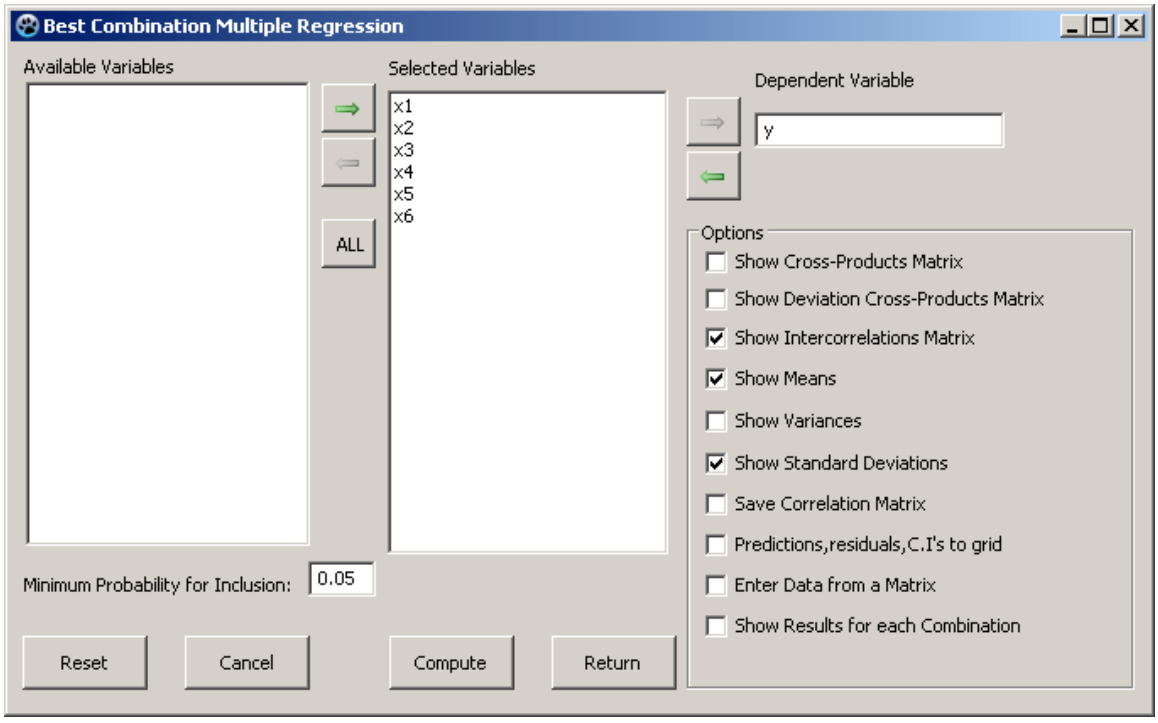
BEST COMBINATION MULTIPLE REGRESSION

This procedure was written to provide a researcher with the ability to explore the best combination of independent variables to predict a dependent variable. Each combination of variables is analyzed to identify the best set of predictors. To demonstrate, we will use the Longley.LAZ file which can pose a particularly challenging set of data for a multiple regression procedure. Below is the dialog for this procedure and the results of the analysis:




```
Best Combination Multiple Regression by Bill Miller

Variables entered in step  1
 2 x2

Squared Multiple Correlation = 0.9674
Dependent variable = y
ANOVA for Regression Effects :
SOURCE      df           SS           MS            F            Prob
Regression   1 178972685.8339 178972685.8339       415.1026         0.0000
Residual    14   6036140.1661    431152.8690
Total       15 185008826.0000

Variables in the equation
VARIABLE            b        s.e. b    Beta     t    prob. t
              x2    0.03475   0.0017   0.9836 20.374 0.0000
(Intercept)      51843.58978

Increase in squared R for this step = 0.967374
F = 415.1026 with D.F. 1 and 14 with Probability = 0.0000
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Variables entered in step  2
 3 x3
 6 x6

Squared Multiple Correlation = 0.9823
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Dependent variable = y
ANOVA for Regression Effects :
SOURCE      df           SS           MS            F            Prob
Regression   2 181736701.2969  90868350.6485       361.0158         0.0000
Residual    13   3272124.7031    251701.9002
Total       15 185008826.0000

Variables in the equation
VARIABLE            b        s.e. b    Beta    t    prob. t
             x3   -0.99553   0.1863  -0.2649 -5.343 0.0001
             x6  847.08874  36.5739   1.1483 23.161 0.0000
(Intercept)      -1587138.90777

Increase in squared R for this step = 0.014940
F =  10.9813 with D.F. 1 and 13 with Probability = 0.0056
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Variables entered in step  3
 3 x3
 4 x4
 6 x6

Squared Multiple Correlation = 0.9928
Dependent variable = y
ANOVA for Regression Effects :
SOURCE      df           SS           MS            F            Prob
Regression   3 183685465.2573  61228488.4191       555.2091         0.0000
Residual    12   1323360.7427    110280.0619
Total       15 185008826.0000

Variables in the equation
VARIABLE            b        s.e. b    Beta    t    prob. t
             x3   -1.46967   0.1671  -0.3910 -8.793 0.0000
             x4   -0.77228   0.1837  -0.1530 -4.204 0.0012
             x6  956.37980  35.5248   1.2965 26.921 0.0000
(Intercept)      -1797221.11220

Increase in squared R for this step = 0.010533
F =  17.6710 with D.F. 1 and 12 with Probability = 0.0012
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Variables entered in step  4
 2 x2
 3 x3
 4 x4
 6 x6

Squared Multiple Correlation = 0.9954
Dependent variable = y
ANOVA for Regression Effects :
SOURCE      df           SS           MS            F            Prob
Regression   4 184150145.5942  46037536.3985       589.7571         0.0000
