```
> #HW10:
> if (FALSE)
+ {"
+ Use the R program code below to generate all possible and stepwise selection procedures on the 6 predictors provided in the
lmod statement.
+ Submit the following output and summary into Canvas.
+ generated output (graphic output is not needed)
+ a short paragraph discussing the model you would choose
+ "}
> ##-----------------------------------------------------------------""
> library(faraway) #this command brings in a library of regression functions

Attaching package: 'faraway'

The following object is masked _by_ '.GlobalEnv':

    pima

> #install.packages("olsrr") #install olsrr if package has not been installed on your computer
> library(olsrr)
Registered S3 methods overwritten by 'car':
  method                          from
  influence.merMod                lme4
  cooks.distance.influence.merMod lme4
  dfbeta.influence.merMod         lme4
  dfbetas.influence.merMod        lme4
--- Please select a CRAN mirror for use in this session ---
Need help getting started with regression models? Visit: https://www.rsquaredacademy.com

Attaching package: 'olsrr'

The following object is masked from 'package:faraway':

    hsb

The following object is masked from 'package:datasets':

    rivers

>
> data(fat,package="faraway")
> #Can we predict body fat using only easy-to-record measurements?
> #use the variables specified in this model
> lmod <- lm(brozek ~ weight + neck + chest + abdom + hip + thigh, data=fat)
>
> ols_step_all_possible(lmod)
   Index N                       Predictors  R-Square Adj. R-Square Mallow's Cp
4      1 1                            abdom 0.6621178     0.6607663   60.268352
3      2 1                            chest 0.4940475     0.4920237  213.608032
5      3 1                              hip 0.3915004     0.3890664  307.167386
```

Measuring body fat is not so simple. Hydrostatic underwater weighing is a method of determining body composition (body fat to lean mass). Obtain a person's total body density by submerging the body underwater in a tank and measuring the displacement.

Considered the gold standard for body composition assessment. More sophisticated methods may make underwater weighing obsolete in the near future. n=252 men - Brozek's equation was applied to each man's hydrostatic underwater weighing results to accurately estimate their percentage of body fat.

maximize R2, R2(adj)

Want Cp ~ p

1	4	1	weight	0.3759604	0.3734643	321.345361
6	5	1	thigh	0.3150402	0.3123003	376.926242
2	6	1	neck	0.2415614	0.2385276	443.964947
9	7	2	weight abdom	0.7187265	0.7164672	10.621203
13	8	2	neck abdom	0.6966835	0.6942472	30.732228
19	9	2	abdom hip	0.6931164	0.6906515	33.986659
16	10	2	chest abdom	0.6732290	0.6706043	52.131001
20	11	2	abdom thigh	0.6715991	0.6689614	53.618018
12	12	2	neck chest	0.5034718	0.4994836	207.009796
17	13	2	chest hip	0.4998938	0.4958769	210.274172
18	14	2	chest thigh	0.4990351	0.4950113	211.057588
8	15	2	weight chest	0.4952243	0.4911698	214.534449
10	16	2	weight hip	0.3967085	0.3918627	304.415792
14	17	2	neck hip	0.3936755	0.3888054	307.182919
21	18	2	hip thigh	0.3915012	0.3866137	309.166640
11	19	2	weight thigh	0.3793032	0.3743177	320.295541
7	20	2	weight neck	0.3769908	0.3719867	322.405277
15	21	2	neck thigh	0.3348112	0.3294684	360.887997
30	22	3	weight abdom thigh	0.7236399	0.7202969	8.138374
23	23	3	weight neck abdom	0.7235932	0.7202496	8.180981
26	24	3	weight chest abdom	0.7187280	0.7153255	12.619776
29	25	3	weight abdom hip	0.7187273	0.7153248	12.620394
35	26	3	neck abdom hip	0.7151147	0.7116686	15.916358
38	27	3	chest abdom hip	0.6995469	0.6959124	30.119738
36	28	3	neck abdom thigh	0.6989308	0.6952888	30.681843
32	29	3	neck chest abdom	0.6984257	0.6947777	31.142662
41	30	3	abdom hip thigh	0.6950646	0.6913759	34.209166
39	31	3	chest abdom thigh	0.6807157	0.6768533	47.300527
27	32	3	weight chest hip	0.5247033	0.5189538	189.639085
34	33	3	neck chest thigh	0.5141260	0.5082485	199.289379
33	34	3	neck chest hip	0.5141009	0.5082231	199.312263
28	35	3	weight chest thigh	0.5131574	0.5072682	200.173050
22	36	3	weight neck chest	0.5036208	0.4976162	208.873835
40	37	3	chest hip thigh	0.5002576	0.4942123	211.942290
31	38	3	weight hip thigh	0.3968386	0.3895423	306.297052
24	39	3	weight neck hip	0.3967218	0.3894240	306.403650
37	40	3	neck hip thigh	0.3936991	0.3863648	309.161422
25	41	3	weight neck thigh	0.3800204	0.3725206	321.641245
46	42	4	weight neck abdom thigh	0.7276750	0.7232649	6.456915
51	43	4	weight abdom hip thigh	0.7252947	0.7208460	8.628625
45	44	4	weight neck abdom hip	0.7240225	0.7195532	9.789331
49	45	4	weight chest abdom thigh	0.7239150	0.7194440	9.887432
42	46	4	weight neck chest abdom	0.7236976	0.7192230	10.085775
55	47	4	neck abdom hip thigh	0.7198238	0.7152865	13.620048
48	48	4	weight chest abdom hip	0.7187299	0.7141749	14.618089
52	49	4	neck chest abdom hip	0.7161606	0.7115640	16.962154
56	50	4	chest abdom hip thigh	0.7014961	0.6966620	30.341381
53	51	4	neck chest abdom thigh	0.7006379	0.6957900	31.124354
50	52	4	weight chest hip thigh	0.5284036	0.5207664	188.263140
43	53	4	weight neck chest hip	0.5274308	0.5197778	189.150708

