Tufte Handout

Toyota cars predicted value in R Markdown

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install.packages(knitr) library(knitr)

Calculating with R

Before we start we will load necessary libraries

```
library(knitr)
library(leaps)#Exhaustive search for the best of variables in x for predicting y
library(e1071)#skewness and kurotosis
library(moments)
```

```
##
## Attaching package: 'moments'
```

```
## The following objects are masked from 'package:e1071':
##
##     kurtosis, moment, skewness
```

```
library(broom)
library(dplyr)
```

```
##
## Attaching package: 'dplyr'
```

```
## The following objects are masked from 'package:stats':
##
##     filter, lag
```

```
## The following objects are masked from 'package:base':
##
##     intersect, setdiff, setequal, union
```

```
library(plyr)
```

```
## Warning: package 'plyr' was built under R version 3.3.2
```

```
## ------------------------------------------------------------------------------
```

```
## You have loaded plyr after dplyr - this is likely to cause problems.
## If you need functions from both plyr and dplyr, please load plyr first, then dplyr:
## library(plyr); library(dplyr)
```

```
## ------------------------------------------------------------------------------
```

```
##
## Attaching package: 'plyr'
```

```
## The following objects are masked from 'package:dplyr':
##
##     arrange, count, desc, failwith, id, mutate, rename, summarise,
##     summarize
```

```
library(ISLR)
```

```
## Warning: package 'ISLR' was built under R version 3.3.2
```

```
library(plm)
```

```
## Warning: package 'plm' was built under R version 3.3.2
```

```
## Loading required package: Formula
```

```
##
## Attaching package: 'plm'
```

```
## The following object is masked from 'package:dplyr':
##
##     between
```

```
library(lattice)
library(ggplot2)
```

To run the analysis , we need to load the data in to R

```
#Read Data
Toyotacor <- read.csv("ToyotaCorolla.csv")
attach(Toyotacor)
summary(Toyotacor)
```

```
##      Price            Age              KM            FuelType
##  Min.   : 4350   Min.   : 1.00   Min.   :     1   Min.   :0.0000
##  1st Qu.: 8450   1st Qu.:44.00   1st Qu.: 43000   1st Qu.:1.0000
##  Median : 9900   Median :61.00   Median : 63390   Median :1.0000
##  Mean   :10731   Mean   :55.95   Mean   : 68533   Mean   :0.9039
##  3rd Qu.:11950   3rd Qu.:70.00   3rd Qu.: 87021   3rd Qu.:1.0000
##  Max.   :32500   Max.   :80.00   Max.   :243000   Max.   :2.0000
##        HP           MetColor        Automatic             CC
##  Min.   : 69.0   Min.   :0.0000   Min.   :0.00000   Min.   :1300
##  1st Qu.: 90.0   1st Qu.:0.0000   1st Qu.:0.00000   1st Qu.:1400
##  Median :110.0   Median :1.0000   Median :0.00000   Median :1600
##  Mean   :101.5   Mean   :0.6748   Mean   :0.05571   Mean   :1567
##  3rd Qu.:110.0   3rd Qu.:1.0000   3rd Qu.:0.00000   3rd Qu.:1600
##  Max.   :192.0   Max.   :1.0000   Max.   :1.00000   Max.   :2000
##      Doors           Weight
##  Min.   :2.000   Min.   :1000
##  1st Qu.:3.000   1st Qu.:1040
##  Median :4.000   Median :1070
##  Mean   :4.033   Mean   :1072
##  3rd Qu.:5.000   3rd Qu.:1085
##  Max.   :5.000   Max.   :1615
```

Familiarize yourself with th data

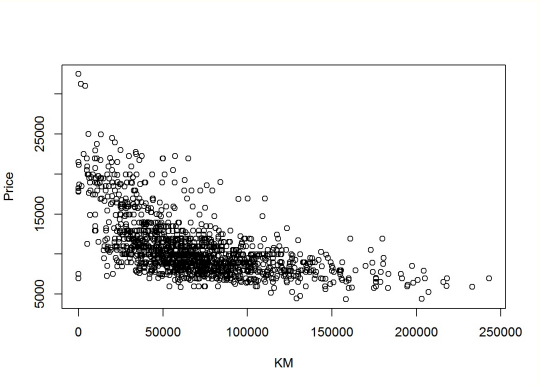
```
# Variable definition
# MPG - Miles per galon
# GPM - Galons per miles
# WT - Weight
# DIS - Dicplacement
# NC - Number of cylinders
# HP - Horsepower
# ACC - acceleration (0-60mph) in seconds
```

```
# ET - V-type engine (0) or straight (1)
```

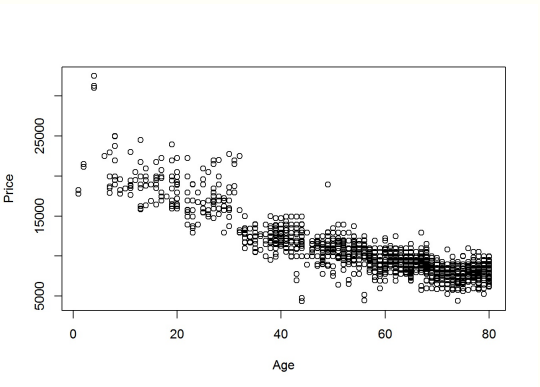
```
head(Toyotacor)
```

```
##   Price Age    KM FuelType HP MetColor Automatic   CC Doors Weight
## 1 13500  23 46986        0 90        1         0 2000     3   1165
## 2 13750  23 72937        0 90        1         0 2000     3   1165
## 3 13950  24 41711        0 90        1         0 2000     3   1165
## 4 14950  26 48000        0 90        0         0 2000     3   1165
## 5 13750  30 38500        0 90        0         0 2000     3   1170
## 6 12950  32 61000        0 90        0         0 2000     3   1170
```

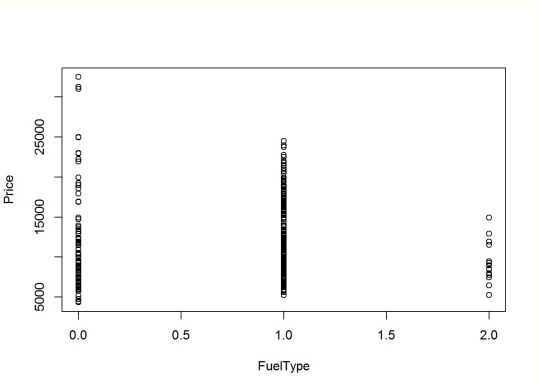
```
 # Become familiar with the data
plot(Price ~ KM, data = Toyotacor)
```



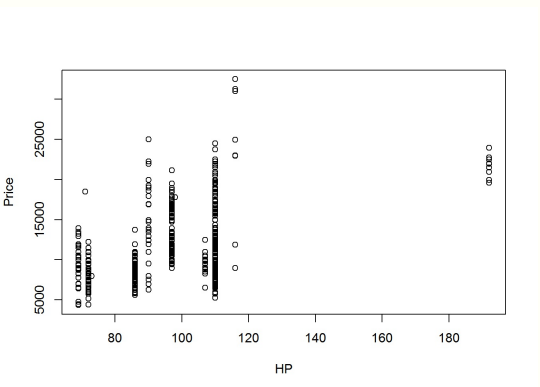

```
plot(Price ~ Age, data = Toyotacor)
```



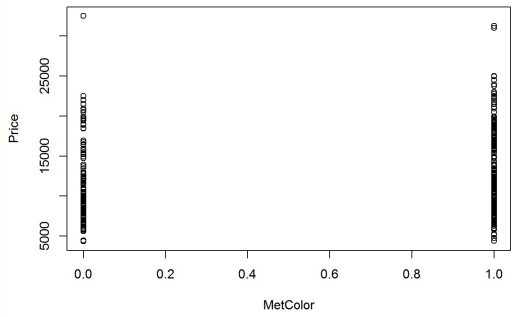

```
plot(Price ~ FuelType, data = Toyotacor)
```



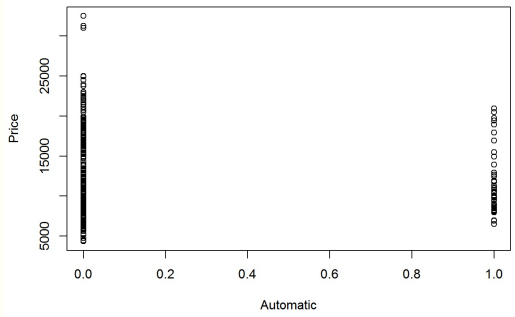

```
plot(Price ~ HP, data = Toyotacor)
```



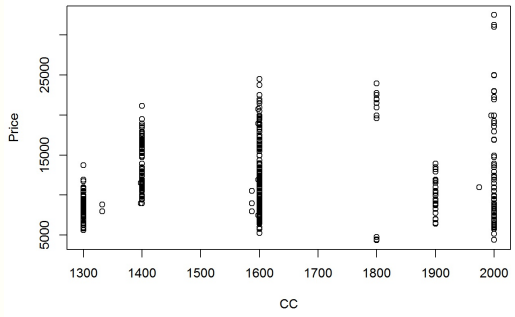

```
plot(Price ~ MetColor, data = Toyotacor)
```



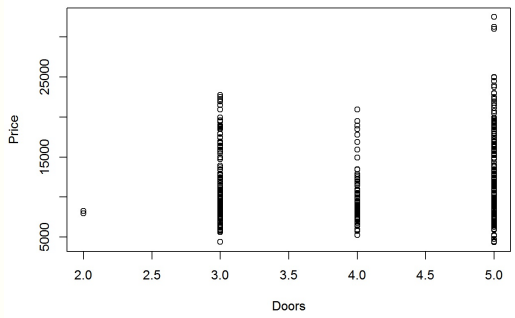

```
plot(Price ~ Automatic, data = Toyotacor)
```



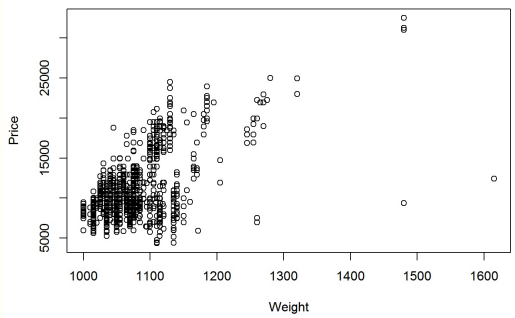

```
plot(Price ~ CC, data = Toyotacor)
```




```
plot(Price ~ Doors, data = Toyotacor)
```




```
plot(Price ~ Weight, data = Toyotacor)
```



###

Prepare for analysis

Descriptive statistics are statistics that quantitatively describe or summarise features of a collection of information

Linear Regression

Linear regression models are probably the most common used technique in data and buisiness analytics. They can be very powerful but one has to remember their limitations and constrains. The most important limitation is, that they should only be used to predict values within the range of the test data set. Here are are predicting the values for Toyota Coralla.

```
# show results of first Analysis
Toyotacor.m1 <- lm(Price ~ ., data = Toyotacor)
summary(Toyotacor.m1) # Show results of the first model
```

```
##
## Call:
## lm(formula = Price ~ ., data = Toyotacor)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -11209.6   -748.0      8.9    735.9   6374.1
##
## Coefficients:
##               Estimate Std. Error t value Pr(>|t|)
## (Intercept) -2.358e+03  1.154e+03  -2.043   0.0412 *
## Age         -1.226e+02  2.589e+00 -47.336  < 2e-16 ***
## KM          -1.567e-02  1.285e-03 -12.190  < 2e-16 ***
## FuelType    -1.555e+03  2.497e+02  -6.225 6.31e-10 ***
## HP           5.279e+01  4.084e+00  12.926  < 2e-16 ***
## MetColor     5.563e+01  7.501e+01   0.742   0.4584
## Automatic    2.905e+02  1.560e+02   1.863   0.0627 .
## CC          -3.446e+00  4.024e-01  -8.565  < 2e-16 ***
## Doors       -2.535e+01  3.910e+01  -0.648   0.5169
## Weight       2.099e+01  1.096e+00  19.151  < 2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 1317 on 1426 degrees of freedom
## Multiple R-squared:  0.869,  Adjusted R-squared:  0.8681
## F-statistic:  1051 on 9 and 1426 DF,  p-value: < 2.2e-16
```

```
#Confident Interval
confint(Toyotacor.m1)
```

```
##                     2.5 %        97.5 %
## (Intercept) -4.622093e+03   -94.3881168
## Age         -1.276522e+02  -117.4931773
## KM          -1.818931e-02    -0.0131468
## FuelType    -2.044477e+03 -1064.7406133
## HP           4.477963e+01    60.8020798
## MetColor    -9.151219e+01   202.7764608
## Automatic   -1.539937e+01   596.4856405
## CC          -4.235881e+00    -2.6571199
## Doors       -1.020607e+02    51.3541562
## Weight       1.884418e+01    23.1450328
```

```
Toyotacor.m1.confint <- confint(Toyotacor.m1)
## Check with a correlation matrix if predictor variables are themselves related
Toyotacor.D= as.data.frame(matrix(Toyotacor))[1,]
TyCo.col <- cor(data.frame(lapply(Toyotacor.D, rank)))
print(TyCo.col)
```

```
##                                                                 c.1217.5..1228..1239.5..12
## c.1217.5..1228..1239.5..1261.5..1228..1183..1315..1356..1409..
```