Residual    11    858680.4058     78061.8551
Total       15 185008826.0000

Variables in the equation
VARIABLE            b        s.e. b    Beta    t    prob. t
             x2   -0.04019   0.0165  -1.1375 -2.440 0.0328
             x3   -2.08839   0.2900  -0.5557 -7.202 0.0000
             x4   -1.01464   0.1837  -0.2011 -5.522 0.0002
             x6 1887.40951 382.7665   2.5586  4.931 0.0004
(Intercept)      -3598729.37432

Increase in squared R for this step = 0.002512
F =   5.9527 with D.F. 1 and 11 with Probability = 0.0328
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Variables entered in step  5
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 2 x2
 3 x3
 4 x4
 5 x5
 6 x6

Squared Multiple Correlation = 0.9955
Dependent variable = y
ANOVA for Regression Effects :
SOURCE      df           SS           MS            F            Prob
Regression   5 184169477.9681  36833895.5936       438.8394         0.0000
Residual    10    839348.0319     83934.8032
Total       15 185008826.0000

Variables in the equation
VARIABLE            b        s.e. b    Beta    t    prob. t
              x2   -0.03196   0.0242  -0.9046 -1.321 0.2161
              x3   -1.97215   0.3861  -0.5247 -5.108 0.0005
              x4   -1.01997   0.1908  -0.2021 -5.345 0.0003
              x5   -0.07754   0.1616  -0.1536 -0.480 0.6416
              x6 1814.10136 425.2826   2.4593  4.266 0.0016
(Intercept)      -3449891.59970

Increase in squared R for this step = 0.000104
F =   0.2303 with D.F. 1 and 10 with Probability = 0.6416
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Last variable added failed entry test. Job ended.

Product-Moment Correlations Matrix with   16 cases.


Variables
                     x1           x2           x3           x4           x5
        x1        1.000        0.992        0.621        0.465        0.979
        x2        0.992        1.000        0.604        0.446        0.991
        x3        0.621        0.604        1.000       -0.177        0.687
        x4        0.465        0.446       -0.177        1.000        0.364
        x5        0.979        0.991        0.687        0.364        1.000
        x6        0.991        0.995        0.668        0.417        0.994
         y        0.971        0.984        0.502        0.457        0.960


Variables
                     x6           y
        x1        0.991        0.971
        x2        0.995        0.984
        x3        0.668        0.502
        x4        0.417        0.457
        x5        0.994        0.960
        x6        1.000        0.971
         y        0.971        1.000


Means with   16 valid cases.

Variables           x1           x2           x3           x4           x5
               101.681   387698.438     3193.313     2606.688   117424.000

Variables           x6            y
              1954.500    65317.000


Standard Deviations with   16 valid cases.

Variables           x1           x2           x3           x4           x5
                10.792    99394.938      934.464      695.920     6956.102

Variables           x6            y
                 4.761     3511.968
```