6!/((2!)(4!))
=6*5/(2*1) = 15

Step 2 for backward - eliminate hip?

```
44     54 4            weight neck chest thigh 0.5201578     0.5123871  195.786192
54     55 4               neck chest hip thigh 0.5156677     0.5078242  199.882797
47     56 4              weight neck hip thigh 0.3968542     0.3870867  308.282818
60     57 5         weight neck abdom hip thigh 0.7311966     0.7257331    5.243999
58     58 5       weight neck chest abdom thigh 0.7283531     0.7228318    7.838290
61     59 5        weight chest abdom hip thigh 0.7253709     0.7197890   10.559131
57     60 5         weight neck chest abdom hip 0.7240481     0.7184394   11.765933
62     61 5          neck chest abdom hip thigh 0.7206337     0.7149556   14.881093
59     62 5         weight neck chest hip thigh 0.5315287     0.5220069  187.411972
63     63 6 weight neck chest abdom hip thigh 0.7314640     0.7248877    7.000000
> ols_step_forward_p(lmod,details=TRUE)
Forward Selection Method
---------------------------

Candidate Terms:

1. weight
2. neck
3. chest
4. abdom
5. hip
6. thigh

We are selecting variables based on p value...


Forward Selection: Step 1

+ abdom

                        Model Summary
-----------------------------------------------------------------
R                       0.814       RMSE                 4.514
R-Squared               0.662       Coef. Var           23.837
Adj. R-Squared          0.661       MSE                 20.380
Pred R-Squared          0.652       MAE                  3.631
-----------------------------------------------------------------
 RMSE: Root Mean Square Error
 MSE: Mean Square Error
 MAE: Mean Absolute Error

                                ANOVA
--------------------------------------------------------------------------
                Sum of
               Squares         DF    Mean Square       F          Sig.
--------------------------------------------------------------------------
Regression     9984.086          1       9984.086    489.903    0.0000
Residual       5094.931        250         20.380
Total         15079.017        251
--------------------------------------------------------------------------
```

Step 1 for backward - eliminate chest

Parameter Estimates

model	Beta	Std. Error	Std. Beta	t	Sig	lower	upper
(Intercept)	-35.197	2.462		-14.294	0.000	-40.046	-30.347
abdom	0.585	0.026	0.814	22.134	0.000	0.533	0.637