Calculate regression - Model 1

```
#calculate regression - Model 1
x <- Toyotacor[, 2:10] # independent variable
x
```

```
##      Age     KM FuelType  HP MetColor Automatic   CC Doors Weight
## 1     23  46986        0  90        1         0 2000     3   1165
## 2     23  72937        0  90        1         0 2000     3   1165
## 3     24  41711        0  90        1         0 2000     3   1165
## 4     26  48000        0  90        0         0 2000     3   1165
## 5     30  38500        0  90        0         0 2000     3   1170
## 6     32  61000        0  90        0         0 2000     3   1170
## 7     27  94612        0  90        1         0 2000     3   1245
## 8     30  75889        0  90        1         0 2000     3   1245
## 9     27  19700        1 192        0         0 1800     3   1185
## 10    23  71138        0  69        0         0 1900     3   1105
## 11    25  31461        1 192        0         0 1800     3   1185
## 12    22  43610        1 192        0         0 1800     3   1185
## 13    25  32189        1 192        0         0 1800     3   1185
## 14    31  23000        1 192        1         0 1800     3   1185
## 15    32  34131        1 192        1         0 1800     3   1185
## 16    28  18739        1 192        0         0 1800     3   1185
## 17    30  34000        1 192        1         0 1800     3   1185
## 18    24  21716        1 110        1         0 1600     3   1105
## 19    24  25563        1 110        0         0 1600     3   1065
## 20    30  64359        1 110        1         0 1600     3   1105
## 21    30  67660        1 110        1         0 1600     3   1105
## 22    29  43905        1 110        0         1 1600     3   1170
## 23    28  56349        1 110        1         0 1600     3   1120
## 24    28  32220        1 110        1         0 1600     3   1120
## 25    29  25813        1 110        1         0 1600     3   1120
## 26    25  28450        1 110        1         0 1600     3   1120
## 27    27  34545        1 110        1         0 1600     3   1120
## 28    29  41415        1 110        1         0 1600     3   1120
## 29    28  44142        1 110        0         0 1600     3   1120
## 30    30  11090        1 110        1         0 1600     3   1120
## 31    29   9750        1  97        1         0 1400     3   1100
## 32    22  35199        1  97        1         0 1400     3   1100
## 33    27  29510        1  97        1         0 1400     3   1100
## 34    26  32692        1  97        1         0 1400     3   1100
## 35    22  41000        1  97        1         0 1400     3   1100
## 36    26  43000        1  97        0         0 1400     3   1100
## 37    25  25000        1  97        0         0 1400     3   1100
```

```
## 38   23  10000       1  97       1        0 1400    3   1100
## 39   32  25329       1  97       1        0 1400    3   1100
## 40   27  27500       1  97       0        0 1400    3   1100
## 41   22  49059       1  97       0        0 1400    3   1100
## 42   27  44068       1  97       1        0 1400    3   1100
## 43   22  46961       1  97       0        0 1400    3   1100
## 44   27 110404       0  90       0        0 2000    5   1255
## 45   22 100250       0  90       0        0 2000    5   1255
## 46   23  84000       0  90       0        0 2000    5   1270
## 47   27  79375       0  90       1        0 2000    5   1255
## 48   22  75048       1  97       1        0 1400    5   1110
## 49   22  72215       0  90       1        0 2000    5   1255
## 50   31  64982       1 192       1        0 1800    5   1195
## 51   22  62636       0  90       1        0 2000    5   1255
## 52   30  57086       1  97       1        0 1400    5   1110
## 53   26  56000       1 110       1        1 1600    5   1180
## 54   27  49866       1 192       1        0 1800    5   1195
## 55   25  49163       1 110       0        1 1600    5   1165
## 56   32  45725       1 110       1        0 1600    5   1075
## 57   28  43210       1  97       0        0 1400    5   1110
## 58   26  43000       1  97       0        0 1400    5   1110
## 59   23  39704       1 110       1        1 1600    5   1180
## 60   30  38950       1 110       1        0 1600    5   1130
## 61   22  37400       1  97       1        0 1400    5   1110
## 62   27  37177       1 110       0        0 1600    5   1130
## 63   31  36544       1 110       1        0 1600    5   1130
## 64   30  33511       1 110       1        0 1600    5   1130
## 65   27  32809       1  97       1        0 1400    5   1110
## 66   26  32181       1 110       1        0 1600    5   1075
## 67   28  30993       1 110       1        0 1600    5   1130
## 68   22  30400       1  97       1        0 1400    5   1110
## 69   22  30000       0 110       1        0 2000    5   1275
## 70   25  29719       1  97       1        0 1400    5   1110
## 71   28  29206       1  97       1        0 1400    5   1110
## 72   32  29198       1  97       1        0 1400    5   1060
## 73   28  28817       1 110       1        0 1598    5   1130
## 74   23  28227       1  97       1        0 1400    5   1110
## 75   28  28000       1 110       0        0 1600    5   1130
## 76   23  28000       1 110       1        0 1600    5   1115
## 77   31  25266       1 110       1        0 1600    5   1130
## 78   27  23489       1 110       0        0 1600    5   1115
## 79   29  22575       1 110       1        0 1600    5   1115
## 80   30  22000       1  97       1        0 1400    5   1110
## 81   25  20019       1 110       1        1 1600    5   1180
## 82   29  20000       1 110       1        0 1600    5   1115
## 83   25  17003       1  97       1        0 1400    5   1110
## 84   31  16238       1 110       1        1 1600    5   1180
## 85   25  15414       1  97       1        0 1400    5   1110
## 86   28   8537       1 110       1        0 1600    5   1130
## 87   30   7000       1  97       1        0 1400    5   1100
## 88   20  66966       0  90       1        0 2000    3   1245
## 89   19  51884       1  97       1        0 1400    3   1100
## 90   19  50005       0 110       1        0 2000    3   1265
## 91   20  48110       1  97       1        0 1400    3   1100
## 92   20  37500       0  90       1        0 2000    3   1260
## 93   16  34472       0  90       1        0 1995    3   1260
## 94   20  33329       1  97       1        0 1400    3   1100
## 95   20  31850       1 110       0        0 1600    3   1120
## 96   17  30351       0  90       1        0 1995    3   1260
## 97   19  29435       1  97       1        0 1400    3   1100
## 98   19  25948       1  97       1        0 1400    3   1100
## 99   11  24500       1 110       1        0 1600    3   1120
## 100  18  23902       1  97       1        0 1400    3   1100
## 101  20  23175       1 110       1        0 1600    3   1120
## 102  19  19200       1  97       1        0 1400    3   1100
## 103  13  18000       1  71       0        0 1400    3   1125
## 104  11  16123       1 110       1        0 1600    3   1105
## 105  11  14635       1 110       1        1 1600    3   1155
## 106  19  13748       1  97       1        0 1400    3   1100
## 107  14  11500       1 110       1        0 1600    3   1045
## 108  17  10000       1  97       1        0 1400    3   1100
## 109  20   7187       1 110       1        0 1600    3   1105
## 110   4      1       0 116       0        0 2000    5   1480
## 111   4   4000       0 116       1        0 2000    5   1480
## 112   4   1500       0 116       1        0 2000    5   1480
## 113   8  13253       0 116       1        0 2000    5   1320
## 114   8  13253       0 116       1        0 2000    5   1320
## 115   7  10000       0 116       1        0 2000    5   1270
## 116   8   6000       0  90       1        0 2000    5   1280
## 117   8  10841       0  90       1        0 2000    5   1270
## 118   7      1       1 110       1        0 1600    3   1105
## 119  20  63000       0  90       1        0 2000    5   1255
## 120  17  57313       0 110       1        0 2000    5   1275
## 121  13  57037       1 110       0        0 1600    5   1115
## 122  19  51099       0  90       1        0 2000    5   1255
## 123  14  40010       1 110       1        0 1600    5   1115
## 124  20  39115       1 110       1        0 1600    5   1130
## 125  17  36012       1 110       0        0 1600    5   1130
## 126  16  36000       1 110       1        0 1600    5   1130
## 127  20  36000       1 110       1        0 1600    5   1075
## 128  20  35000       1  97       1        0 1400    5   1110
## 129  17  33740       1  97       1        0 1400    5   1135
## 130  13  33477       1 110       1        0 1600    5   1075
## 131  20  32627       1  97       1        0 1400    5   1110
## 132  20  29797       1  97       1        0 1400    5   1110
## 133  19  29441       1  97       1        0 1400    5   1110
## 134  13  29371       1 110       1        0 1600    4   1105
## 135  20  29000       1  97       0        0 1400    5   1110
## 136  19  27821       1  97       0        0 1400    5   1110
## 137  19  27371       1  97       0        0 1400    5   1135
## 138  13  25170       1 110       1        0 1600    5   1105
## 139  11  25000       0 116       1        0 2000    5   1320
## 140  20  23000       1 110       1        0 1600    5   1130
## 141  20  22588       1  97       1        0 1400    5   1110
## 142  19  21684       1 192       1        0 1800    5   1185
## 143  13  21428       1 110       1        0 1600    5   1130
## 144  16  20629       1 110       1        0 1600    4   1090
## 145  15  20270       1 110       1        0 1600    5   1130
## 146  16  20105       1  97       0        0 1400    5   1110
## 147  20  20000       1 110       0        1 1600    5   1165
## 148  13  19988       1 110       1        0 1600    5   1130
## 149  19  18328       1 110       0        0 1600    5   1130
## 150  14  17896       1 110       1        1 1600    4   1150
## 151  20  17300       1  97       1        0 1400    5   1110
```

```
## 152   19  17038       1 110       0        0 1600    5   1130
## 153   10  13747       1  97       1        0 1400    5   1110
## 154   12  13634       1 110       1        0 1600    5   1115
## 155   13  13178       1 110       1        0 1600    5   1130
## 156   15  13157       1  97       1        0 1400    4   1085
## 157   16  13000       1 110       1        0 1600    4   1105
## 158   11  12500       1 110       1        0 1600    5   1115
## 159   17  11999       1 110       1        0 1600    5   1130
## 160   16  11754       1 110       0        1 1600    5   1180
## 161   16  11000       1 110       1        0 1600    4   1105
## 162   17  10000       1 110       0        0 1598    5   1105
## 163    9   7650       1 110       1        0 1600    5   1115
## 164   14   6500       1 110       1        0 1600    4   1100
## 165   11   6155       1  97       1        0 1400    5   1110
## 166   14   6000       1 110       0        0 1600    5   1130
## 167   14   5459       1 110       1        0 1600    5   1130
## 168   14   5278       1 110       1        1 1600    4   1150
## 169   12   5000       1 110       1        0 1600    5   1130
## 170    9      1       1  98       1        0 1400    4   1065
## 171    9      1       1 110       1        0 1600    5   1075
## 172    8  11000       1 110       1        0 1600    5   1130
## 173    8  10077       1  97       1        0 1400    5   1110
## 174    8  10000       1  97       1        0 1400    5   1110
## 175    8   9788       1 110       1        0 1600    5   1130
## 176    8   8574       1 110       1        0 1600    5   1130
## 177    8   7000       1 110       0        0 1600    5   1115
## 178    7   6250       1 110       1        0 1600    5   1115
## 179    8   5000       1 110       1        0 1600    5   1130
## 180    6   3000       1 110       0        0 1600    5   1130
## 181    7   2000       1 110       0        0 1600    5   1075
## 182    7    450       1  97       1        0 1400    5   1110
## 183    2    225       1  97       1        0 1400    5   1110
## 184    2     15       1 110       1        0 1600    5   1130
## 185    1      1       1  98       1        0 1400    4   1100
## 186    1      1       1 110       1        0 1600    5   1075
## 187   43 243000       0  69       0        0 1900    3   1110
## 188   38 180638       0  90       0        0 2000    4   1160
## 189   40 179860       0  90       1        0 2000    5   1205
## 190   43 178858       2 110       0        0 1600    3   1084
## 191   40 161000       0  69       1        0 1900    3   1105
## 192   44 158320       0  69       0        0 1800    5   1110
## 193   44 131273       0  69       1        0 1800    5   1110
## 194   40 130062       0  69       1        0 1900    5   1140
## 195   41 123425       0  69       1        0 1900    5   1140
## 196   37 118217       1 110       1        0 1600    5   1075
## 197   44 110000       0  69       1        0 1900    5   1095
## 198   39 108847       0  90       1        0 2000    5   1205
## 199   42 105699       1  97       1        0 1400    3   1025
## 200   39  98823       2 110       1        0 1600    5   1119
## 201   44  96829       1 110       1        0 1600    5   1075
## 202   40  96518       1  97       1        0 1400    3   1025
## 203   42  92204       1 110       1        0 1600    5   1075
## 204   35  91456       0  69       1        0 1900    3   1110
## 205   43  89968       0  69       1        0 1900    5   1140
## 206   44  89757       1 110       1        0 1600    3   1045
## 207   40  85389       1 110       1        0 1600    5   1075
## 208   43  85017       1  97       0        0 1400    5   1060
## 209   41  84312       1 110       0        0 1600    5   1080
## 210   37  82743       2 110       1        0 1600    5   1121
## 211   41  81106       0  69       1        0 1900    5   1140
## 212   40  80425       0  90       1        0 2000    5   1205
## 213   34  78677       1 110       1        1 1600    5   1105
## 214   40  78425       1 110       1        0 1600    5   1075
## 215   33  78108       0  90       1        0 2000    3   1170
## 216   33  77321       1 110       1        0 1600    5   1075
## 217   33  75699       0  69       0        0 1900    3   1105
## 218   41  75697       1  97       1        0 1400    3   1025
## 219   44  74846       1  97       1        0 1400    3   1025
## 220   38  74319       1 110       1        0 1600    5   1075
## 221   43  74285       1 110       1        0 1600    5   1075
## 222   44  74172       1 110       1        0 1600    5   1615
## 223   40  73042       1 110       1        0 1598    5   1075
## 224   44  71793       2 110       1        0 1600    4   1067
## 225   35  71200       1 110       1        0 1600    5   1075
## 226   38  67805       1 110       1        0 1600    5   1075
## 227   35  65988       1 110       1        0 1600    3   1040
## 228   34  65345       1  97       1        0 1400    5   1060
## 229   42  64564       1 110       1        0 1600    5   1080
## 230   36  63459       1  97       1        0 1400    5   1060
## 231   44  63451       1  97       0        0 1400    3   1025
## 232   33  62000       1 110       1        0 1600    5   1075
## 233   42  61300       1  97       1        0 1400    3   1030
## 234   41  61200       1 110       1        0 1600    3   1045
## 235   41  61000       1 110       0        0 1600    5   1075
## 236   38  60829       1 110       1        0 1600    5   1075
## 237   44  60500       1 110       0        0 1600    5   1075
## 238   35  59500       0  69       1        0 1900    3   1110
## 239   44  59000       1 110       0        1 1600    5   1110
## 240   40  58954       1 110       1        0 1600    5   1080
## 241   38  58798       1 110       1        0 1600    5   1075
## 242   38  58363       1 110       1        0 1600    3   1055
## 243   43  58277       1 110       1        0 1600    3   1045
## 244   33  57711       0  90       1        0 2000    3   1165
## 245   33  57269       1 110       1        0 1600    5   1075
## 246   39  56001       1 110       1        0 1600    5   1075
## 247   42  55968       1 110       0        0 1600    3   1050
## 248   39  55678       1 110       1        0 1600    4   1030
## 249   43  55539       1 110       1        0 1600    5   1085
## 250   42  55400       1 110       0        0 1600    5   1075
## 251   33  55350       1 110       0        0 1600    5   1075
## 252   43  54600       1 110       0        0 1600    4   1030
## 253   43  53773       1 110       1        0 1600    5   1075
## 254   42  53719       1 110       1        1 1600    5   1105
## 255   39  53644       1 110       1        0 1600    5   1075
## 256   42  53350       1 110       0        0 1600    5   1075
## 257   38  53000       1 110       1        0 1600    5   1075
## 258   44  52084       1  97       1        0 1400    3   1025
## 259   44  52000       1  97       0        0 1400    3   1025
## 260   33  51945       1 110       1        0 1600    5   1075
## 261   41  51732       1  97       1        0 1400    3   1025
## 262   39  50873       1 110       1        0 1600    5   1075
## 263   41  50856       1 110       0        0 1600    4   1030
## 264   40  50640       1 110       1        0 1600    5   1075
## 265   39  50000       1  97       1        0 1400    5   1060
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## 266   38  49500       1 110       1        0 1600    5   1075
## 267   44  49332       1 110       1        0 1600    5   1080
## 268   34  49291       1 110       1        0 1600    3   1040
## 269   40  48952       0  90       1        0 2000    5   1205
## 270   39  48945       1 110       0        0 1600    3   1040
## 271   33  48928       0  69       1        0 1900    3   1105
## 272   38  48197       1 110       1        0 1600    5   1075
## 273   35  48052       0  69       1        0 1900    3   1105
## 274   34  48011       1 110       1        0 1600    4   1030
## 275   43  48000       1 110       1        0 1600    5   1075
## 276   41  47350       1 110       1        0 1600    5   1075
## 277   39  46821       1  97       1        0 1400    5   1060
## 278   39  46694       1 110       0        0 1600    3   1040
## 279   43  46515       1  97       0        0 1400    5   1025
## 280   38  46327       1 110       1        0 1600    3   1055
## 281   35  46304       1  97       1        0 1400    5   1060
## 282   40  45886       1 110       1        0 1600    5   1080
## 283   39  45713       1  97       1        0 1400    5   1085
## 284   40  45600       1 110       1        1 1600    5   1105
## 285   41  45287       1 110       1        0 1600    5   1075
## 286   39  45081       1 110       1        0 1600    5   1075
## 287   40  44830       1 110       1        0 1600    5   1075
## 288   37  44757       1  97       0        0 1400    3   1025
## 289   44  44218       1  97       1        0 1400    5   1060
## 290   43  43632       1 110       1        0 1600    5   1075
## 291   36  43427       1 110       1        0 1600    3   1040
## 292   39  43254       1 110       1        0 1600    5   1075
## 293   35  43000       1 110       0        0 1600    3   1050
## 294   33  42823       1 110       1        0 1600    5   1075
## 295   42  42560       1 110       1        0 1600    5   1080
## 296   38  41754       1 110       0        0 1600    3   1040
## 297   44  41499       2 110       1        0 1600    5   1103
## 298   40  41339       1 110       1        0 1600    5   1080
## 299   35  41000       1 110       1        0 1600    5   1075
## 300   39  40000       1 110       1        0 1600    3   1055
## 301   37  39757       1 110       1        0 1600    5   1075
## 302   41  39659       1 110       1        0 1600    3   1045
## 303   43  39650       1 110       0        0 1600    3   1055
## 304   39  39524       1  97       1        0 1398    3   1025
## 305   44  39516       1  97       1        0 1400    5   1060
## 306   41  39439       1  97       0        0 1400    5   1060
## 307   44  39000       1  97       1        0 1400    3   1025
## 308   42  38932       1 110       1        0 1600    3   1040
## 309   37  38812       1  97       0        0 1400    3   1025
## 310   42  38665       1 110       1        0 1600    5   1075
## 311   40  38653       1 110       1        0 1600    5   1080
## 312   44  38461       1 110       1        0 1600    5   1080
## 313   42  38078       1  97       0        0 1400    3   1025
## 314   39  37782       1  97       1        0 1400    5   1060
## 315   43  37576       1  97       0        0 1400    3   1030
## 316   41  37533       1 110       1        0 1600    5   1075
## 317   44  37389       1 110       1        0 1600    5   1080
## 318   38  37320       1  97       1        0 1400    3   1025
## 319   42  37000       1  97       1        0 1400    3   1025
## 320   44  37000       1 110       0        0 1600    4   1075
## 321   40  36566       1 110       0        0 1600    5   1090
## 322   36  36269       1 110       1        0 1600    5   1075
## 323   37  36074       1 110       1        1 1600    5   1075
## 324   44  36066       1 110       1        0 1600    3   1040
## 325   39  34599       1 110       1        0 1600    5   1075
## 326   41  34000       1 110       1        0 1600    5   1075
## 327   42  33623       1  97       1        0 1400    3   1025
## 328   33  33591       1 110       1        0 1600    5   1075
## 329   35  33258       1 110       1        0 1600    5   1075
## 330   43  33113       1 110       1        0 1600    5   1075
## 331   41  33000       1 110       1        1 1600    5   1075
## 332   35  32941       1 110       1        0 1600    5   1080
## 333   38  32781       1 110       0        0 1600    5   1075
## 334   40  32532       1 110       1        0 1600    3   1040
## 335   34  32431       1  97       1        0 1400    5   1060
## 336   35  32000       1 110       0        0 1600    3   1040
## 337   33  31000       1 110       1        0 1600    5   1075
## 338   41  30989       1 110       0        0 1600    3   1045
## 339   43  30742       1 110       1        0 1600    3   1040
## 340   42  30190       1 110       1        0 1600    5   1075
## 341   41  29716       1 116       1        0 1600    5   1075
## 342   44  29716       1 110       1        1 1600    3   1070
## 343   42  29640       1 110       0        0 1600    3   1055
## 344   41  29056       1  97       1        0 1400    5   1060
## 345   33  28715       1 110       1        0 1600    5   1075
## 346   41  28571       1 110       0        0 1600    5   1090
## 347   40  28362       1 110       1        0 1600    3   1040
## 348   38  28150       1 110       1        0 1600    5   1075
## 349   43  27301       1 110       1        0 1600    3   1040
## 350   33  27240       1 110       1        0 1600    5   1075
## 351   39  27170       1  97       1        0 1400    5   1060
## 352   42  27141       1  97       1        0 1400    5   1060
## 353   38  26262       1 110       1        0 1600    5   1075
## 354   38  26000       1  97       1        0 1400    5   1060
## 355   43  25228       1 110       1        0 1600    3   1045
## 356   39  25062       1 110       1        0 1600    5   1080
## 357   39  24723       1 110       1        1 1600    4   1060
## 358   33  24650       1 110       1        0 1600    3   1055
## 359   43  24553       1 110       1        0 1600    5   1080
## 360   41  24475       1 110       1        0 1600    5   1030
## 361   39  24444       1 110       1        0 1600    3   1040
## 362   35  24011       1  97       0        0 1400    3   1025
## 363   41  24000       1  97       1        0 1400    3   1025
## 364   40  23616       1 110       1        0 1600    5   1075
## 365   38  22865       1 110       1        0 1600    5   1075
## 366   41  22780       1  86       1        0 1300    5   1035
## 367   35  21904       1  97       0        0 1400    3   1025
## 368   41  21651       1  97       0        0 1400    3   1025
## 369   37  21500       1 110       1        0 1600    5   1030
## 370   44  21027       1 110       1        0 1600    5   1080
## 371   39  18500       1 110       0        0 1600    4   1030
## 372   35  18000       1 110       1        0 1600    5   1075
## 373   40  17051       1  97       0        0 1400    5   1060
## 374   33  16512       1  97       1        0 1400    5   1085
## 375   40  16325       1 110       1        0 1600    5   1080
## 376   38  16000       1  97       1        0 1400    5   1060
## 377   39  12000       1 110       1        0 1600    5   1075
## 378   43  10000       1  97       1        0 1400    5   1060
## 379   53 216000       0  69       0        0 1900    3   1110
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## 380   51 198167       0  69       0        0 1900    4   1095
