50.00       100.00
Priors              0.5          0.5

      Error Count Estimates for fertilizer
                    high         low       Total
Rate              0.0000      0.0000      0.0000
Priors            0.5000      0.5000
```

Obs	fertilizer	yield	weight	Can1	Can2	high	low	_INTO_
1	low	34	10	-3.09314	.	0.00002	0.99998	low
2	low	29	14	-1.92110	.	0.00125	0.99875	low
3	low	35	11	-1.07511	.	0.02315	0.97685	low
4	low	32	13	-0.87242	.	0.04579	0.95421	low
5	high	33	14	1.14561	.	0.98180	0.01820	high
6	high	38	12	2.47628	.	0.99982	0.00018	high
7	high	34	13	0.66093	.	0.90893	0.09107	high
8	high	35	14	2.67896	.	0.99991	0.00009	high