Forward Selection: Step 2

+ weight

Model Summary

R	0.848	RMSE	4.127
R-Squared	0.719	Coef. Var	21.792
Adj. R-Squared	0.716	MSE	17.033
Pred R-Squared	0.709	MAE	3.344

RMSE: Root Mean Square Error
MSE: Mean Square Error
MAE: Mean Absolute Error

ANOVA

	Sum of Squares	DF	Mean Square	F	Sig.
Regression	10837.688	2	5418.844	318.13	0.0000
Residual	4241.328	249	17.033		
Total	15079.017	251			

Parameter Estimates

model	Beta	Std. Error	Std. Beta	t	Sig	lower	upper
(Intercept)	-41.348	2.413		-17.136	0.000	-46.101	-36.596
abdom	0.915	0.053	1.273	17.419	0.000	0.812	1.019
weight	-0.136	0.019	-0.517	-7.079	0.000	-0.174	-0.098

Forward Selection: Step 3

+ thigh

Model Summary

R	0.851	RMSE	4.099
R-Squared	0.724	Coef. Var	21.645
Adj. R-Squared	0.720	MSE	16.803
Pred R-Squared	0.712	MAE	3.327

RMSE: Root Mean Square Error
MSE: Mean Square Error
MAE: Mean Absolute Error

ANOVA

	Sum of Squares	DF	Mean Square	F	Sig.
Regression	10911.778	3	3637.259	216.46	0.0000
Residual	4167.238	248	16.803		
Total	15079.017	251			

Parameter Estimates

model	Beta	Std. Error	Std. Beta	t	Sig	lower	upper
(Intercept)	-48.039	3.987		-12.049	0.000	-55.891	-40.186
abdom	0.917	0.052	1.276	17.578	0.000	0.815	1.020
weight	-0.170	0.025	-0.643	-6.834	0.000	-0.219	-0.121
thigh	0.209	0.100	0.142	2.100	0.037	0.013	0.405

Forward Selection: Step 4

+ neck

Model Summary

R	0.853	RMSE	4.077
R-Squared	0.728	Coef. Var	21.530
Adj. R-Squared	0.723	MSE	16.625
Pred R-Squared	0.715	MAE	3.289

RMSE: Root Mean Square Error
MSE: Mean Square Error
MAE: Mean Absolute Error

ANOVA

	Sum of Squares	DF	Mean Square	F	Sig.
Regression	10972.624	4	2743.156	165.001	0.0000
Residual	4106.393	247	16.625		
Total	15079.017	251			

Parameter Estimates

model	Beta	Std. Error	Std. Beta	t	Sig	lower	upper
(Intercept)	-38.283	6.460		-5.926	0.000	-51.006	-25.559
abdom	0.924	0.052	1.285	17.757	0.000	0.821	1.026
weight	-0.144	0.028	-0.545	-5.106	0.000	-0.199	-0.088
thigh	0.191	0.099	0.130	1.924	0.055	-0.005	0.387
neck	-0.366	0.191	-0.115	-1.913	0.057	-0.743	0.011

Forward Selection: Step 5

+ hip

Model Summary

R	0.855	RMSE	4.059
R-Squared	0.731	Coef. Var	21.433
Adj. R-Squared	0.726	MSE	16.477
Pred R-Squared	0.716	MAE	3.274

RMSE: Root Mean Square Error
MSE: Mean Square Error
MAE: Mean Absolute Error

ANOVA

	Sum of Squares	DF	Mean Square	F	Sig.
Regression	11025.726	5	2205.145	133.833	0.0000
Residual	4053.291	246	16.477		
Total	15079.017	251			

Parameter Estimates

model	Beta	Std. Error	Std. Beta	t	Sig	lower	upper

(Intercept)	-26.393	9.232		-2.859	0.005	-44.576	-8.210
abdom	0.955	0.055	1.328	17.492	0.000	0.847	1.062
weight	-0.109	0.034	-0.415	-3.226	0.001	-0.176	-0.043
thigh	0.290	0.113	0.197	2.562	0.011	0.067	0.514
neck	-0.459	0.197	-0.144	-2.324	0.021	-0.848	-0.070
hip	-0.233	0.130	-0.215	-1.795	0.074	-0.488	0.023

No more variables to be added.