## 381   53 176000       0  69       0        0 1900    3   1105
## 382   54 174139       0  72       1        0 2000    4   1100
## 383   45 174000       0  69       1        0 1900    5   1095
## 384   55 150000       2 110       1        0 1600    3   1075
## 385   54 149329       0  72       1        0 2000    5   1135
## 386   51 146736       1 110       1        0 1600    5   1080
## 387   53 143513       0  69       0        0 1900    5   1140
## 388   48 142130       2 110       0        0 1600    5   1119
## 389   48 140700       0  69       1        0 1900    5   1110
## 390   54 138394       0  69       1        0 1900    4   1095
## 391   55 137000       0  72       1        0 2000    5   1135
## 392   52 135258       0  69       1        0 1900    5   1140
## 393   49 131364       1 110       1        0 1600    5   1075
## 394   56 129155       0  69       0        0 1800    5   1110
## 395   50 126110       1 110       0        0 1600    3   1055
## 396   48 119742       1 110       1        0 1600    5   1080
## 397   53 117913       0  69       1        0 1900    5   1110
## 398   47 117430       0  90       1        0 2000    3   1165
## 399   55 117175       1 110       1        0 1600    4   1035
## 400   54 115558       1 110       1        0 1600    4   1035
## 401   53 115113       1  97       1        0 1400    3   1025
## 402   54 115046       0  69       1        0 1900    5   1140
## 403   56 113997       0  72       1        0 2000    5   1135
## 404   49 107859       1  97       0        0 1400    5   1060
## 405   52 104805       1  97       1        0 1400    3   1025
## 406   54 103454       1 110       1        0 1600    5   1075
## 407   51 103018       0  69       0        0 1900    5   1140
## 408   47 102352       1 110       1        0 1600    5   1080
## 409   50 102030       1  97       1        0 1400    5   1060
## 410   54 101352       1 110       0        0 1600    5   1080
## 411   50  99865       1 110       1        0 1600    4   1035
## 412   52  99323       1 110       1        0 1600    3   1055
## 413   48  98100       0  69       1        0 1900    5   1140
## 414   51  98040       1 110       0        0 1600    5   1080
## 415   49  97600       1 110       1        0 1600    3   1045
## 416   55  97234       1 110       0        0 1600    5   1080
## 417   51  96135       0  72       0        0 2000    3   1115
## 418   54  96100       1 110       1        0 1600    5   1080
## 419   55  94401       0  72       0        0 2000    3   1115
## 420   55  94122       1  86       1        0 1300    3   1015
## 421   49  91340       1 110       1        0 1600    3   1055
## 422   53  90200       1  97       0        0 1400    3   1025
## 423   53  90097       0  69       1        0 1900    5   1140
## 424   48  89049       1  97       1        0 1400    5   1060
## 425   52  89000       1 110       0        0 1600    5   1075
## 426   45  87274       1 110       1        0 1600    3   1040
## 427   49  86221       1 110       0        0 1600    3   1045
## 428   54  84598       1 110       0        0 1600    5   1075
## 429   50  83567       1 110       0        0 1600    5   1075
## 430   50  83106       1 110       1        0 1600    5   1075
## 431   50  82805       1 110       1        0 1600    3   1040
## 432   50  82735       1  97       1        0 1400    3   1030
## 433   54  81905       1 110       1        0 1600    5   1105
## 434   49  80320       1 110       1        1 1600    3   1070
## 435   49  80090       1  97       1        0 1400    3   1030
## 436   53  79800       1 110       0        0 1600    5   1075
## 437   47  78785       2 110       1        0 1600    5   1119
## 438   48  78600       1 110       1        0 1600    5   1075
## 439   55  77780       1 110       0        0 1600    3   1040
## 440   49  77648       1 110       0        0 1600    4   1030
## 441   54  77270       1 110       1        0 1600    4   1035
## 442   50  76167       1  97       1        0 1400    5   1060
## 443   46  75249       1 110       1        0 1600    4   1035
## 444   54  75231       1 110       1        0 1600    5   1080
## 445   48  75045       1 110       1        0 1600    3   1055
## 446   50  74849       1 110       1        1 1600    4   1060
## 447   55  74715       1 110       1        0 1600    5   1080
## 448   49  74656       0  69       0        0 1900    3   1105
## 449   56  74500       1  97       0        0 1400    3   1025
## 450   49  74494       1 110       1        0 1600    5   1075
## 451   50  73634       1 110       0        0 1587    5   1075
## 452   47  73403       1 110       1        0 1600    5   1075
## 453   49  73175       1  97       1        0 1400    3   1030
## 454   52  73000       1 110       0        0 1600    3   1055
## 455   50  72242       1 110       0        1 1600    3   1070
## 456   53  72000       1  97       1        0 1400    3   1025
## 457   54  71725       1 110       1        0 1600    4   1035
## 458   54  71276       1 110       0        0 1600    5   1080
## 459   50  70440       0  69       1        0 1900    3   1105
## 460   53  70239       1 110       0        0 1600    3   1040
## 461   55  69813       1  97       1        0 1400    3   1025
## 462   49  69659       1  86       0        0 1300    3   1025
## 463   46  69574       1  97       0        0 1400    5   1065
## 464   47  69000       0  69       1        0 1900    5   1140
## 465   49  68565       1 110       1        0 1600    4   1030
## 466   55  68520       0  72       1        0 2000    3   1115
## 467   46  68414       1  97       0        0 1400    3   1025
## 468   56  66777       1 110       0        0 1600    5   1090
## 469   52  66527       1 110       1        0 1600    5   1080
## 470   54  66063       1 110       1        0 1600    5   1090
## 471   50  65471       1  97       1        0 1400    5   1060
## 472   56  65400       1  97       1        0 1400    3   1025
## 473   52  65170       1  97       1        0 1400    3   1025
## 474   56  65000       1 110       1        0 1600    5   1075
## 475   48  64193       1 110       1        0 1600    3   1040
## 476   54  64000       1  97       1        0 1400    3   1025
## 477   54  63792       1 110       1        0 1600    5   1075
## 478   53  63635       1 110       1        0 1600    4   1035
## 479   54  63135       1 110       1        0 1600    3   1050
## 480   54  63123       1 110       1        0 1600    4   1035
## 481   48  63000       0  69       1        0 1900    5   1140
## 482   55  63000       1 110       0        0 1600    4   1035
## 483   54  62987       1 110       0        0 1600    5   1080
## 484   56  62751       1 110       0        0 1600    3   1050
## 485   54  62519       1  97       0        0 1400    3   1025
## 486   50  62280       1  97       1        0 1400    5   1060
## 487   50  61672       1 110       0        0 1600    5   1075
## 488   54  61000       0  69       0        0 2000    5   1140
## 489   56  61000       1 110       1        0 1600    3   1050
## 490   53  60558       1 110       1        0 1600    4   1105
## 491   47  60348       1 110       0        0 1600    4   1030
## 492   54  60239       1 110       1        0 1600    5   1075
## 493   51  59000       1  97       1        0 1400    3   1025
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## 494   51  58761       1  97       0        0 1300    5   1060
## 495   54  58745       1 110       1        0 1600    4   1035
## 496   52  58596       1 110       1        0 1600    3   1045
## 497   54  58530       1 110       0        0 1600    5   1075
## 498   55  58377       1 110       1        0 1600    3   1050
## 499   56  58142       1 110       1        0 1600    5   1080
## 500   53  57948       1  97       1        0 1400    3   1025
## 501   51  57645       1 110       0        0 1600    5   1080
## 502   47  57500       1 110       1        0 1600    4   1105
## 503   53  57475       1 110       0        0 1600    3   1040
## 504   55  56743       1 110       0        0 1600    3   1045
## 505   48  56675       1  97       1        0 1400    3   1025
## 506   54  55877       1 110       1        0 1600    5   1075
## 507   53  55500       1 110       1        0 1600    4   1035
## 508   55  54900       1  97       1        0 1400    5   1060
## 509   50  54465       1 110       0        0 1600    5   1075
## 510   46  53700       1  97       1        0 1400    5   1060
## 511   52  53561       1  97       1        0 1400    5   1060
## 512   51  53408       1 110       1        0 1600    5   1080
## 513   51  53268       1 110       1        0 1600    5   1080
## 514   49  53116       1  97       1        0 1400    3   1025
## 515   56  52448       1  97       0        0 1400    3   1025
## 516   55  52149       1  97       1        0 1400    3   1085
## 517   55  52141       1 110       1        0 1600    5   1070
## 518   56  52000       1  97       0        0 1400    3   1025
## 519   48  50967       1  97       1        0 1400    5   1060
## 520   50  50400       1 110       0        0 1600    5   1080
## 521   54  50000       1  97       1        0 1400    3   1025
## 522   51  50000       1  86       1        0 1300    5   1045
## 523   53  49969       1 110       0        0 1600    5   1075
## 524   49  49568       1 110       1        0 1600    3   1105
## 525   51  49473       1 110       0        0 1600    3   1055
## 526   52  49432       1 110       1        0 1600    3   1050
## 527   48  49417       1 110       1        0 1600    3   1045
## 528   54  49366       1  97       1        0 1400    3   1025
## 529   56  48731       1 110       1        0 1600    3   1055
## 530   54  48370       1 110       1        0 1600    5   1080
## 531   48  48071       1  97       0        0 1400    3   1025
## 532   54  47852       1 110       1        0 1600    4   1030
## 533   54  47768       1 110       0        0 1600    3   1055
## 534   52  47689       1 110       0        0 1600    5   1075
## 535   53  47451       1 110       1        0 1600    3   1055
## 536   50  47219       1 110       1        0 1600    5   1080
## 537   56  47211       1 110       1        0 1600    5   1070
## 538   54  46856       1  97       0        0 1400    5   1060
## 539   56  46500       1  86       0        0 1300    5   1035
## 540   52  46449       1 110       1        0 1600    4   1035
## 541   47  46391       1 110       0        0 1600    5   1075
## 542   54  46230       1 110       1        0 1600    3   1055
## 543   52  46029       1 110       1        0 1600    4   1030
## 544   50  46000       1  97       0        0 1400    3   1025
## 545   50  45900       1 110       1        0 1600    5   1075
## 546   47  45850       1  97       0        0 1400    5   1060
## 547   56  45336       1 110       1        0 1600    5   1080
## 548   55  44537       1  97       0        0 1400    3   1025
## 549   56  43700       1  86       1        0 1300    3   1025
## 550   48  43120       1  97       1        0 1400    3   1030
## 551   49  41710       1 110       0        0 1600    3   1040
## 552   52  41700       1  97       1        0 1400    3   1025
## 553   49  41636       1 110       1        0 1600    5   1105
## 554   50  41273       1  97       0        0 1400    5   1060
## 555   49  40836       1 110       0        1 1600    3   1075
## 556   50  40400       1  97       1        0 1400    5   1060
## 557   47  40361       1 110       1        0 1600    5   1090
## 558   54  40325       1  86       0        0 1300    5   1045
## 559   47  40000       1 110       0        0 1600    5   1080
## 560   50  39706       1 110       1        0 1600    5   1080
## 561   54  39291       1 110       1        0 1600    3   1040
## 562   54  39000       1  97       0        0 1400    3   1025
## 563   47  38900       1  97       1        0 1400    3   1025
## 564   51  38403       1 110       0        0 1600    3   1055
## 565   56  37461       1  97       0        0 1400    3   1025
## 566   54  37000       1  97       1        0 1400    3   1025
## 567   55  36406       1 110       1        0 1600    4   1035
## 568   48  36005       1  97       1        0 1400    5   1065
## 569   52  36000       1 110       1        0 1600    5   1075
## 570   49  36000       1 110       0        0 1600    5   1080
## 571   45  36000       1 110       1        1 1600    3   1070
## 572   52  35823       1 110       0        0 1600    5   1075
## 573   56  35230       1  97       0        0 1400    3   1025
## 574   48  35142       1 110       0        0 1600    3   1055
## 575   49  34890       1  97       0        0 1400    3   1025
## 576   51  34882       1 110       1        0 1600    5   1075
## 577   46  34000       1 110       1        0 1600    5   1075
## 578   56  33998       1 110       0        0 1600    5   1080
## 579   55  33230       1 110       0        0 1600    3   1050
## 580   46  33021       1 110       1        0 1600    5   1080
## 581   49  31999       1  97       0        0 1400    3   1030
## 582   52  31579       1  97       0        0 1400    3   1025
## 583   56  31000       1  97       0        0 1400    3   1025
## 584   46  30806       1  97       1        0 1400    5   1060
## 585   55  30461       1  86       1        0 1300    5   1050
## 586   50  29686       1 110       1        1 1600    3   1075
## 587   55  29650       1  86       0        0 1300    3   1025
## 588   52  29500       1 110       1        0 1600    3   1055
## 589   48  28656       1  97       0        0 1400    3   1085
## 590   55  27500       1  97       1        0 1400    3   1025
## 591   48  26938       1 110       1        0 1600    3   1040
## 592   53  26624       1  97       0        0 1400    5   1060
## 593   47  26221       1  97       1        0 1400    3   1025
## 594   50  22648       1  97       1        0 1400    5   1060
## 595   50  22500       1  97       1        0 1400    3   1025
## 596   56  19313       1  97       0        0 1400    3   1025
## 597   50  17619       1 110       0        0 1600    4   1030
## 598   51  17069       1  97       1        0 1400    3   1025
## 599   48  15000       1  97       1        0 1400    3   1025
## 600   50  10210       1  97       0        0 1400    5   1065
## 601   47   5309       1 110       1        1 1600    3   1070
## 602   50      1       0  90       1        0 2000    3   1260
## 603   52  31000       1  97       0        0 1398    3   1025
## 604   58 205000       0  72       1        0 2000    4   1100
## 605   68 204250       0  72       0        0 2000    3   1115
## 606   68 194545       1  86       0        0 1300    4   1000
## 607   59 190900       0  72       1        0 2000    3   1115
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## 608   62 183500       0  72       1        0 2000    5   1140
## 609   65 176184       0  72       1        0 2000    3   1115
## 610   67 174833       0  72       0        0 2000    4   1100
## 611   68 155720       1  86       1        0 1300    3   1015
## 612   67 155500       1 110       1        0 1600    5   1050
## 613   59 154783       0  72       1        0 2000    3   1120
## 614   64 154462       0  72       1        0 2000    5   1135
## 615   64 150585       1 110       1        0 1600    3   1065
## 616   67 149000       0  90       1        0 2000    5   1135
## 617   62 147636       0  72       0        0 2000    5   1135
## 618   59 144521       0  72       1        0 2000    5   1135
## 619   64 144000       2 110       1        0 1600    3   1065
## 620   65 140168       0  72       1        0 2000    3   1115
## 621   68 140000       1 110       1        0 1600    5   1085
## 622   60 139800       0  72       0        0 2000    3   1115
## 623   59 137050       2 110       1        0 1600    3   1078
## 624   61 136956       1 110       0        0 1600    3   1065
## 625   67 135337       2 110       1        0 1600    5   1120
## 626   64 133769       0  72       1        0 2000    3   1120
## 627   58 133405       0  72       1        0 2000    5   1135
## 628   65 132807       0  72       1        0 2000    5   1135
## 629   64 132393       0  72       0        0 2000    5   1135
## 630   60 130270       1 110       0        0 1600    3   1050
## 631   59 130000       0  72       1        0 2000    4   1135
## 632   67 127000       0  72       1        0 2000    5   1135
## 633   67 126800       0  72       0        0 2000    5   1135
## 634   66 126452       1 110       1        0 1600    5   1085
## 635   62 125175       0 116       0        0 2000    5   1150
## 636   68 125000       0  72       1        0 2000    3   1115
## 637   61 123000       0  72       0        0 2000    5   1135
## 638   59 121626       1  86       0        0 1300    5   1050
## 639   64 120400       1 110       0        0 1600    5   1090
## 640   66 120000       0  72       0        0 2000    4   1100
## 641   68 119541       1 110       0        0 1600    3   1055
## 642   68 119500       1 110       1        0 1600    5   1070
## 643   68 119289       1 110       1        0 1600    4   1035
## 644   57 118833       1 110       0        0 1600    3   1065
## 645   64 118000       0  72       1        0 2000    5   1150
## 646   68 117955       1 110       1        1 1600    4   1065
## 647   65 117609       1  86       0        0 1300    3   1015
## 648   68 117000       0  72       0        0 2000    3   1115
## 649   64 116000       1  86       0        0 1300    5   1045
## 650   58 115715       1 110       0        0 1600    5   1070
## 651   60 115191       2 110       1        0 1600    4   1079
## 652   68 115071       1 110       1        0 1600    3   1055
## 653   63 115000       2 110       0        0 1600    3   1109
## 654   64 114846       1 110       1        0 1600    5   1075
## 655   65 114383       0  90       0        0 2000    3   1260
## 656   59 113700       1 110       1        0 1600    5   1065
## 657   67 113118       1  86       1        0 1300    3   1020
## 658   59 112827       1  86       1        0 1300    5   1040
## 659   68 112116       1 110       1        0 1600    5   1070
## 660   66 112000       1 110       1        0 1600    3   1065
## 661   62 112000       0  72       0        0 2000    4   1135
## 662   65 111769       1 110       0        0 1600    3   1065
## 663   61 110853       1 110       1        0 1600    5   1070
## 664   68 110287       1 110       1        0 1600    3   1050
## 665   62 109547       1 110       0        0 1600    5   1075
## 666   63 109230       1 110       0        0 1600    3   1050
## 667   68 109150       1 110       0        0 1600    5   1075
## 668   67 108793       1 110       1        0 1600    4   1035
## 669   64 106784       1 110       0        1 1600    3   1050
## 670   58 105942       1  86       0        0 1300    5   1040
## 671   59 105000       1  86       1        0 1300    3   1015
## 672   62 105000       1  86       0        0 1300    5   1040
## 673   68 104299       1 110       1        0 1600    5   1085
## 674   67 104000       1  86       0        0 1300    3   1020
## 675   68 104000       1  86       1        0 1300    3   1015
## 676   58 103458       1  86       1        0 1300    3   1025
## 677   63 103400       1 110       1        0 1600    5   1075
## 678   63 102807       1  86       0        0 1300    5   1055
## 679   68 102494       1 110       0        0 1600    5   1090
## 680   57 102300       0  72       1        0 2000    5   1135
## 681   61 102106       1 110       0        0 1600    3   1050
## 682   68 101889       1 110       1        0 1600    5   1075
## 683   57 101791       0  72       0        0 2000    3   1115
## 684   63 101469       1 110       1        0 1600    3   1065
## 685   68 101001       1 110       0        0 1600    5   1075
## 686   61 100748       1 110       0        0 1600    5   1070
## 687   65 100550       1 110       1        0 1600    5   1075
## 688   67  99781       1 110       1        0 1600    5   1085
## 689   59  98658       1  86       1        0 1300    3   1020
## 690   65  98500       1 110       1        0 1600    5   1075
## 691   64  98291       1  86       0        0 1300    4   1000
## 692   61  97648       1 110       1        0 1600    3   1065
## 693   61  97425       1 110       1        0 1600    5   1075
## 694   65  97173       1  86       0        0 1300    3   1015
## 695   66  97046       1  86       1        0 1300    4   1000
## 696   67  96000       1 110       1        0 1600    3   1050
## 697   60  96000       0  72       0        0 2000    4   1100
## 698   67  95750       1 110       1        0 1600    5   1070
## 699   61  95147       1 110       1        0 1600    3   1050
## 700   68  95000       1 110       0        0 1600    3   1050
## 701   65  95000       1 110       1        0 1600    3   1050
## 702   66  94606       1 110       0        0 1600    3   1065
## 703   63  94504       1  86       1        0 1300    4   1000
## 704   65  93428       1 110       1        0 1600    5   1075
## 705   65  93408       1  86       0        0 1300    3   1015
## 706   68  93296       1 110       1        0 1600    5   1090
## 707   62  93098       1 110       1        0 1600    5   1075
## 708   67  92922       0  72       1        0 2000    4   1100
## 709   61  92498       1 110       1        0 1600    3   1050
## 710   65  92226       1 110       0        0 1600    3   1065
## 711   68  91505       0  72       0        0 2000    3   1115
## 712   64  91333       1 110       1        0 1600    3   1050
## 713   65  91246       1  86       1        0 1300    3   1015
## 714   58  91000       1 110       1        0 1600    5   1075
## 715   68  90727       1 110       0        0 1600    3   1050
## 716   62  90000       1 110       0        0 1600    3   1050
## 717   60  89576       1 110       0        0 1600    4   1035
## 718   64  89145       1  86       1        0 1300    3   1025
## 719   63  89000       1 110       1        0 1600    5   1085
## 720   68  88807       1 110       0        0 1600    3   1050
## 721   63  88685       1 110       0        0 1600    5   1070
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## 722   62  88667       1 110       1        0 1600    4   1040
## 723   57  88480       1 110       1        0 1600    3   1050
## 724   61  88127       1  86       0        0 1300    3   1015
## 725   62  88000       1  86       0        0 1300    3   1020
## 726   65  87821       1  86       1        0 1300    3   1015
## 727   59  87654       1  86       1        1 1300    5   1065
## 728   59  86888       1 110       1        0 1600    3   1050
## 729   59  86871       1  86       1        0 1300    5   1040
## 730   68  86714       1 110       1        0 1600    4   1035
## 731   65  85889       1 110       0        0 1600    3   1065
## 732   62  85000       1 110       1        0 1600    3   1050
## 733   60  85000       1  86       1        0 1300    3   1025
## 734   68  84976       1 110       1        0 1600    4   1035
## 735   65  84558       1 110       1        0 1600    5   1120
## 736   62  84549       1 110       0        0 1600    5   1075
## 737   68  84482       1 110       1        0 1600    5   1075
## 738   62  83908       1 110       1        0 1600    5   1070
## 739   67  83560       1  86       0        0 1300    3   1015
## 740   68  83000       1 107       1        1 1600    5   1100
## 741   64  82723       1  86       0        0 1300    3   1015
## 742   62  82421       1 110       1        0 1600    3   1065
## 743   58  82254       1 110       0        0 1600    5   1050
## 744   61  82115       1 110       1        0 1600    3   1055
## 745   65  82000       1  86       1        0 1300    3   1015
## 746   68  81965       1  86       1        0 1300    5   1035
## 747   66  81250       1 110       0        0 1600    3   1050
## 748   65  81192       1 110       1        0 1600    3   1065
## 749   61  81170       1 110       1        0 1600    4   1040
## 750   66  81083       1  86       0        0 1300    3   1015
## 751   61  80714       1 110       1        0 1600    5   1075
## 752   57  80470       1 110       0        0 1600    5   1085
## 753   65  80439       1 110       1        0 1600    4   1035
## 754   59  80430       1 110       1        0 1600    3   1065
## 755   68  80426       1 110       1        0 1600    3   1055
## 756   62  80265       1  86       0        0 1300    3   1015
## 757   65  80153       1 110       0        0 1600    5   1070
## 758   68  80121       1 110       0        0 1600    5   1070
## 759   65  80086       1 110       1        0 1600    4   1035
## 760   62  80000       1 110       0        0 1600    5   1075
## 761   60  80000       1  86       0        0 1300    5   1015
## 762   65  80000       1  86       1        0 1300    2   1015
## 763   67  79858       1 110       1        0 1600    4   1040
## 764   67  79762       1  86       1        0 1300    3   1015
## 765   59  79660       1  86       0        1 1300    5   1065
## 766   60  79150       1 110       1        0 1600    5   1075
## 767   61  79000       1 110       1        0 1600    3   1050
## 768   57  78955       1  86       1        0 1300    5   1045
## 769   59  78750       0  90       1        0 1975    5   1155
## 770   68  78521       1  86       0        0 1300    3   1015
## 771   64  78356       1  86       1        0 1300    3   1015
## 772   65  78076       1  86       1        0 1300    3   1015
## 773   61  78063       1 107       1        1 1600    5   1100
## 774   67  77821       1 110       1        0 1600    5   1075
## 775   68  77695       1 110       1        0 1600    4   1035
## 776   65  77500       1 110       1        0 1600    3   1050
## 777   63  77457       1 110       1        0 1600    3   1055
## 778   68  77029       1  86       1        0 1300    3   1015
## 779   68  77008       1  86       1        0 1300    3   1015
## 780   66  76791       1 110       1        0 1600    5   1070
## 781   61  76700       1  86       1        0 1300    5   1035
## 782   67  76569       1  86       1        0 1300    3   1020
## 783   59  76162       1 110       1        0 1600    5   1075
## 784   65  76155       1 110       1        0 1600    4   1035
## 785   61  75609       1  86       1        0 1300    3   1015
## 786   62  75569       0  72       1        0 2000    3   1120
## 787   67  75429       1 110       1        0 1600    3   1065
## 788   68  75000       1 110       1        0 1600    5   1075
## 789   65  75000       1  86       0        0 1300    3   1015
## 790   62  75000       1 110       1        0 1600    5   1070
## 791   66  74963       1 107       0        1 1600    3   1085
## 792   68  74889       1  86       1        0 1300    3   1015
## 793   68  74875       1 110       0        0 1600    5   1070
## 794   63  74747       1 110       1        0 1600    5   1075
## 795   60  74720       1 110       1        0 1600    5   1085
## 796   62  74457       1 110       0        0 1600    5   1075
## 797   60  74337       1  86       0        0 1300    5   1035
## 798   68  74308       1 110       0        0 1600    3   1050
## 799   64  74193       1 110       0        0 1600    3   1050
## 800   65  74179       1 110       1        0 1600    3   1050
## 801   67  73936       1  86       1        0 1300    5   1050
## 802   61  73894       1 110       1        0 1600    3   1065
## 803   64  73500       1 110       1        0 1600    3   1050
## 804   64  73376       1 110       0        0 1600    5   1070
## 805   64  73300       1  86       1        0 1300    3   1015
## 806   58  73172       1 110       1        0 1600    5   1075
## 807   58  72928       1 110       1        0 1600    5   1075
## 808   67  72880       1  86       1        0 1332    3   1015
## 809   63  72522       1 110       1        0 1600    3   1050
## 810   64  72000       1  86       1        0 1300    3   1015
## 811   57  72000       1  86       0        0 1300    3   1015
## 812   59  71366       1 110       0        0 1600    3   1065
## 813   65  71317       1 110       0        0 1600    3   1050
## 814   62  71000       1 110       0        0 1600    5   1070
## 815   60  70954       1 110       0        0 1600    3   1050
## 816   63  70908       1  86       0        0 1300    5   1035
## 817   58  70560       1 110       1        0 1600    3   1050
## 818   67  70552       1 110       0        0 1600    5   1075
## 819   62  70500       1 110       1        0 1600    5   1035
## 820   60  70453       0  72       0        0 2000    5   1135
## 821   59  70218       1 110       1        0 1600    3   1050
## 822   64  70116       1 110       1        0 1600    4   1035
## 823   65  70068       1 110       1        0 1600    5   1075
## 824   67  70000       1 107       1        1 1587    3   1065
## 825   68  70000       1  86       1        0 1300    3   1015
## 826   68  69103       1 110       0        0 1600    4   1035
## 827   58  69022       1  86       1        0 1300    5   1035
## 828   67  69000       1 110       1        0 1600    3   1065
## 829   68  68865       1 110       1        0 1600    3   1065
## 830   58  68723       1  86       0        0 1300    3   1025
## 831   63  68453       1 110       1        0 1600    5   1070
## 832   63  68238       1  86       0        0 1300    5   1050
## 833   63  68153       1 110       1        0 1600    5   1085
## 834   65  68000       1 110       0        0 1600    5   1075
## 835   65  68000       1  86       1        0 1300    3   1015
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## 836   67  67762       1 110       1        0 1600    3   1065
