

# Michael\_Ghattas\_WP4

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## Data Set

```
attach(Cars93)
Cars93 = na.omit(Cars93)

model1B = lm(Price ~ Horsepower + Fuel.tank.capacity + Weight + EngineSize + Length + Rev.per.mile + Ai
full.model = model1B
price.null <- as.formula("Price ~ 1")

backward.model <- step(full.model, scope = price.null, direction = "backward", trace = 1)

## Start:  AIC=330.17
## Price ~ Horsepower + Fuel.tank.capacity + Weight + EngineSize +
##      Length + Rev.per.mile + AirBags + Man.trans.avail
##
##           Df Sum of Sq    RSS    AIC
## - Length      1      0.60 2612.3 328.19
## - EngineSize   1      2.50 2614.2 328.26
## - Weight       1     11.37 2623.1 328.57
## - Fuel.tank.capacity 1     11.66 2623.4 328.58
## - Man.trans.avail 1     19.79 2631.5 328.87
## <none>                2611.7 330.17
## - Rev.per.mile     1    132.82 2744.5 332.78
## - AirBags          2     374.99 2986.7 338.65
## - Horsepower       1   1053.55 3665.3 359.69
##
## Step:  AIC=328.19
## Price ~ Horsepower + Fuel.tank.capacity + Weight + EngineSize +
##      Rev.per.mile + AirBags + Man.trans.avail
##
##           Df Sum of Sq    RSS    AIC
## - EngineSize      1      2.08 2614.4 326.27
## - Weight          1     10.85 2623.2 326.58
## - Fuel.tank.capacity 1     11.64 2624.0 326.61
## - Man.trans.avail  1     19.22 2631.5 326.87
## <none>                2612.3 328.19
## - Rev.per.mile     1    134.14 2746.5 330.85
## - AirBags          2     391.07 3003.4 337.17
## - Horsepower       1   1119.86 3732.2 359.37
##
```

```
## Step: AIC=326.27
## Price ~ Horsepower + Fuel.tank.capacity + Weight + Rev.per.mile +
##   AirBags + Man.trans.avail
##
##           Df Sum of Sq    RSS    AIC
## - Fuel.tank.capacity  1      12.95 2627.4 324.73
## - Weight              1      13.09 2627.5 324.73
## - Man.trans.avail     1      23.78 2638.2 325.11
## <none>                2614.4 326.27
## - Rev.per.mile        1     158.19 2772.6 329.73
## - AirBags             2      394.27 3008.7 335.33
## - Horsepower          1    1246.54 3860.9 360.52
##
## Step: AIC=324.73
## Price ~ Horsepower + Weight + Rev.per.mile + AirBags + Man.trans.avail
##
##           Df Sum of Sq    RSS    AIC
## - Man.trans.avail     1      20.27 2647.6 323.44
## <none>                2627.4 324.73
## - Weight              1      93.91 2721.3 325.99
## - Rev.per.mile        1     175.05 2802.4 328.72
## - AirBags             2      381.70 3009.1 333.34
## - Horsepower          1    1368.18 3995.5 361.71
##
## Step: AIC=323.44
## Price ~ Horsepower + Weight + Rev.per.mile + AirBags
##
##           Df Sum of Sq    RSS    AIC
## <none>                2647.6 323.44
## - Weight              1     153.76 2801.4 326.69
## - Rev.per.mile        1     154.87 2802.5 326.73
## - AirBags             2      375.31 3022.9 331.77
## - Horsepower          1    1361.86 4009.5 360.04
```

```
summary(backward.model)
```

```
##
## Call:
## lm(formula = Price ~ Horsepower + Weight + Rev.per.mile + AirBags)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -14.3954  -2.6804  -0.3608   1.5608  29.0967
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)  -14.379941    8.274187  -1.738  0.08576 .
## Horsepower      0.114340    0.017092   6.690 2.07e-09 ***
## Weight         0.003882    0.001727   2.248  0.02712 *
## Rev.per.mile    0.003914    0.001735   2.256  0.02659 *
## AirBagsDriver only -2.793539    1.672564  -1.670  0.09847 .
## AirBagsNone     -6.345148    1.890520  -3.356  0.00117 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
##  
## Residual standard error: 5.517 on 87 degrees of freedom  
## Multiple R-squared:  0.6916, Adjusted R-squared:  0.6738  
## F-statistic: 39.01 on 5 and 87 DF,  p-value: < 2.2e-16
```