Variables Entered:

+ abdom
+ weight
+ thigh
+ neck
+ hip

Final Model Output

Model Summary

R	0.855	RMSE	4.059
R-Squared	0.731	Coef. Var	21.433
Adj. R-Squared	0.726	MSE	16.477
Pred R-Squared	0.716	MAE	3.274

RMSE: Root Mean Square Error
MSE: Mean Square Error
MAE: Mean Absolute Error

ANOVA

	Sum of Squares	DF	Mean Square	F	Sig.
Regression	11025.726	5	2205.145	133.833	0.0000
Residual	4053.291	246	16.477		
Total	15079.017	251			

Parameter Estimates

model	Beta	Std. Error	Std. Beta	t	Sig	lower	upper

```
(Intercept)    -26.393          9.232                -2.859    0.005    -44.576    -8.210
      abdom      0.955          0.055         1.328  17.492    0.000      0.847     1.062
     weight     -0.109          0.034        -0.415  -3.226    0.001     -0.176    -0.043
      thigh      0.290          0.113         0.197   2.562    0.011      0.067     0.514
       neck     -0.459          0.197        -0.144  -2.324    0.021     -0.848    -0.070
        hip     -0.233          0.130        -0.215  -1.795    0.074     -0.488     0.023
----------------------------------------------------------------------------------------

                            Selection Summary
-------------------------------------------------------------------------
        Variable                    Adj.
Step    Entered      R-Square     R-Square      C(p)          AIC         RMSE
-------------------------------------------------------------------------
   1    abdom          0.6621       0.6608    60.2684    1478.8012    4.5144
   2    weight         0.7187       0.7165    10.6212    1434.5921    4.1272
   3    thigh          0.7236       0.7203     8.1384    1432.1511    4.0992
   4    neck           0.7277       0.7233     6.4569    1430.4445    4.0774
   5    hip            0.7312       0.7257     5.2440    1429.1646    4.0592
-------------------------------------------------------------------------
> ols_step_backward_p(lmod,details=TRUE)
Backward Elimination Method
---------------------------

Candidate Terms:

1 . weight
2 . neck
3 . chest
4 . abdom
5 . hip
6 . thigh

We are eliminating variables based on p value...

x chest

Backward Elimination: Step 1

 Variable chest Removed

                       Model Summary
---------------------------------------------------------------
R                       0.855       RMSE                 4.059
R-Squared               0.731       Coef. Var           21.433
Adj. R-Squared          0.726       MSE                 16.477
Pred R-Squared          0.716       MAE                  3.274
---------------------------------------------------------------
 RMSE: Root Mean Square Error
 MSE: Mean Square Error
 MAE: Mean Absolute Error
```

abdom > weight > thigh > neck > hip

ANOVA

	Sum of Squares	DF	Mean Square	F	Sig.
Regression	11025.726	5	2205.145	133.833	0.0000
Residual	4053.291	246	16.477		
Total	15079.017	251			

Parameter Estimates

model	Beta	Std. Error	Std. Beta	t	Sig	lower	upper
(Intercept)	-26.393	9.232		-2.859	0.005	-44.576	-8.210
weight	-0.109	0.034	-0.415	-3.226	0.001	-0.176	-0.043
neck	-0.459	0.197	-0.144	-2.324	0.021	-0.848	-0.070
abdom	0.955	0.055	1.328	17.492	0.000	0.847	1.062
hip	-0.233	0.130	-0.215	-1.795	0.074	-0.488	0.023
thigh	0.290	0.113	0.197	2.562	0.011	0.067	0.514

No more variables satisfy the condition of p value = 0.3

Variables Removed:

x chest

Final Model Output

Model Summary

R	0.855	RMSE	4.059
R-Squared	0.731	Coef. Var	21.433
Adj. R-Squared	0.726	MSE	16.477
Pred R-Squared	0.716	MAE	3.274