## 837   68  67146       1 110       1        0 1600    5   1075
## 838   67  67110       1  86       1        0 1300    5   1035
## 839   59  67010       1 110       1        0 1600    3   1065
## 840   65  67003       1 110       1        0 1600    4   1035
## 841   68  66785       1  86       0        1 1300    3   1045
## 842   68  66550       1  86       0        0 1332    3   1010
## 843   61  66259       1 110       1        0 1600    3   1065
## 844   62  66082       1 110       0        0 1600    5   1070
## 845   65  66000       1  86       1        0 1300    3   1015
## 846   61  66000       1 110       0        0 1600    3   1050
## 847   63  65896       1 110       1        0 1600    3   1065
## 848   67  65785       1 110       1        0 1600    5   1075
## 849   65  65513       1 110       1        1 1600    4   1070
## 850   59  65463       1 110       1        0 1600    5   1070
## 851   68  65400       1  86       1        0 1300    4   1000
## 852   60  65259       1 110       1        0 1600    3   1050
## 853   64  65000       1 110       1        0 1600    3   1050
## 854   68  65000       1 110       0        0 1600    5   1070
## 855   57  65000       1 110       0        0 1600    4   1035
## 856   62  64966       1  86       0        0 1300    3   1020
## 857   68  64950       1 110       1        0 1600    5   1075
## 858   60  64914       1 110       1        0 1600    5   1070
## 859   62  64797       1 110       1        0 1600    5   1075
## 860   65  64772       1 110       1        0 1600    3   1050
## 861   63  64690       1  86       0        0 1300    3   1020
## 862   65  64630       1 110       0        0 1600    5   1070
## 863   67  64613       1 110       1        0 1600    5   1085
## 864   60  64383       1  86       0        0 1300    3   1015
## 865   68  64000       1 110       0        0 1600    5   1075
## 866   66  63881       1  86       0        0 1300    3   1015
## 867   58  63870       0  72       0        0 2000    5   1135
## 868   66  63328       1  86       0        1 1300    5   1065
## 869   65  63000       1  86       1        1 1300    5   1065
## 870   61  63000       1  86       0        1 1300    3   1050
## 871   65  62396       1 110       0        0 1600    3   1050
## 872   62  62377       1 110       1        0 1600    5   1075
## 873   67  62316       1 110       1        0 1600    3   1050
## 874   68  62292       1 110       1        0 1600    3   1065
## 875   65  62225       1 110       1        0 1600    3   1050
## 876   68  62222       1 110       0        0 1600    5   1075
## 877   66  62135       1  86       1        0 1300    5   1035
## 878   58  62024       1 110       1        0 1600    5   1075
## 879   60  61977       1  86       1        0 1300    3   1015
## 880   62  61930       1 110       1        0 1600    4   1035
## 881   57  61682       1 110       0        0 1600    3   1050
## 882   68  61568       1 110       1        0 1600    4   1035
## 883   68  61504       1 110       1        0 1600    4   1035
## 884   65  61384       1 110       1        0 1600    3   1050
## 885   58  61343       1 110       1        0 1600    5   1075
## 886   62  61254       1 110       0        0 1600    5   1075
## 887   59  61166       1 110       1        0 1600    3   1050
## 888   62  61149       1  86       1        0 1300    5   1040
## 889   61  61144       1 110       1        0 1600    5   1090
## 890   59  61127       1 110       1        0 1600    3   1050
## 891   60  61100       1  86       1        0 1300    3   1015
## 892   68  61100       1 110       1        0 1600    5   1075
## 893   57  61000       1 110       1        0 1600    3   1050
## 894   65  60724       1  86       1        0 1300    3   1015
## 895   59  60708       1  86       1        0 1300    5   1045
## 896   61  60532       1 110       1        0 1600    3   1050
## 897   67  60000       1  86       0        1 1300    4   1030
## 898   66  60000       1  86       1        0 1300    3   1015
## 899   65  60000       1  86       1        0 1300    3   1015
## 900   62  59295       1  86       0        0 1300    5   1035
## 901   65  59264       1  86       0        0 1300    3   1015
## 902   63  59000       1 110       0        0 1600    3   1050
## 903   63  59000       1  86       1        0 1300    5   1035
## 904   65  59000       1 110       0        0 1600    5   1075
## 905   61  59000       1 110       1        0 1600    5   1070
## 906   65  59000       1 110       0        0 1600    3   1050
## 907   68  58860       1 110       1        0 1600    3   1055
## 908   65  58829       1 110       0        0 1600    3   1050
## 909   66  58654       1 110       1        0 1600    5   1070
## 910   65  58300       1  86       1        0 1300    3   1015
## 911   60  58269       1 110       1        0 1600    3   1050
## 912   64  58136       1 110       1        0 1600    5   1075
## 913   66  58113       1 107       1        1 1600    3   1085
## 914   67  58058       1 110       1        0 1600    3   1065
## 915   58  58000       1 110       1        0 1600    3   1050
## 916   62  58000       1 110       1        0 1600    3   1065
## 917   68  57565       1  86       1        0 1300    5   1035
## 918   63  57413       1 107       0        1 1600    5   1115
## 919   65  57374       1 110       1        0 1600    5   1075
## 920   62  57179       1 110       1        0 1600    5   1075
## 921   61  57169       1 110       1        0 1600    3   1065
## 922   63  57124       1 110       1        0 1600    3   1065
## 923   63  57000       1 110       1        0 1600    3   1050
## 924   67  57000       1 110       0        0 1600    3   1050
## 925   63  57000       1  86       1        0 1300    5   1035
## 926   59  56259       1  86       0        0 1300    3   1015
## 927   62  56209       1 107       1        1 1600    3   1080
## 928   67  56074       1  86       0        0 1300    4   1000
## 929   63  55942       1 110       1        0 1600    5   1070
## 930   57  55844       1  86       1        0 1300    5   1045
## 931   61  55747       1  86       0        0 1300    3   1020
## 932   58  55478       1  86       0        0 1300    5   1045
## 933   60  55085       1 107       0        1 1600    5   1105
## 934   65  55061       1 110       1        0 1600    5   1070
## 935   65  55000       1  86       1        0 1300    3   1015
## 936   57  55000       1 110       0        0 1600    5   1075
## 937   63  54936       1 110       1        0 1600    5   1075
## 938   68  54875       1 110       1        0 1600    5   1070
## 939   67  54847       1 110       0        0 1600    3   1050
## 940   60  54554       1 110       1        0 1600    3   1065
## 941   61  54125       1 110       1        0 1600    5   1035
## 942   61  54000       1 110       1        0 1600    3   1055
## 943   57  54000       1 110       1        0 1600    5   1075
## 944   58  54000       1  86       0        0 1300    5   1035
## 945   57  54000       1 110       1        0 1600    3   1135
## 946   62  53285       1 110       1        0 1600    5   1075
## 947   65  53053       1 110       1        0 1600    5   1075
## 948   68  53000       1 110       1        1 1587    3   1075
## 949   68  53000       1  86       0        0 1300    3   1015
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## 950   64  52968       1 110       1        0 1600    3   1050
## 951   67  52800       1  86       1        0 1300    3   1015
## 952   57  52548       1 110       0        0 1600    3   1050
## 953   60  52487       1 110       1        0 1600    4   1035
## 954   66  52383       1  86       0        0 1300    3   1015
## 955   61  52112       1 110       1        0 1600    4   1035
## 956   58  51712       1 110       0        0 1600    3   1050
## 957   58  51421       1 110       0        1 1600    5   1105
## 958   61  51235       1  86       1        0 1300    4   1000
## 959   65  51000       1  86       1        0 1300    3   1015
## 960   61  50925       1 110       1        0 1600    5   1070
## 961   66  50806       1  86       0        0 1300    3   1480
## 962   59  50469       1 110       1        0 1600    5   1070
## 963   61  50173       1 110       1        0 1600    5   1075
## 964   62  50000       1 110       1        0 1600    5   1075
## 965   65  49942       1 110       0        0 1600    3   1065
## 966   67  49585       1 110       0        0 1600    5   1085
## 967   62  49258       1 110       1        0 1600    4   1035
## 968   61  49000       1 110       0        0 1600    3   1050
## 969   63  48738       1 110       0        0 1600    5   1055
## 970   62  47750       1  86       1        0 1300    5   1040
## 971   63  47612       1  86       0        0 1300    3   1015
## 972   68  47500       1  86       1        0 1300    5   1035
## 973   66  47237       1 110       0        0 1600    3   1050
## 974   58  47171       1  86       1        0 1300    3   1015
## 975   60  47060       1 110       0        0 1600    4   1035
## 976   65  47014       1  86       1        0 1300    3   1015
## 977   59  46929       1  86       1        0 1300    3   1025
## 978   63  46000       1  86       0        0 1300    5   1035
## 979   65  45681       1 110       0        0 1600    3   1050
## 980   65  45549       1  86       1        0 1300    3   1015
## 981   57  45000       1 110       1        0 1600    5   1050
## 982   57  45000       1 110       1        0 1600    3   1050
## 983   65  45000       1 110       0        0 1600    5   1075
## 984   66  45000       1  86       1        0 1300    5   1035
## 985   63  45000       1 110       1        0 1600    4   1035
## 986   61  45000       1 107       0        1 1600    3   1085
## 987   63  44944       1 110       1        0 1600    4   1035
## 988   61  44597       1  86       0        0 1300    3   1015
## 989   68  44458       1  86       0        0 1300    3   1015
## 990   59  43818       1 110       0        0 1600    5   1070
## 991   60  43426       1 110       1        0 1600    5   1070
## 992   58  43000       2 110       1        1 1600    4   1114
## 993   68  43000       1 110       1        0 1600    5   1035
## 994   57  43000       1 110       0        0 1600    5   1075
## 995   64  43000       1  86       0        0 1300    3   1015
## 996   68  42750       1 110       1        0 1600    3   1050
## 997   67  42102       1 110       1        0 1600    5   1075
## 998   63  41586       1 110       1        0 1600    5   1114
## 999   64  41200       1 110       0        0 1600    5   1070
## 1000  57  40214       1  86       0        0 1300    3   1025
## 1001  60  40000       1  86       1        0 1300    4   1000
## 1002  66  39222       1  86       1        1 1300    3   1045
## 1003  66  39144       1 110       1        0 1600    3   1050
## 1004  62  39000       1 110       1        0 1600    5   1075
## 1005  61  38019       1 110       1        0 1600    5   1070
## 1006  68  37759       1 110       1        0 1600    5   1070
## 1007  61  37500       1 110       0        0 1600    5   1085
## 1008  60  37111       1 110       1        0 1600    3   1050
## 1009  62  37000       1  86       0        0 1300    3   1015
## 1010  59  36954       1 110       1        0 1600    3   1050
## 1011  60  36943       1 110       0        0 1600    5   1070
## 1012  63  36923       1  86       0        0 1300    5   1050
## 1013  66  36658       1 110       0        0 1600    3   1050
## 1014  65  36000       1  86       1        0 1300    3   1015
## 1015  65  36000       1 110       1        0 1600    3   1065
## 1016  62  35512       1 110       1        0 1600    3   1065
## 1017  65  35283       1  86       1        0 1300    3   1015
## 1018  68  35000       1 110       1        0 1600    3   1050
## 1019  57  35000       1  86       1        0 1300    5   1045
## 1020  64  34114       1 110       0        0 1600    3   1050
## 1021  58  34000       1 110       0        0 1600    5   1075
## 1022  68  33847       1  86       1        0 1300    4   1000
## 1023  57  33535       1 110       0        0 1600    4   1035
## 1024  65  33000       1 110       0        0 1600    3   1050
## 1025  59  32150       1 110       1        0 1600    5   1085
## 1026  65  31588       1  86       1        0 1300    3   1015
## 1027  60  31480       1 110       1        0 1600    3   1065
## 1028  57  31307       1 110       1        0 1600    5   1070
## 1029  68  31000       1 110       1        0 1600    4   1035
## 1030  58  30634       1 110       1        0 1600    5   1075
## 1031  68  30300       1  86       1        0 1300    4   1000
## 1032  60  28500       1  86       1        1 1300    3   1045
## 1033  60  28500       1 110       0        0 1600    5   1075
## 1034  57  28000       1  86       0        0 1300    3   1015
## 1035  68  26698       1 110       0        0 1600    3   1055
## 1036  62  26000       1 107       0        1 1600    3   1085
## 1037  62  25505       1  86       1        0 1300    5   1035
## 1038  58  25000       1 110       1        0 1600    5   1075
## 1039  66  22835       1 110       1        0 1600    3   1050
## 1040  59  22705       1 110       1        0 1600    5   1075
## 1041  63  22178       1  86       1        0 1300    3   1015
## 1042  62  17345       1 110       1        0 1600    3   1050
## 1043  67  15535       1  86       1        1 1300    4   1030
## 1044  66  15110       1  86       0        0 1300    5   1035
## 1045  73 232940       0  72       0        0 2000    5   1172
## 1046  79 218118       0  72       0        0 2000    5   1150
## 1047  78 217764       0  72       1        0 2000    5   1135
## 1048  79 207114       2 110       1        0 1600    5   1114
## 1049  74 203254       0  72       1        0 2000    3   1135
## 1050  77 200732       0  72       1        0 2000    4   1100
## 1051  69 197501       0  72       0        0 2000    5   1135
## 1052  80 194765       0  72       0        0 2000    3   1120
## 1053  76 191620       0  72       0        0 2000    5   1150
## 1054  76 183277       0  72       0        0 2000    3   1115
## 1055  78 180378       0  72       1        0 2000    4   1100
## 1056  70 178800       0  72       0        0 2000    3   1115
## 1057  73 176177       1 110       1        0 1600    5   1075
## 1058  78 176000       1  86       0        0 1300    5   1035
## 1059  77 172980       0  72       1        0 2000    5   1135
## 1060  77 170000       0  72       0        0 2000    4   1100
## 1061  71 164000       1 110       1        0 1600    3   1050
## 1062  78 161775       1  86       1        0 1300    3   1015
## 1063  80 160000       1  86       0        0 1300    3   1015
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## 1064  78 159968       0  72       0        0 2000    3   1115
## 1065  74 159908       1 110       0        0 1600    3   1050
## 1066  73 158492       1  86       0        0 1300    3   1015
## 1067  69 156204       0  72       1        0 2000    3   1115
## 1068  73 156169       1  86       1        0 1300    5   1035
## 1069  78 155210       1 110       0        0 1600    3   1050
## 1070  69 155000       0  72       0        0 2000    3   1115
## 1071  76 154900       0  72       1        0 2000    5   1140
## 1072  70 151300       0  72       1        0 2000    5   1150
## 1073  71 151000       2 110       1        0 1600    5   1094
## 1074  75 150000       0  72       1        0 2000    3   1135
## 1075  69 146304       0  72       1        0 2000    3   1115
## 1076  75 146197       1  86       0        0 1300    3   1015
## 1077  77 145996       1 110       0        0 1600    4   1035
## 1078  80 143560       1  86       1        1 1300    3   1045
## 1079  71 139145       0  73       0        0 2000    2   1115
## 1080  79 138500       1  86       0        0 1300    5   1050
## 1081  74 137741       0  90       1        0 2000    5   1135
## 1082  80 137178       0  90       1        0 2000    5   1135
## 1083  76 134889       0  72       1        0 2000    3   1115
## 1084  71 134660       0  72       0        0 2000    5   1135
## 1085  73 134539       1 110       0        0 1600    5   1070
## 1086  79 131500       0  72       0        0 2000    5   1140
## 1087  77 131307       1 110       1        0 1600    3   1050
## 1088  74 130025       1 110       1        0 1600    3   1050
## 1089  78 130000       1  86       0        0 1300    5   1015
## 1090  77 128960       1 110       1        0 1600    5   1070
## 1091  80 128351       1 110       1        0 1600    5   1070
## 1092  73 128006       1 110       1        0 1600    3   1050
## 1093  71 127159       0  72       1        0 2000    3   1115
## 1094  72 126478       1 110       1        0 1600    4   1035
## 1095  77 126000       1 110       1        0 1600    5   1050
## 1096  76 125778       1 110       0        0 1600    3   1050
## 1097  75 125400       1 110       0        0 1600    3   1050
## 1098  74 124910       0  72       0        0 2000    5   1135
## 1099  70 124743       1 110       1        0 1600    3   1050
## 1100  76 124591       1 110       1        0 1600    5   1075
## 1101  74 124057       1 110       1        0 1600    3   1050
## 1102  72 123403       1 110       1        0 1600    3   1050
## 1103  75 123104       1 110       1        0 1600    5   1070
## 1104  74 123077       1  86       1        0 1300    3   1015
## 1105  80 122820       1  86       0        0 1300    5   1040
## 1106  77 122290       1 110       0        0 1600    3   1050
## 1107  74 121900       1 110       1        0 1600    4   1035
## 1108  77 121545       1 110       1        0 1600    5   1070
## 1109  71 120474       0  72       1        0 2000    3   1115
## 1110  76 120263       0  72       1        0 2000    5   1135
## 1111  74 120196       1 110       1        0 1600    3   1050
## 1112  71 120000       1 110       0        0 1600    5   1085
## 1113  78 120000       1 110       0        0 1600    5   1075
## 1114  73 115877       1 110       0        0 1600    4   1035
## 1115  76 115345       1 110       1        0 1600    5   1070
## 1116  71 115157       1 110       1        0 1600    3   1050
## 1117  78 115000       1 107       1        1 1600    5   1100
## 1118  77 114258       1  86       1        0 1300    5   1050
## 1119  73 112963       0  72       1        0 2000    5   1135
## 1120  74 112307       1 110       1        0 1600    5   1070
## 1121  72 112000       1  86       1        0 1300    3   1015
## 1122  73 111602       1  86       1        0 1300    3   1015
## 1123  80 111392       2 110       0        0 1598    3   1083
## 1124  76 110901       1 110       1        0 1600    5   1085
## 1125  80 110887       1 110       1        0 1600    3   1055
## 1126  72 110634       1  86       1        0 1300    3   1015
## 1127  80 110000       1 110       1        0 1600    4   1035
## 1128  75 109540       1 110       0        0 1600    5   1085
## 1129  78 109263       1 110       0        0 1600    5   1070
## 1130  71 107516       1 110       1        0 1600    3   1050
## 1131  73 107108       1 110       1        0 1600    3   1050
## 1132  75 107000       1 110       1        0 1600    3   1050
## 1133  74 106250       1 110       0        0 1600    5   1070
## 1134  71 106150       1  86       0        0 1300    3   1015
## 1135  72 106108       1 110       1        0 1600    3   1050
## 1136  72 105856       1  86       0        0 1300    3   1015
## 1137  77 105152       1  86       0        0 1300    3   1015
## 1138  80 105135       1 110       1        0 1600    3   1050
## 1139  76 104344       1 110       1        0 1600    3   1050
## 1140  74 104150       1 110       1        0 1600    3   1050
## 1141  74 104000       1  86       1        0 1300    3   1010
## 1142  73 103121       1  86       1        0 1300    5   1035
## 1143  80 102300       1  86       1        0 1300    3   1015
## 1144  75 102005       1 107       1        1 1600    5   1105
## 1145  77 102000       1  86       1        0 1300    3   1015
## 1146  75 101855       1 110       1        0 1600    5   1070
## 1147  74 101773       1 110       0        0 1600    3   1050
## 1148  75 101159       1 110       1        0 1600    5   1085
## 1149  74 101000       1  86       0        0 1300    3   1015
## 1150  74 100732       1  86       1        1 1300    4   1030
## 1151  79 100719       1 110       0        0 1600    5   1070
## 1152  78 100487       1 110       0        0 1600    4   1035
## 1153  80 100458       1 110       0        0 1600    5   1085
## 1154  75 100192       1 110       1        0 1600    3   1050
## 1155  80 100123       1 110       1        0 1600    3   1050
## 1156  73  99971       1 110       1        0 1600    3   1050
## 1157  79  99397       1  86       0        0 1300    5   1035
## 1158  69  99374       1  86       1        0 1300    5   1035
## 1159  72  99245       1 110       1        0 1600    5   1114
## 1160  79  98742       1 110       0        0 1600    5   1085
## 1161  71  98154       1 110       1        0 1600    3   1050
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## 1163  80  97548       1  86       0        0 1300    5   1035
## 1164  78  97534       1 110       1        0 1600    5   1070
## 1165  73  97494       1 110       1        0 1600    5   1085
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## 1167  69  97000       1 110       0        0 1600    4   1035
## 1168  74  96302       1  86       1        0 1300    3   1015
## 1169  78  96000       1  86       1        0 1300    3   1015
## 1170  74  96000       1 110       1        0 1600    5   1085
## 1171  78  95909       1 110       1        0 1600    5   1070
## 1172  79  95700       1 110       0        0 1600    5   1085
## 1173  78  95651       1 110       1        0 1600    5   1070
## 1174  79  95000       1  86       1        0 1300    5   1035
## 1175  80  94447       1 110       0        0 1600    3   1050
## 1176  80  94079       1 110       1        0 1600    5   1085
## 1177  80  93841       1 110       0        0 1600    5   1070
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## 1178  79  93090       1  86       1        0 1300    5   1035