RMSE: Root Mean Square Error
MSE: Mean Square Error
MAE: Mean Absolute Error

ANOVA

	Sum of

```
                Squares          DF    Mean Square       F          Sig.
-----------------------------------------------------------------------
Regression    11025.726           5       2205.145    133.833    0.0000
Residual       4053.291         246         16.477
Total         15079.017         251
-----------------------------------------------------------------------

                                    Parameter Estimates
-----------------------------------------------------------------------------------------------
      model        Beta     Std. Error    Std. Beta      t        Sig       lower     upper
-----------------------------------------------------------------------------------------------
(Intercept)    -26.393          9.232                  -2.859    0.005    -44.576    -8.210
     weight     -0.109          0.034       -0.415     -3.226    0.001     -0.176    -0.043
       neck     -0.459          0.197       -0.144     -2.324    0.021     -0.848    -0.070
      abdom      0.955          0.055        1.328     17.492    0.000      0.847     1.062
        hip     -0.233          0.130       -0.215     -1.795    0.074     -0.488     0.023
      thigh      0.290          0.113        0.197      2.562    0.011      0.067     0.514
-----------------------------------------------------------------------------------------------


                            Elimination Summary
-------------------------------------------------------------------------
        Variable                 Adj.
Step    Removed     R-Square    R-Square     C(p)        AIC         RMSE
-------------------------------------------------------------------------
   1    chest         0.7312      0.7257    5.2440    1429.1646    4.0592
-------------------------------------------------------------------------
> ols_step_both_p(lmod,details=TRUE)
Stepwise Selection Method
---------------------------

Candidate Terms:

1. weight
2. neck
3. chest
4. abdom
5. hip
6. thigh

We are selecting variables based on p value...


Stepwise Selection: Step 1

+ abdom

                         Model Summary
-------------------------------------------------------------
R                       0.814       RMSE                 4.514
```

R-Squared	0.662	Coef. Var	23.837
Adj. R-Squared	0.661	MSE	20.380
Pred R-Squared	0.652	MAE	3.631

RMSE: Root Mean Square Error
MSE: Mean Square Error
MAE: Mean Absolute Error

ANOVA

	Sum of Squares	DF	Mean Square	F	Sig.
Regression	9984.086	1	9984.086	489.903	0.0000
Residual	5094.931	250	20.380		
Total	15079.017	251			

Parameter Estimates

model	Beta	Std. Error	Std. Beta	t	Sig	lower	upper
(Intercept)	-35.197	2.462		-14.294	0.000	-40.046	-30.347
abdom	0.585	0.026	0.814	22.134	0.000	0.533	0.637

Stepwise Selection: Step 2

+ weight

Model Summary

R	0.848	RMSE	4.127
R-Squared	0.719	Coef. Var	21.792
Adj. R-Squared	0.716	MSE	17.033
Pred R-Squared	0.709	MAE	3.344

RMSE: Root Mean Square Error
MSE: Mean Square Error
MAE: Mean Absolute Error

ANOVA

	Sum of Squares	DF	Mean Square	F	Sig.
Regression	10837.688	2	5418.844	318.13	0.0000
Residual	4241.328	249	17.033		

Total	15079.017	251

Parameter Estimates

model	Beta	Std. Error	Std. Beta	t	Sig	lower	upper
(Intercept)	-41.348	2.413		-17.136	0.000	-46.101	-36.596
abdom	0.915	0.053	1.273	17.419	0.000	0.812	1.019
weight	-0.136	0.019	-0.517	-7.079	0.000	-0.174	-0.098

Model Summary

R	0.848	RMSE	4.127
R-Squared	0.719	Coef. Var	21.792
Adj. R-Squared	0.716	MSE	17.033
Pred R-Squared	0.709	MAE	3.344

RMSE: Root Mean Square Error
MSE: Mean Square Error
MAE: Mean Absolute Error

ANOVA

	Sum of Squares	DF	Mean Square	F	Sig.
Regression	10837.688	2	5418.844	318.13	0.0000
Residual	4241.328	249	17.033		
Total	15079.017	251			

Parameter Estimates

model	Beta	Std. Error	Std. Beta	t	Sig	lower	upper
(Intercept)	-41.348	2.413		-17.136	0.000	-46.101	-36.596
abdom	0.915	0.053	1.273	17.419	0.000	0.812	1.019
weight	-0.136	0.019	-0.517	-7.079	0.000	-0.174	-0.098

Stepwise Selection: Step 3

\+ thigh

Model Summary

R	0.851	RMSE	4.099
R-Squared	0.724	Coef. Var	21.645
Adj. R-Squared	0.720	MSE	16.803
Pred R-Squared	0.712	MAE	3.327

RMSE: Root Mean Square Error
MSE: Mean Square Error
MAE: Mean Absolute Error

ANOVA

	Sum of Squares	DF	Mean Square	F	Sig.
Regression	10911.778	3	3637.259	216.46	0.0000
Residual	4167.238	248	16.803		
Total	15079.017	251			

Parameter Estimates

model	Beta	Std. Error	Std. Beta	t	Sig	lower	upper
(Intercept)	-48.039	3.987		-12.049	0.000	-55.891	-40.186
abdom	0.917	0.052	1.276	17.578	0.000	0.815	1.020
weight	-0.170	0.025	-0.643	-6.834	0.000	-0.219	-0.121
thigh	0.209	0.100	0.142	2.100	0.037	0.013	0.405

Model Summary

R	0.851	RMSE	4.099
R-Squared	0.724	Coef. Var	21.645
Adj. R-Squared	0.720	MSE	16.803
Pred R-Squared	0.712	MAE	3.327

RMSE: Root Mean Square Error
MSE: Mean Square Error
MAE: Mean Absolute Error

ANOVA

	Sum of Squares	DF	Mean Square	F	Sig.
Regression	10911.778	3	3637.259	216.46	0.0000

Residual	4167.238	248	16.803				
Total	15079.017	251					

Parameter Estimates

model	Beta	Std. Error	Std. Beta	t	Sig	lower	upper
(Intercept)	-48.039	3.987		-12.049	0.000	-55.891	-40.186
abdom	0.917	0.052	1.276	17.578	0.000	0.815	1.020
weight	-0.170	0.025	-0.643	-6.834	0.000	-0.219	-0.121
thigh	0.209	0.100	0.142	2.100	0.037	0.013	0.405

Stepwise Selection: Step 4

\+ neck

Model Summary

R	0.853	RMSE	4.077
R-Squared	0.728	Coef. Var	21.530
Adj. R-Squared	0.723	MSE	16.625
Pred R-Squared	0.715	MAE	3.289

RMSE: Root Mean Square Error
MSE: Mean Square Error
MAE: Mean Absolute Error

ANOVA

	Sum of Squares	DF	Mean Square	F	Sig.
Regression	10972.624	4	2743.156	165.001	0.0000
Residual	4106.393	247	16.625		
Total	15079.017	251			

Parameter Estimates

model	Beta	Std. Error	Std. Beta	t	Sig	lower	upper
(Intercept)	-38.283	6.460		-5.926	0.000	-51.006	-25.559
abdom	0.924	0.052	1.285	17.757	0.000	0.821	1.026
weight	-0.144	0.028	-0.545	-5.106	0.000	-0.199	-0.088
thigh	0.191	0.099	0.130	1.924	0.055	-0.005	0.387
neck	-0.366	0.191	-0.115	-1.913	0.057	-0.743	0.011

Model Summary

R	0.853	RMSE	4.077
R-Squared	0.728	Coef. Var	21.530
Adj. R-Squared	0.723	MSE	16.625
Pred R-Squared	0.715	MAE	3.289

RMSE: Root Mean Square Error
MSE: Mean Square Error
MAE: Mean Absolute Error

ANOVA

	Sum of Squares	DF	Mean Square	F	Sig.
Regression	10972.624	4	2743.156	165.001	0.0000
Residual	4106.393	247	16.625		
Total	15079.017	251			