## 1179  72  93066       1 110       1        0 1600    5   1075
## 1180  79  93039       1 110       1        0 1600    3   1050
## 1181  77  93000       1 110       1        0 1600    5   1075
## 1182  80  92830       1  86       1        0 1300    3   1015
## 1183  80  92255       1 107       0        1 1600    5   1105
## 1184  80  92096       1  86       1        0 1300    5   1035
## 1185  72  91921       1  86       1        0 1300    3   1020
## 1186  70  91900       1  86       1        0 1300    3   1015
## 1187  78  91399       1 110       1        0 1600    5   1070
## 1188  75  91082       1 110       1        0 1600    3   1050
## 1189  71  90370       1  86       1        0 1300    5   1035
## 1190  78  90345       1  86       1        0 1300    5   1035
## 1191  77  90305       1  86       1        0 1300    3   1015
## 1192  78  90011       1  86       0        1 1300    3   1045
## 1193  77  90000       1  86       1        0 1300    3   1015
## 1194  70  89983       1 110       0        0 1600    3   1055
## 1195  78  89953       1 110       0        0 1600    5   1114
## 1196  74  89800       0  72       1        0 2000    3   1115
## 1197  79  89739       1  86       1        0 1300    5   1035
## 1198  76  89520       1 110       1        0 1600    3   1050
## 1199  75  89507       1  86       0        0 1300    3   1015
## 1200  69  89096       1 110       1        0 1600    5   1085
## 1201  74  88700       1 110       1        0 1600    3   1050
## 1202  72  88500       1 110       1        0 1600    5   1075
## 1203  73  88186       0  72       1        0 2000    3   1115
## 1204  75  88000       1 110       1        0 1600    3   1050
## 1205  78  87743       1 110       0        0 1600    3   1055
## 1206  75  87613       1  86       0        0 1300    3   1015
## 1207  73  87358       1 110       1        0 1600    3   1050
## 1208  72  87083       1 110       0        0 1600    4   1035
## 1209  70  87000       1 110       1        0 1600    4   1035
## 1210  78  87000       1 110       1        0 1600    4   1035
## 1211  73  87000       1  86       1        0 1300    3   1015
## 1212  80  87000       1  86       1        0 1300    3   1015
## 1213  72  86860       1 110       0        0 1600    5   1075
## 1214  80  86109       1 110       1        0 1600    3   1055
## 1215  79  86000       1  86       1        0 1300    5   1040
## 1216  80  86000       1 110       0        0 1600    3   1050
## 1217  70  85864       0  72       1        0 2000    5   1135
## 1218  80  85565       1 110       0        0 1600    5   1070
## 1219  70  85470       1 107       0        1 1600    3   1080
## 1220  73  85200       1 110       1        0 1600    3   1050
## 1221  70  85000       1 110       1        0 1600    3   1055
## 1222  73  84988       1 110       1        0 1600    3   1050
## 1223  79  84966       1 110       0        0 1600    5   1070
## 1224  76  84472       1 110       1        0 1600    5   1070
## 1225  73  84402       1 110       1        0 1600    4   1035
## 1226  74  84123       1 110       0        0 1600    3   1050
## 1227  80  84000       1 110       0        0 1600    5   1075
## 1228  78  84000       1 110       1        0 1600    5   1065
## 1229  77  84000       1 110       1        0 1600    5   1085
## 1230  75  83850       1 110       1        0 1600    3   1055
## 1231  80  83540       1 110       1        0 1600    5   1070
## 1232  76  83405       1 110       1        0 1600    5   1070
## 1233  71  83291       1 110       1        0 1600    5   1070
## 1234  69  83133       1  86       0        0 1300    3   1015
## 1235  71  83047       1  86       1        1 1300    3   1045
## 1236  71  82700       1 110       0        0 1600    3   1050
## 1237  78  82675       1  86       0        0 1300    3   1015
## 1238  78  82595       1  86       1        0 1300    3   1015
## 1239  75  82256       1 110       1        0 1600    3   1050
## 1240  77  82103       1  86       1        0 1300    3   1015
## 1241  80  82021       1  86       1        0 1300    5   1035
## 1242  71  82000       1 110       1        0 1600    5   1075
## 1243  79  81988       1 110       1        0 1600    5   1070
## 1244  76  81930       1 110       0        0 1600    5   1070
## 1245  70  81663       1 110       0        0 1600    3   1050
## 1246  77  80486       1 110       1        0 1600    5   1070
## 1247  78  80000       1 110       1        0 1600    4   1065
## 1248  69  79000       1  86       0        0 1300    3   1015
## 1249  74  78894       1 110       0        0 1600    5   1070
## 1250  78  78689       1 110       0        0 1600    4   1035
## 1251  77  78435       1  86       0        0 1300    3   1015
## 1252  71  78260       1 110       0        0 1600    3   1050
## 1253  72  78120       1 110       1        0 1600    5   1075
## 1254  77  77000       1  86       0        0 1300    3   1015
## 1255  78  77000       1 110       0        0 1600    3   1050
## 1256  75  76382       1 110       1        0 1600    3   1055
## 1257  76  76268       1  86       1        0 1300    3   1015
## 1258  73  76151       1  86       1        0 1300    3   1015
## 1259  80  76000       1 110       0        0 1600    3   1050
## 1260  71  76000       1 110       1        0 1600    5   1070
## 1261  72  75840       1  86       0        0 1300    5   1035
## 1262  77  75799       1 110       1        0 1600    3   1050
## 1263  72  75525       1 110       1        0 1600    3   1114
## 1264  78  75323       1  86       1        0 1300    5   1050
## 1265  79  75322       1 110       1        0 1600    4   1115
## 1266  78  75226       1 110       0        0 1600    4   1035
## 1267  71  75085       1  86       0        0 1300    5   1035
## 1268  73  75000       1 110       0        0 1600    5   1075
## 1269  69  75000       1  86       1        0 1300    4   1000
## 1270  69  75000       1  86       1        0 1300    4   1000
## 1271  78  74926       1 110       1        0 1600    5   1075
## 1272  80  74785       1 110       1        0 1600    5   1070
## 1273  69  74573       1 110       1        0 1600    5   1085
## 1274  75  74567       1  86       1        0 1300    3   1015
## 1275  80  74196       1 110       0        0 1600    5   1075
## 1276  80  74151       1 110       1        0 1600    3   1050
## 1277  75  74096       1 110       1        0 1600    3   1050
## 1278  79  74093       1 110       1        0 1600    5   1075
## 1279  71  74000       1 110       0        0 1600    3   1050
## 1280  75  74000       1  86       1        0 1300    3   1015
## 1281  78  73638       1  86       1        1 1300    4   1015
## 1282  75  73460       1 110       1        0 1600    5   1070
## 1283  80  73200       1 110       1        0 1600    5   1070
## 1284  76  73116       1 110       1        0 1600    5   1075
## 1285  70  73014       1 110       1        0 1600    5   1075
## 1286  77  72703       1 110       1        0 1600    3   1050
## 1287  79  72328       1 110       1        0 1600    5   1075
## 1288  78  72222       1 110       1        0 1600    5   1070
## 1289  71  72128       1 107       1        1 1600    5   1100
## 1290  78  72090       1 110       1        0 1600    5   1070
## 1291  78  72000       1 110       1        0 1600    4   1035
```

```
## 1292  78  72000       1 110       0        0 1600    3   1055
## 1293  77  71900       1  86       1        0 1300    3   1015
## 1294  77  71825       1 110       0        0 1600    5   1075
## 1295  80  71740       1 110       1        0 1600    5   1070
## 1296  80  71500       1 110       1        0 1600    4   1035
## 1297  79  71359       1 110       1        0 1600    3   1050
## 1298  79  71263       1  86       0        0 1300    3   1015
## 1299  78  71186       1 110       0        0 1600    3   1050
## 1300  72  71054       1  86       0        1 1300    3   1045
## 1301  76  71000       1 110       1        0 1600    3   1050
## 1302  80  70939       1 110       1        1 1600    5   1100
## 1303  77  70932       1 110       1        0 1600    3   1050
## 1304  80  70597       1 107       1        1 1600    3   1080
## 1305  73  70482       1 110       1        0 1600    5   1075
## 1306  77  70124       1 110       1        0 1600    3   1050
## 1307  76  70039       1 110       1        0 1600    3   1050
## 1308  80  69904       1 110       0        0 1600    5   1070
## 1309  75  69388       1  86       0        0 1300    3   1010
## 1310  75  69320       1 110       1        0 1600    5   1070
## 1311  78  69000       1 110       1        0 1600    5   1075
## 1312  73  68988       1  86       1        0 1300    5   1035
## 1313  79  68945       1 110       1        0 1600    5   1085
## 1314  74  68285       1 110       1        0 1600    3   1050
## 1315  76  68000       1 110       1        0 1600    5   1075
## 1316  70  68000       1  86       1        1 1300    3   1045
## 1317  75  67451       1  86       1        0 1300    4   1000
## 1318  76  67266       1  86       1        0 1300    5   1035
## 1319  78  67255       1 110       0        0 1600    5   1085
## 1320  70  67100       1 110       1        0 1600    5   1075
## 1321  69  67092       0  72       1        0 2000    3   1115
## 1322  80  66880       1 110       1        0 1600    3   1055
## 1323  79  66855       1 110       1        0 1600    5   1075
## 1324  80  66843       1 110       1        0 1600    5   1075
## 1325  74  66718       1 110       1        0 1600    3   1050
## 1326  80  66168       1  86       1        0 1300    3   1015
## 1327  80  65950       1 110       0        0 1600    5   1070
## 1328  78  65500       1  86       1        0 1300    3   1015
## 1329  80  65307       1 110       1        0 1600    3   1055
## 1330  79  65254       1  86       1        0 1300    3   1015
## 1331  71  65021       0  72       1        0 2000    3   1115
## 1332  75  65006       1  86       1        0 1300    3   1015
## 1333  77  64280       1 110       0        0 1600    4   1035
## 1334  75  64000       1 107       0        1 1600    3   1085
## 1335  71  64000       1 110       1        0 1600    5   1070
## 1336  80  64000       1 110       0        0 1600    3   1055
## 1337  79  63918       1 110       0        0 1600    4   1035
## 1338  75  63634       1 110       1        0 1600    4   1035
## 1339  80  63500       1 110       1        0 1600    3   1050
## 1340  80  63266       1 110       1        0 1600    4   1035
## 1341  77  62595       1 110       1        0 1600    3   1050
## 1342  80  62581       1 110       0        0 1600    5   1075
## 1343  77  62285       1 110       1        0 1600    5   1075
## 1344  77  61906       1  86       1        1 1300    5   1065
## 1345  74  61700       1 110       0        0 1600    5   1070
## 1346  77  61648       1 110       1        0 1600    5   1070
## 1347  75  61626       1  86       0        0 1300    5   1035
## 1348  70  61510       1 110       0        0 1600    4   1035
## 1349  79  61165       1 107       1        1 1600    3   1080
## 1350  70  61000       1 110       1        0 1600    4   1035
## 1351  76  60833       1 110       1        0 1600    4   1035
## 1352  70  60600       1  86       0        0 1300    3   1060
## 1353  72  60483       1 110       1        0 1600    5   1075
## 1354  80  60476       1 110       1        0 1600    5   1114
## 1355  79  60142       1 110       0        0 1600    3   1050
## 1356  69  60050       1 110       1        0 1600    3   1050
## 1357  77  60000       1 110       1        0 1600    3   1050
## 1358  76  60000       1 110       0        0 1600    3   1050
## 1359  76  59815       1 110       1        0 1587    3   1055
## 1360  80  59326       1 110       1        0 1600    5   1085
## 1361  73  59240       1 110       1        0 1600    3   1050
## 1362  71  59164       1 110       0        0 1600    4   1035
## 1363  70  59017       1 107       1        1 1600    3   1080
## 1364  69  58952       1 110       1        0 1600    3   1050
## 1365  74  58454       1  86       1        0 1300    3   1015
## 1366  75  58341       1  86       1        1 1300    4   1030
## 1367  80  58267       1 110       1        0 1600    5   1070
## 1368  80  58000       1 110       0        0 1600    3   1055
## 1369  70  57829       1 110       0        0 1600    3   1050
## 1370  80  57787       1  86       0        0 1300    3   1015
## 1371  78  57628       1 110       0        0 1600    5   1075
## 1372  75  57537       1  86       1        0 1300    5   1050
## 1373  76  57263       1 110       1        0 1600    3   1050
## 1374  75  57144       1 110       1        0 1600    5   1070
## 1375  69  57096       1  86       1        0 1300    3   1025
## 1376  80  57000       1  86       0        0 1300    4   1000
## 1377  73  56566       1 110       1        0 1600    3   1050
## 1378  73  56307       1 110       1        0 1600    3   1050
## 1379  79  56214       1  86       0        0 1300    3   1015
## 1380  74  56132       1 110       0        0 1600    4   1035
## 1381  79  55425       1 110       0        0 1600    5   1075
## 1382  77  54439       1  86       1        0 1300    3   1015
## 1383  69  53809       1 110       1        0 1600    3   1050
## 1384  76  53133       1 110       1        0 1600    5   1070
## 1385  77  52900       1 110       1        0 1600    4   1075
## 1386  80  52700       1 110       0        0 1600    3   1050
## 1387  69  52320       1 110       0        0 1600    5   1070
## 1388  78  52287       1 110       0        0 1600    5   1114
## 1389  75  52000       1 110       0        0 1600    5   1075
## 1390  69  52000       1 110       1        0 1600    3   1050
## 1391  73  52000       1 110       1        1 1600    4   1065
## 1392  70  51874       1  86       0        0 1300    4   1000
## 1393  79  49827       1  86       1        0 1300    5   1035
## 1394  69  49640       1 110       1        0 1600    4   1035
## 1395  80  49580       1 110       1        0 1600    4   1035
## 1396  76  49170       1  86       0        0 1300    3   1045
## 1397  77  48838       1 110       0        0 1600    3   1055
## 1398  71  48576       1  86       1        0 1300    3   1015
## 1399  75  48400       1 110       1        0 1600    5   1075
## 1400  74  48242       1  86       1        0 1300    5   1035
## 1401  70  47955       1 110       1        0 1600    5   1070
## 1402  71  47633       1 110       1        0 1600    5   1075
## 1403  78  47400       1  86       1        0 1300    5   1040
## 1404  73  47360       1  86       0        0 1300    3   1010
## 1405  77  45507       1 110       1        0 1600    3   1050
```

```
## 1406  76  45410       1  86       1        0 1300    5   1035
## 1407  70  44850       1 110       1        0 1600    3   1050
## 1408  69  44826       1 110       0        0 1600    5   1075
## 1409  80  44444       1 110       1        0 1600    3   1050
## 1410  75  43720       1 110       1        0 1600    5   1070
## 1411  78  43622       1  86       1        0 1300    4   1000
## 1412  76  43532       1 110       0        0 1600    5   1070
## 1413  69  42800       1 110       1        0 1600    3   1050
## 1414  74  42317       1 107       1        1 1600    5   1100
## 1415  80  42186       1 110       1        0 1600    3   1050
## 1416  72  42000       1 110       1        0 1600    3   1050
## 1417  79  40093       1 110       0        0 1600    5   1114
## 1418  79  39800       1 107       0        1 1600    3   1080
## 1419  73  39168       1  86       0        0 1300    3   1015
## 1420  75  38945       1 110       1        0 1600    3   1050
## 1421  76  36537       1 110       0        1 1600    4   1075
## 1422  78  36000       1  86       0        1 1300    3   1045
## 1423  78  36000       1 110       1        0 1600    3   1050
## 1424  80  35821       1  86       0        1 1300    3   1015
## 1425  73  34717       1  86       0        0 1300    3   1015
## 1426  80  34000       1  86       1        0 1300    4   1000
## 1427  78  30964       1 110       0        1 1600    3   1080
## 1428  71  29000       1  86       1        1 1300    3   1045
## 1429  72  26000       1  86       0        0 1300    3   1015
## 1430  78  24000       1  86       1        1 1300    5   1065
## 1431  80  23000       1  86       0        0 1300    3   1015
## 1432  69  20544       1  86       1        0 1300    3   1025
## 1433  72  19000       1  86       0        0 1300    3   1015
## 1434  71  17016       1  86       0        0 1300    3   1015
## 1435  70  16916       1  86       1        0 1300    3   1015
## 1436  76      1       1 110       0        0 1600    5   1114
```

```
y <- Toyotacor[,1] # dependent variable
y
```

```
##    [1] 13500 13750 13950 14950 13750 12950 16900 18600 21500 12950 20950
##   [12] 19950 19600 21500 22500 22000 22750 17950 16750 16950 15950 16950
##   [23] 15950 16950 16250 15950 17495 15750 16950 17950 12950 15750 15950
##   [34] 14950 15500 15750 15950 14950 15750 14750 13950 16750 13950 16950
##   [45] 16950 19000 17950 15800 17950 21950 17950 15750 20500 21950 15500
##   [56] 13250 15250 15250 18950 15999 14950 16500 18750 17950 17950 16950
##   [67] 18950 14950 22250 15950 15950 12995 18950 15750 19950 16950 18750
##   [78] 18450 16895 14900 18950 17250 15450 17950 16650 17450 14900 17950
##   [89] 15950 21950 16450 22250 19950 15950 18900 19950 15950 15950 18750
##  [100] 17450 18990 16250 18500 18500 19450 16950 18800 17450 17950 32500
##  [111] 31000 31275 24950 24950 22950 24990 21950 17900 19250 22250 18950
##  [122] 19950 16350 18950 16950 21750 15950 16500 17950 15850 16250 15950
##  [133] 16250 15950 16500 16500 18450 16250 23000 19900 16450 23950 19950
##  [144] 18500 18950 16450 20500 24500 19450 20950 17200 19950 18450 19500
##  [155] 21750 16868 19500 18900 19750 19750 18950 20750 19600 19500 17650
##  [166] 19950 19950 20950 20500 17795 18245 23750 19500 18950 21950 19950
##  [177] 18950 19950 21950 22500 18500 18700 21125 21500 17795 18245  6950
##  [188]  9500 11950  7750 11950  4350  4750 11750 13250 11950 11900 14750
##  [199]  9950 11950 11495 11250 10500 10450 12950 11500 12500 10950 11450
##  [210] 11950 13250 14750 11790 11450 13500 10950 13500 10950 10950 12950
##  [221] 11950 12450 11950 14950 12450 12950 11950 11690 12450 12750 11925
##  [232] 12950 11950 12900 11900 11650 10950 13950 13950 11950 10950 12450
##  [243] 11950 13500 11690 13500 11950 12900 13500 11750 11750 10850 11750
##  [254] 14950  9940 12900 13500 11750 11950 13450 11950 12495 13500 12750
##  [265] 12000 11950 12495 12450 14750 10950 13500 12950 13500 13450 13500
##  [276] 11480 13450 11495 12750 14990 12950 12950 12850 13950 11950 12950
##  [287] 11700  9950 11895 12950 12500 13875 10500 12295 13950 10950 12950
##  [298] 12850 13995 13750 12750 12500 13950 11500 13950 11895  9950 13500
##  [309] 11450 12450 12950 13995 11750 11650  9950 13950 12950 10950  9900
##  [320] 11950 11990 10750 13950 11250 12950 11950 10950 12950 12950 11695
##  [331] 11000 13950 11950 11750 12400 12500 12900 12200 12750 11950 11900
##  [342] 11950 14950 11950 12950 14950 13450 13750 12950 12750 11895  9950
##  [353] 12450 12500 14950 13750 12695 14990 12750 14350 12950 11500 11950
##  [364] 13450 12900 10500 10950 11950 11450 13250 10250 13995 11950 13250
##  [375] 12950 11750 11500 13500  6500  6400  7000  7750  8900  8500  8950
##  [386]  9900 10250  9250  7750  9450  7750  8250  9950  4450  9950  9000
##  [397]  9950 12450 10500 10750  8950 10500  5150 10950  9450  9950 10950
##  [408] 11900  9950 11950  7900 10950  8950 11950 10900  9950  9950 10950
##  [419]  8950  8950 10500  8950  9250 11500  9750  9950 11450 12500 10500
##  [430] 12950 12200 10950 10950 11290 10750 10895 11500  9750 10250 12500
##  [441] 11950 10750 11450 11950 11750 10950 11950 10995 11450  8900 10500
##  [452] 11750 11450 12000 11950  9850 10950 10950  8695 10990  9500 11950
##  [463] 10750  8750  8750 11450  9950 11950 13950 11250 10900  9750  9950
##  [474] 11950 10450  8950 10250  9930 10500 11950 11500 11500 11450  9900
##  [485]  9500 10500 10750  8950 12000  9940 10950 10750  9799 11750 11950
##  [496] 11250 11750 10950 11250  9950  9700 11950  9900  9990  9475 11500
##  [507] 11950 11500 10500 10900 11700 11900 13950 10950 10500 10750 11950
##  [518] 10000 10495 11450  9400 11950  9650 18950 11450 10250 11450  9950
##  [529] 10500 13750  9950 10250 10850 11895 12950 11950 10750  9550 10950
##  [540] 11750 10950 12450 10500 10900 12950 10950 12500  9950 10750 12500
##  [551] 10450 10750 12950 10995 11950 11250 11950 13750 11000 13500 10950
##  [562] 10750  8950 12950  9750 10900 10995 10750 10950 13000 12950 11500
##  [573] 10950 11710  9980 12250 11500 11950 11500 11900 11930 10500  8950
##  [584] 10450 10500 12950  9950 12900  9950  9950 10950 10950  9950 10950
##  [595] 10800 10500 10450 10600 10450 12950 11250  7500  8950  6950  7900
##  [606]  5950  7500  7500  6900  5751  6950  7950  7750  7950  8250  6250
##  [617]  9500  6900  8450  7350  8950  6900  8950  8750  7950  8950  8950
##  [628]  8950  7950  7750  7500  8950  9800  9450  8950  8750 10500  7995
##  [639] 10450  9950  9950  8950  7950 10950  9950  8600  7250  6950  8000
##  [650]  9950  9450  7950  9450  9950  6950  8250  9950  8250  9950 10500
##  [661]  7950  9750  9250  9500  9950  7750  9500  9950  9750  9750  5950
##  [672]  8500  8495  9250  6900  8950  9500  9250  9895  9950  7950  8750
##  [683]  8250  8950  8950  8950  8950  9450  8950  9250  8750  9950  9950
##  [694]  9900  8950  8950 12250  9250 10250  8950  7999  9900  8250 10500
##  [705]  8450  9900 10500  8500  9500  9450  9900  8250  8750  9500  8450
##  [716]  8490  8750  9750  9950  8500  8450  7900  8750  7950  6900  8150
##  [727] 10995  8900  9500  8950 11500 10450 10500  9250 10950 10450  9250
##  [738]  8750  8750  9800  8250 10450  9750  8950  7450  8450  8250 10950
##  [749]  8950  8750 10450 10950  8450  9950  9950  8750  9950  9500  8250
##  [760] 10950  7950  8250  9895  9130 10950 10500  8900  9500 10950  7950
##  [771]  7950  7950  9500 10950  9750  9750  9450  8950  8950  8900  9950
##  [782]  8750  8950  8990  8950  8950  9950  9900  8950  8950  9500  7950
##  [793]  7750  8950 11950  8950 11950  8950  9950  8250  8995  9995  9250
##  [804] 10950  8900  9500  9950  7950  8250  9450  7950  9500  8950 10950
##  [815]  8950  9450  8000  9900  8950 10900  9450  8450  9500 10500  6950
##  [826]  9750  6950  9650  9950  9250  8950  9900 10995 10500  8950  9750
##  [837] 10950  9750  9950 10500 10400  8800 10500  9250  7800  9950 10750
##  [848] 10950  9950  9950  8100  9250  7800  9000  8950  8950  9950  8500
##  [859]  7995  8750  9750 10950  9750  8200  8950  9500 10950  9750  9950
```

```
##  [870] 10450  9850  9450 10295  9750  8950  9900  8750  9950  8500  9950
##  [881] 10950  9795  8750  8250  9950  9950 10500  9750 11250  8900  7950
##  [892] 11500  9450  7995 10995  8950  8250  8950  8950  9500  7500  8950
##  [903]  9950  9750  9450  9950  9750  8950  8250  7750  8950  9950  9450
##  [914] 12950  9950 10495  7950 10500  8950  9900  9995  9950  9950  8250
##  [925]  9950  8950 10950  9250  9950  9995  8750 10950 10350  9950  8950
##  [936] 10950 10950  8950  8900 10250  9450  9250 10500  7350 10250 10250
##  [947] 11500  8950  7750  9500  8450  8950  8400  9250  8900  8750 10950
##  [958]  8950  8950  8895  9390  8750  9750  9950 10950  9900  9500  9950
##  [969]  9950 10500  9950 10495  9500  8500 10450  8950  9900  8900  8745
##  [980]  8750 10750  9750  8850  7950  9450  9950  8250  9950  9995  9950
##  [991] 10495  7950  8950  9695  7750  9950  9950  9950  9900 10950  8950
## [1002]  8950  8250 10250  8750  9750 10950 10950  9750  8900  9500  9950
## [1013]  9950  8250 10450 10950  9250  8900 10900  9750 11950  7900 10900
## [1024] 10450 10950  9950 10750  9900 10750 10450  9450 10750 10950 10000
## [1035] 10500 12500  8950 10500  9245 10950  9500 10900 10950  9450  5900
## [1046]  6950  6000  5250  4400  6750  8500  6150  6950  5750  8750  6500
## [1057]  5950  6500 10500  8500  7950  5800  6750  6950  5740  6550  8950
## [1068]  6750  7950  7950  7450  7750  6450  7900  6900  5600  5950  6950
## [1079]  7950  8950  7950  9500  8600  5950  7750  7950  6950  7250  6500
## [1090]  7250  9250  8250  7250  5250  7900  6900  7900  7250  8450  7950
## [1101]  7950  6450  6650  7950  7250  7450  7950  7250  8250  8950  7750
## [1112]  8500  7750  5750  6900  6500  6500  7600  8950  7450  7350  7750
## [1123]  7460  9250  7250  6500  6800  8700  7500  7750  7950  9950  6640
## [1134]  8750  7750  5950  6750  6500  8750  7950  6750  7950  7950  8950
## [1145]  7750  6450  6900  8450  6750  8050  9500  7750  8500  7795  6490
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## [1167]  7950  6495  7250  9250  6650  6990  7750  6950  7250  9950  9250
## [1178]  7200  8250  8950  8250  6250  9900  7300  8950  6500  7950  7450
## [1189]  7950  8500  6950  7950  6750  8450  7500  8750  8750  8950  7450
## [1200]  9200  8950  7850  6950  7200  7450  6750  7500  7450  7950  7250
## [1211]  7950  8250  8250  6750  8750  8950  8500  8250  9450  7950  7900
## [1222]  8500  8250  8250  8950  7950  6950  7250  7750  8700  8950  6750
## [1233]  7500  7950  8950  7950  7450  5950  7750  6950  8750  8950  7495
## [1244]  7750  6950  7990  7250  6900  7750  7250  8950  8500  7950  6950
## [1255]  8000  7950  8500  7490  8250  9250  7950  9500  8950  8450  7995
## [1266]  8750  5950  8500  8950  8750  7600  7145  8450  5950  9000  7250
## [1277]  7400  8800  7750  7500  8450  7400  7500  8950  8950  7950  7950
## [1288]  7950  8950  7750  8250  7950  7750  8500  6950  7500  7750  5950
## [1299]  7500  8950  7950  6900  7450  8500  7500  8750  7500  9950  7950
## [1310]  9950  9250  9250  9950  5950  7995  8950  7450  8250  8500  8500
## [1321]  9400  7250  8950  9450  8500  6750  7400  8950  6900  7750  8950
## [1332]  6950  8495 10000  6999  8950  8500  8750  7499  9000  8950  6950
## [1343]  8500  8450  8950  8250  7950  7450  9000  7150  7750  5845  8500
## [1354]  8250  9450  6750  8400  7900  7950  8750  9900  6495  8250  6900
## [1365]  7500  7950  8250  8950  9750  8250  8900  8950  6750  7950  8600
## [1376]  7750  7800  8750  9500  7750  9950  7750  5950 10950  9450  8250
## [1387]  9750  7450  8750  8750  8500  8950  7500  7250  7450  8750  9800
## [1398]  7500  8950  8950  7450  8950 10500  7000  8500  7750  8950  8250
## [1409]  9250  7900  8500  7950  9950  8750  7500  6950  8950  8750  7750
## [1420]  8450  8150  8500  7600  7950  7750  7950  9950  8950  8450  8950
## [1431]  8450  7500 10845  8500  7250  6950
```

```
#model selection
Toyotacor.out <- summary(regsubsets(x,y, nbest = 2, nvmax = ncol(x)))
Toyotacor.regtab <- cbind(Toyotacor.out$which, Toyotacor.out$rsq, Toyotacor.out$adjr2, Toyot

colnames(Toyotacor.regtab) <- c("(Intercept)", "Age", "KM", "FuelType", "HP", "MetColor", "T
print(Toyotacor.regtab) # pValue is < 0.05, so we reject null hypothesis
```

```
##   (Intercept) Age KM FuelType HP MetColor Transmission CC Doors Weight
## 1           1   1  0        0  0        0            0  0     0      0
## 1           1   0  0        0  0        0            0  0     0      1
## 2           1   1  0        0  0        0            0  0     0      1
## 2           1   1  0        0  1        0            0  0     0      0
## 3           1   1  1        0  0        0            0  0     0      1
## 3           1   1  0        0  1        0            0  0     0      1
## 4           1   1  1        0  1        0            0  0     0      1
## 4           1   1  1        1  0        0            0  0     0      1
## 5           1   1  1        0  1        0            0  1     0      1
## 5           1   1  1        0  1        0            1  0     0      1
## 6           1   1  1        1  1        0            0  1     0      1
## 6           1   1  1        0  1        0            0  1     1      1
## 7           1   1  1        1  1        0            1  1     0      1
## 7           1   1  1        1  1        0            0  1     1      1
## 8           1   1  1        1  1        1            1  1     0      1
## 8           1   1  1        1  1        0            1  1     1      1
## 9           1   1  1        1  1        1            1  1     1      1
##        R-Sq R-Sq(adj)         Cp
## 1 0.7684109 0.7682494 1088.286745
## 1 0.3377906 0.3373288 5774.545894
## 2 0.8050716 0.8047995  691.324054
## 2 0.8007810 0.8005029  738.016748
## 3 0.8481042 0.8477860  225.017609
## 3 0.8362027 0.8358595  354.537129
## 4 0.8617759 0.8613895   78.235067
## 4 0.8533261 0.8529161  170.190255
## 5 0.8650265 0.8645546   44.859806
## 5 0.8621603 0.8616783   76.051775
## 6 0.8685488 0.8679968    8.528615
## 6 0.8652395 0.8646737   44.541964
## 7 0.8688811 0.8682383    6.912083
## 7 0.8685996 0.8679555    9.975168
## 8 0.8689263 0.8681914    8.420365
## 8 0.8689143 0.8681795    8.550045
## 9 0.8689649 0.8681379   10.000000
```

Regression analysis with the given variable 7 expect km and windows and also find the car cost using these variables

```
#create second model
Toyotacor.m2 <- lm(Price~ Age + FuelType+HP+MetColor+ Automatic+ CC + Doors, data = Toyotaco
Toyotacor.m2.summary <- summary(Toyotacor.m2)
print(Toyotacor.m2.summary)
```

```
##
## Call:
## lm(formula = Price ~ Age + FuelType + HP + MetColor + Automatic +
##     CC + Doors, data = Toyotacor)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -7743.0  -917.8    -2.5   845.8 10889.1
```

```
##
## Coefficients:
##               Estimate Std. Error t value Pr(>|t|)
## (Intercept) 18013.1737   653.1245  27.580  < 2e-16 ***
## Age          -158.7395     2.2938 -69.203  < 2e-16 ***
## FuelType    -2983.6858   281.3298 -10.606  < 2e-16 ***
## HP             80.1797     4.4713  17.932  < 2e-16 ***
## MetColor       69.5683    87.2992   0.797    0.426
## Automatic    1059.8909   177.2514   5.980 2.82e-09 ***
## CC             -3.0006     0.4238  -7.080 2.26e-12 ***
## Doors         186.6019    43.5539   4.284 1.95e-05 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 1534 on 1428 degrees of freedom
## Multiple R-squared:  0.822,  Adjusted R-squared:  0.8211
## F-statistic: 941.8 on 7 and 1428 DF,  p-value: < 2.2e-16
```

```
#Model 2 Conf Intervals
Toyotacor.m2.confint <- confint(Toyotacor.m2)
print(Toyotacor.m2.confint)
```

```
##                    2.5 %       97.5 %
## (Intercept) 16731.987223 19294.360128
## Age          -163.239073  -154.239859
## FuelType    -3535.549866 -2431.821782
## HP             71.408754    88.950692
## MetColor     -101.680116   240.816723
## Automatic     712.189858  1407.591937
## CC             -3.832028    -2.169183
## Doors         101.165454   272.038356
```

```
Toyotacor.m2 <- lm(Price~ Age + FuelType+HP+MetColor+ Automatic+ CC + Doors, data = Toyotaco
Toyotacor.m2
```

```
##
## Call:
## lm(formula = Price ~ Age + FuelType + HP + MetColor + Automatic +
##     CC + Doors, data = Toyotacor)
##
## Coefficients:
## (Intercept)          Age     FuelType           HP     MetColor
##   18013.174    -158.739   -2983.686      80.180      69.568
##   Automatic           CC        Doors
##    1059.891      -3.001     186.602
```

```
#Assigning values
given.Toyotacor <- data.frame(Age=12, FuelType=1, HP=185, MetColor=1, Automatic=0, CC=2000,
predicted.price <- predict(Toyotacor.m2,given.Toyotacor)
print(predicted.price)# Predicted Car Value
```

```
##        1
## 22772.63
```

```
#predicted Values/ Residuals
Toyotaco_hat <- fitted(Toyotacor.m1)# predicted values
as.data.frame(Toyotaco_hat)
```

```
##      Toyotaco_hat
## 1       16382.873
## 2       15976.272
## 3       16342.950
## 4       15943.636
## 5       15707.164
## 6       15109.488
## 7       16825.944
## 8       16751.579
## 9       21203.719
## 10      13925.192
## 11      21264.593
## 12      21441.960
## 13      21253.186
## 14      20717.356
## 15      20420.382
## 16      21096.204
## 17      20667.580
## 18      16276.364
## 19      15320.673
## 20      14872.795
## 21      14821.075
## 22      16915.403
## 23      15558.361
## 24      15936.415
## 25      15914.228
## 26      16363.202
## 27      16022.560
## 28      15669.775
## 29      15693.989
## 30      16022.336
## 31      15749.031
## 32      16208.303
## 33      15684.575
## 34      15757.292
## 35      16117.413
## 36      15540.154
## 37      15944.751
## 38      16480.550
## 39      15137.220
## 40      15660.436
## 41      15935.512
## 42      15456.480
## 43      15968.383
## 44      16682.122
## 45      17454.079
## 46      17901.031
## 47      17223.918
## 48      15743.187
## 49      17948.965
## 50      20218.820
## 51      18099.049
## 52      15044.035
## 53      17308.487
## 54      20945.949
## 55      17167.631
```

```
## 56     14239.064
## 57     15450.958
## 58     15699.393
## 59     17931.532
## 60     15745.064
## 61     16333.057
## 62     16084.929
## 63     15660.188
## 64     15830.282
## 65     15792.126
## 66     15186.708
## 67     16114.880
## 68     16442.734
## 69     20086.101
## 70     16085.686
## 71     15726.005
## 72     14186.110
## 73     16155.866
## 74     16354.208
## 75     16106.142
## 76     16459.718
## 77     15836.892
## 78     15984.474
## 79     15809.281
## 80     15593.764
## 81     17994.812
## 82     15849.627
## 83     16284.921
## 84     17318.617
## 85     16309.817
## 86     16466.721
## 87     15618.839
## 88     18117.112
## 89     16314.600
## 90     19981.140
## 91     16251.158
## 92     18893.706
## 93     19448.672
## 94     16482.748
## 95     16867.162
## 96     19390.667
## 97     16666.332
## 98     16720.966
## 99     18141.108
## 100    16875.596
## 101    17058.714
## 102    16826.694
## 103    16677.603
## 104    17957.441
## 105    19321.028
## 106    16912.117
## 107    16402.480
## 108    17215.986
## 109    16994.296
## 110    27327.442
## 111    27320.418
## 112    27359.588
## 113    23326.014
## 114    23326.014
## 115    22449.824
## 116    21227.308
## 117    20941.512
## 118    18700.332
## 119    18338.491
## 120    20271.023
## 121    17174.860
## 122    18647.529
## 123    17374.699
## 124    16968.205
## 125    17328.909
## 126    17507.302
## 127    15862.308
## 128    16615.806
## 129    17528.131
## 130    16759.847
## 131    16652.986
## 132    16697.327
## 133    16825.477
## 134    17479.372
## 135    16654.182
## 136    16795.228
## 137    17327.143
## 138    17519.840
## 139    22774.243
## 140    17220.696
## 141    16810.278
## 142    22158.141
## 143    18103.335
## 144    16933.705
## 145    17876.333
## 146    17283.840
## 147    18237.422
## 148    18125.897
## 149    17360.838
## 150    18771.890
## 151    16893.131
## 152    17381.049
## 153    18174.526
## 154    18033.105
## 155    18232.596
## 156    17071.395
## 157    17368.155
## 158    18173.446
## 159    17760.778
## 160    19171.831
## 161    17399.491
## 162    17218.494
## 163    18494.581
## 164    17610.170
## 165    18170.905
## 166    18166.857
## 167    18230.965
## 168    18969.590
## 169    18483.302
```

```
## 170    17645.859
## 171    17774.642
## 172    18879.585
## 173    18477.173
## 174    18478.380
## 175    18898.574
## 176    18917.595
## 177    18571.706
## 178    18761.662
## 179    18973.593
## 180    19194.442
## 181    17932.834
## 182    18750.582
## 183    19366.971
## 184    19787.134
## 185    19361.251
## 186    18755.223
## 187     8885.969
## 188    12264.258
## 189    13006.339
## 190     9434.247
## 191    10489.126
## 192    10384.110
## 193    10863.516
## 194    11657.969
## 195    11639.385
## 196    12490.392
## 197    10537.253
## 198    14241.547
## 199    11077.656
## 200    11918.267
## 201    11967.491
## 202    11466.650
## 203    12285.102
## 204    12296.581
## 205    11918.446
## 206    11499.164
## 207    12637.025
## 208    11907.603
## 209    12580.667
## 210    12457.343
## 211    12302.441
## 212    14564.291
## 213    14398.006
## 214    12746.137
## 215    14774.498
## 216    13621.443
## 217    12628.003
## 218    11670.302
## 219    11315.917
## 220    13055.615
## 221    12443.285
## 222    23659.570
## 223    12837.371
## 224    10662.544
## 225    13472.202
## 226    13157.677
## 227    12869.759
## 228    13374.611
## 229    12823.139
## 230    13159.016
## 231    11438.823
## 232    13861.494
## 233    11878.275
## 234    12314.315
## 235    12840.948
## 236    13266.977
## 237    12481.064
## 238    12797.270
## 239    13529.920
## 240    13156.183
## 241    13298.799
## 242    12936.429
## 243    12114.967
## 244    14989.106
## 245    13935.619
## 246    13220.050
## 247    12323.058
## 248    12305.707
## 249    12946.944
## 250    12806.116
## 251    13910.054
## 252    11776.674
## 253    12764.668
## 254    13808.468
## 255    13256.980
## 256    12838.236
## 257    13389.643
## 258    11672.554
## 259    11618.237
## 260    14019.036
## 261    12045.787
## 262    13300.396
## 263    12080.481
## 264    13181.474
## 265    13002.174
## 266    13444.481
## 267    12816.650
## 268    13253.941
## 269    15057.412
## 270    12590.867
## 271    13103.085
## 272    13464.896
## 273    12871.665
## 274    13038.697
## 275    12855.119
## 276    13110.449
## 277    13051.983
## 278    12626.136
## 279    11776.043
## 280    13125.010
## 281    13550.374
## 282    13360.933
## 283    13594.208
```

```
## 284    14180.822
## 285    13142.772
## 286    13391.145
## 287    13272.505
## 288    12589.730
## 289    12479.903
## 290    12923.557
## 291    13100.673
## 292    13419.771
## 293    13384.250
## 294    14161.960
## 295    13167.899
## 296    12826.109
## 297    11867.645
## 298    13432.175
## 299    13945.377
## 300    13101.569
## 301    13719.707
## 302    12651.820
## 303    12561.130
## 304    12489.101
## 305    12553.574
## 306    12866.867
## 307    11877.554
## 308    12435.665
## 309    12682.877
## 310    13123.953
## 311    13474.260
## 312    12986.977
## 313    12081.513
## 314    13193.606
## 315    12071.779
## 316    13264.262
## 317    13003.773
## 318    12639.313
## 319    12154.036
## 320    12874.616
## 321    13661.273
## 322    13896.930
## 323    14067.956
## 324    12235.424
## 325    13555.378
## 326    13319.617
## 327    12206.947
## 328    14306.607
## 329    14066.679
## 330    13088.370
## 331    13625.829
## 332    14176.619
## 333    13650.803
## 334    12781.086
## 335    13890.309
## 336    13346.653
## 337    14347.203
## 338    12732.030
## 339    12441.414
## 340    13256.740
## 341    13703.485
## 342    13255.298
## 343    12840.540
## 344    13085.180
## 345    14383.005
## 346    13663.966
## 347    12846.422
## 348    13778.994
## 349    12495.328
## 350    14406.115
## 351    13359.876
## 352    12992.612
## 353    13808.575
## 354    13500.780
## 355    12632.781
## 356    13809.777
## 357    13711.093
## 358    14077.510
## 359    13327.461
## 360    12524.098
## 361    13030.382
## 362    13159.925
## 363    12480.293
## 364    13604.887
## 365    13861.799
## 366    12422.598
## 367    13192.937
## 368    12461.465
## 369    13061.002
## 370    13260.134
## 371    12832.581
## 372    14305.742
## 373    13340.216
## 374    14787.167
## 375    13824.096
## 376    13657.460
## 377    13909.460
## 378    13138.605
## 379     8083.279
## 380     8267.560
## 381     8605.028
## 382     8250.642
## 383     9411.925
## 384     8282.204
## 385     9348.824
## 386    10432.510
## 387     9798.141
## 388    10080.944
## 389     9880.872
## 390     8892.001
## 391     9419.423
## 392    10105.685
## 393    10813.532
## 394     9370.196
## 395    10348.461
## 396    11223.172
## 397     9625.037
```

```
## 398    12337.408
## 399     9485.979
## 400     9633.887
## 401     9581.858
## 402    10177.223
## 403     9657.263
## 404    10814.277
## 405     9865.937
## 406    10637.964
## 407    10677.764
## 408    11618.212
## 409    10838.666
## 410    10720.239
## 411    10370.056
## 412    10578.648
## 413    11178.170
## 414    11139.849
## 415    10763.416
## 416    10662.187
## 417    10125.171
## 418    10858.160
## 419     9662.049
## 420     9219.605
## 421    11071.444
## 422     9916.564
## 423    10690.698
## 424    11287.198
## 425    11053.943
## 426    11310.522
## 427    10886.071
## 428    10877.768
## 429    11384.213
## 430    11447.068
## 431    10767.679
## 432    10561.849
## 433    11605.433
## 434    11849.568
## 435    10725.864
## 436    11075.516
## 437    11251.641
## 438    11762.814
## 439    10177.916
## 440    10680.121
## 441    10233.785
## 442    11243.888
## 443    11246.032
## 444    11185.136
## 445    11449.328
## 446    11577.416
## 447    11070.648
## 448    10683.182
## 449     9794.834
## 450    11704.574
## 451    11584.648
## 452    11966.813
## 453    10834.208
## 454    10935.446
## 455    11797.930
## 456    10257.354
## 457    10320.664
## 458    11191.471
## 459    10682.298
## 460    10541.214
## 461    10046.475
## 462    10492.643
## 463    11886.820
## 464    11756.683
## 465    10878.066
## 466    10123.186
## 467    11115.917
## 468    11226.762
## 469    11566.656
## 470    11538.727
## 471    11411.474
## 472     9993.045
## 473    10486.940
## 474    10995.317
## 475    11304.438
## 476    10260.126
## 477    11259.390
## 478    10569.991
## 479    10795.525
## 480    10455.441
## 481    11728.118
## 482    10279.163
## 483    11321.344
## 484    10500.764
## 485    10227.698
## 486    11461.471
## 487    11727.265
## 488    10623.736
## 489    10583.831
## 490    12087.824
## 491    11196.323
## 492    11315.058
## 493    10706.184
## 494    11683.052
## 495    10524.036
## 496    11006.815
## 497    11286.203
## 498    10747.501
## 499    11207.742
## 500    10477.522
## 501    11772.760
## 502    12871.174
## 503    10741.201
## 504    10612.497
## 505    11110.331
## 506    11383.403
## 507    10697.451
## 508    10964.237
## 509    11840.184
## 510    12086.193
## 511    11352.935
```

```
## 512    11894.778
## 513    11896.972
## 514    11043.521
## 515    10140.346
## 516    11582.912
## 517    11214.393
## 518    10147.365
## 519    11883.869
## 520    12008.848
## 521    10479.479
## 522    10980.333
## 523    11542.910
## 524    12775.660
## 525    11426.641
## 526    11255.370
## 527    11640.923
## 528    10489.412
## 529    10881.035
## 530    11605.996
## 531    11189.506
## 532    10589.735
## 533    11085.637
## 534    11701.206
## 535    11268.809
## 536    12114.320
## 537    11169.063
## 538    11157.212
## 539    10156.730
## 540    10961.835
## 541    12334.406
## 542    11165.367
## 543    10863.443
## 544    10976.810
## 545    12030.013
## 546    12030.983
## 547    11408.387
## 548    10386.869
## 549    10096.993
## 550    11427.684
## 551    11478.498
## 552    10854.669
## 553    12849.233
## 554    11734.977
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## 557    12799.436
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## 559    12539.514
## 560    12232.034
## 561    10959.168
## 562    10596.195
## 563    11511.403
## 564    11600.086
## 565    10375.163
## 566    10683.163
## 567    10751.471
## 568    12223.267
## 569    11939.982
## 570    12357.041
## 571    13034.267
## 572    11887.123
## 573    10410.118
## 574    12018.898
## 575    11273.454
## 576    12080.071
## 577    12706.754
## 578    11530.399
## 579    11085.873
## 580    12827.066
## 581    11423.724
## 582    10957.613
## 583    10476.394
## 584    12444.898
## 585    10901.153
## 586    12625.305
## 587    10384.069
## 588    11672.638
## 589    12753.378
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## 591    11888.152
## 592    11596.780
## 593    11710.058
## 594    12082.427
## 595    11400.641
## 596    10659.507
## 597    11498.085
## 598    11363.161
## 599    11763.297
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## 605     6347.484
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## 609     7210.574
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## 611     6661.039
## 612     7704.194
## 613     8386.295
## 614     8042.673
## 615     8514.546
## 616     8710.770
## 617     8339.137
## 618     8811.293
## 619     7063.112
## 620     7774.874
## 621     8559.287
## 622     8337.871
## 623     8057.798
## 624     9040.172
## 625     7935.123
```