Parameter Estimates

model	Beta	Std. Error	Std. Beta	t	Sig	lower	upper
(Intercept)	-38.283	6.460		-5.926	0.000	-51.006	-25.559
abdom	0.924	0.052	1.285	17.757	0.000	0.821	1.026
weight	-0.144	0.028	-0.545	-5.106	0.000	-0.199	-0.088
thigh	0.191	0.099	0.130	1.924	0.055	-0.005	0.387
neck	-0.366	0.191	-0.115	-1.913	0.057	-0.743	0.011

Stepwise Selection: Step 5

+ hip

Model Summary

R	0.855	RMSE	4.059
R-Squared	0.731	Coef. Var	21.433
Adj. R-Squared	0.726	MSE	16.477
Pred R-Squared	0.716	MAE	3.274

RMSE: Root Mean Square Error

MSE: Mean Square Error
MAE: Mean Absolute Error

ANOVA

	Sum of Squares	DF	Mean Square	F	Sig.
Regression	11025.726	5	2205.145	133.833	0.0000
Residual	4053.291	246	16.477		
Total	15079.017	251			

Parameter Estimates

model	Beta	Std. Error	Std. Beta	t	Sig	lower	upper
(Intercept)	-26.393	9.232		-2.859	0.005	-44.576	-8.210
abdom	0.955	0.055	1.328	17.492	0.000	0.847	1.062
weight	-0.109	0.034	-0.415	-3.226	0.001	-0.176	-0.043
thigh	0.290	0.113	0.197	2.562	0.011	0.067	0.514
neck	-0.459	0.197	-0.144	-2.324	0.021	-0.848	-0.070
hip	-0.233	0.130	-0.215	-1.795	0.074	-0.488	0.023

Model Summary

R	0.855	RMSE	4.059
R-Squared	0.731	Coef. Var	21.433
Adj. R-Squared	0.726	MSE	16.477
Pred R-Squared	0.716	MAE	3.274

RMSE: Root Mean Square Error
MSE: Mean Square Error
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ANOVA

	Sum of Squares	DF	Mean Square	F	Sig.
Regression	11025.726	5	2205.145	133.833	0.0000
Residual	4053.291	246	16.477		
Total	15079.017	251			

Parameter Estimates

model	Beta	Std. Error	Std. Beta	t	Sig	lower	upper
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neck	-0.459	0.197	-0.144	-2.324	0.021	-0.848	-0.070
hip	-0.233	0.130	-0.215	-1.795	0.074	-0.488	0.023

No more variables to be added/removed.

Final Model Output

Model Summary

R	0.855	RMSE	4.059
R-Squared	0.731	Coef. Var	21.433
Adj. R-Squared	0.726	MSE	16.477
Pred R-Squared	0.716	MAE	3.274

RMSE: Root Mean Square Error
MSE: Mean Square Error
MAE: Mean Absolute Error

ANOVA

	Sum of Squares	DF	Mean Square	F	Sig.
Regression	11025.726	5	2205.145	133.833	0.0000
Residual	4053.291	246	16.477		
Total	15079.017	251			

Parameter Estimates

model	Beta	Std. Error	Std. Beta	t	Sig	lower	upper
(Intercept)	-26.393	9.232		-2.859	0.005	-44.576	-8.210
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neck	-0.459	0.197	-0.144	-2.324	0.021	-0.848	-0.070
hip	-0.233	0.130	-0.215	-1.795	0.074	-0.488	0.023

Stepwise Selection Summary

Step	Variable	Added/ Removed	R-Square	Adj. R-Square	C(p)	AIC	RMSE
1	abdom	addition	0.662	0.661	60.2680	1478.8012	4.5144
2	weight	addition	0.719	0.716	10.6210	1434.5921	4.1272
3	thigh	addition	0.724	0.720	8.1380	1432.1511	4.0992
4	neck	addition	0.728	0.723	6.4570	1430.4445	4.0774
5	hip	addition	0.731	0.726	5.2440	1429.1646	4.0592

```
> ##------------------------------------------------------------------------##
>
```

abdom > weight > thigh > neck > hip

Follows the path of forward stepwise since no variables eliminated after entering