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## 626     8102.680
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## 628     8259.392
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## 631     9064.162
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## 634     9016.704
## 635    11328.773
## 636     7644.809
## 637     8847.707
## 638     8926.853
## 639     9406.013
## 640     7572.390
## 641     8245.076
## 642     8565.563
## 643     7859.411
## 644     9814.415
## 645     8928.881
## 646     8800.694
## 647     7570.250
## 648     7714.521
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## 650     9794.962
## 651     8273.354
## 652     8370.745
## 653     8508.188
## 654     9233.746
## 655    12117.696
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## 657     7556.075
## 658     8910.402
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## 662     8944.512
## 663     9559.054
## 664     8340.728
## 665     9506.285
## 666     8914.520
## 667     8777.069
## 668     8146.436
## 669     9120.814
## 670     9085.217
## 671     8558.877
## 672     8609.686
## 673     9118.653
## 674     7643.305
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## 676     8915.556
## 677     9535.655
## 678     8836.392
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## 683     9301.116
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## 685     8904.748
## 686     9661.747
## 687     9335.164
## 688     9312.013
## 689     8763.217
## 690     9367.284
## 691     7655.226
## 692     9711.684
## 693     9874.417
## 694     7890.443
## 695     7485.220
## 696     8687.150
## 697     8683.860
## 698     9060.252
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## 701     8947.963
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## 705     7949.433
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## 707     9819.640
## 708     7929.709
## 709     9477.455
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## 711     8113.978
## 712     9127.991
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## 717     9249.906
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## 719     9971.221
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## 722     9179.608
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## 724     8522.467
## 725     8506.857
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## 732     9472.362
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```

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## 753     8835.833
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## 807    10625.956
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## 809     9545.295
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## 852    10026.810
## 853     9540.577
```

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```

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```

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## 1194     8463.047
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```

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```

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## 1366    7908.879
## 1367    8054.093
## 1368    7738.432
## 1369    8861.865
## 1370    6668.954
## 1371    8358.591
## 1372    8025.471
## 1373    8190.929
## 1374    8684.552
## 1375    8293.659
## 1376    6341.013
## 1377    8569.567
## 1378    8573.625
## 1379    6816.173
## 1380    8057.890
## 1381    8270.535
## 1382    7144.761
## 1383    9103.055
## 1384    8624.823
## 1385    8636.228
## 1386    7716.499
## 1387    9439.938
## 1388    9261.064
## 1389    8814.489
## 1390    9131.399
## 1391    9221.217
## 1392    7647.054
## 1393    7341.062
## 1394    8828.103
## 1395    7480.743
## 1396    7924.095
## 1397    8249.700
## 1398    7972.059
## 1399    8926.526
## 1400    7978.760
## 1401    9441.389
## 1402    9428.834
## 1403    7606.634
## 1404    7585.361
## 1405    8252.550
## 1406    7777.986
## 1407    9120.852
## 1408    9662.328
## 1409    7901.487
## 1410    8894.879
## 1411    6851.397
## 1412    8719.620
## 1413    9275.545
## 1414    9801.443
## 1415    7936.865
## 1416    8920.361
## 1417    9329.547
## 1418    8803.198
## 1419    7818.686
## 1420    8600.509
## 1421    9250.088
## 1422    8175.841
## 1423    8278.933
```

```
## 1424     7303.662
## 1425     7888.425
## 1426     6757.010
## 1427     9222.587
## 1428     9199.158
## 1429     8147.576
## 1430     8788.675
## 1431     7213.999
## 1432     8866.357
## 1433     8257.252
## 1434     8410.910
## 1435     8590.682
## 1436    10325.429
```

```
Toyota_resid <- residuals(Toyotacor.m1) # residuals
as.data.frame(Toyota_resid)
```

```
##       Toyota_resid
## 1    -2.882873e+03
## 2    -2.226272e+03
## 3    -2.392950e+03
## 4    -9.936356e+02
## 5    -1.957164e+03
## 6    -2.159488e+03
## 7     7.405566e+01
## 8     1.848421e+03
## 9     2.962806e+02
## 10   -9.751920e+02
## 11   -3.145928e+02
## 12   -1.491960e+03
## 13   -1.653186e+03
## 14    7.826438e+02
## 15    2.079618e+03
## 16    9.037963e+02
## 17    2.082420e+03
## 18    1.673636e+03
## 19    1.429327e+03
## 20    2.077205e+03
## 21    1.128925e+03
## 22    3.459719e+01
## 23    3.916390e+02
## 24    1.013585e+03
## 25    3.357721e+02
## 26   -4.132020e+02
## 27    1.472440e+03
## 28    8.022505e+01
## 29    1.256011e+03
## 30    1.927664e+03
## 31   -2.799031e+03
## 32   -4.583032e+02
## 33    2.654247e+02
## 34   -8.072923e+02
## 35   -6.174129e+02
## 36    2.098461e+02
## 37    5.248521e+00
## 38   -1.530550e+03
## 39    6.127800e+02
## 40   -9.104360e+02
## 41   -1.985512e+03
## 42    1.293520e+03
## 43   -2.018383e+03
## 44    2.678781e+02
## 45   -5.040787e+02
## 46    1.098969e+03
## 47    7.260820e+02
## 48    5.681339e+01
## 49    1.035306e+00
## 50    1.731180e+03
## 51   -1.490490e+02
## 52    7.059654e+02
## 53    3.191513e+03
## 54    1.004051e+03
## 55   -1.667631e+03
## 56   -9.890638e+02
## 57   -2.009577e+02
## 58   -4.493934e+02
## 59    1.018468e+03
## 60    2.539365e+02
## 61   -1.383057e+03
## 62    4.150711e+02
## 63    3.089812e+03
## 64    2.119718e+03
## 65    2.157874e+03
## 66    1.763292e+03
## 67    2.835120e+03
## 68   -1.492734e+03
## 69    2.163899e+03
## 70   -1.356856e+02
## 71    2.239947e+02
## 72   -1.191110e+03
## 73    2.794134e+03
## 74   -6.042077e+02
## 75    3.843858e+03
## 76    4.902815e+02
## 77    2.913108e+03
## 78    2.465526e+03
## 79    1.085719e+03
## 80   -6.937639e+02
## 81    9.551877e+02
## 82    1.400373e+03
## 83   -8.349206e+02
## 84    6.313829e+02
## 85    3.401829e+02
## 86    9.832786e+02
## 87   -7.188386e+02
## 88   -1.671121e+02
## 89   -3.645999e+02
## 90    1.968860e+03
## 91    1.988416e+02
## 92    3.356294e+03
## 93    5.013278e+02
## 94   -5.327479e+02
## 95    2.032838e+03
## 96    5.593325e+02
```

```
## 97   -7.163320e+02
## 98   -7.709665e+02
## 99    6.088915e+02
## 100   5.744040e+02
## 101   1.931286e+03
## 102  -5.766945e+02
## 103   1.822397e+03
## 104   5.425593e+02
## 105   1.289718e+02
## 106   3.788332e+01
## 107   2.397520e+03
## 108   2.340141e+02
## 109   9.557039e+02
## 110   5.172558e+03
## 111   3.679582e+03
## 112   3.915412e+03
## 113   1.623986e+03
## 114   1.623986e+03
## 115   5.001758e+02
## 116   3.762692e+03
## 117   1.008488e+03
## 118  -8.003317e+02
## 119   9.115088e+02
## 120   1.978977e+03
## 121   1.775140e+03
## 122   1.302471e+03
## 123  -1.024699e+03
## 124   1.981795e+03
## 125  -3.789091e+02
## 126   4.242698e+03
## 127   8.769212e+01
## 128  -1.158061e+02
## 129   4.218689e+02
## 130  -9.098472e+02
## 131  -4.029864e+02
## 132  -7.473270e+02
## 133  -5.754775e+02
## 134  -1.529372e+03
## 135  -1.541823e+02
## 136  -2.952276e+02
## 137   1.122857e+03
## 138  -1.269840e+03
## 139   2.257570e+02
## 140   2.679304e+03
## 141  -3.602780e+02
## 142   1.791859e+03
## 143   1.846665e+03
## 144   1.566295e+03
## 145   1.073667e+03
## 146  -8.338404e+02
## 147   2.262578e+03
## 148   6.374103e+03
## 149   2.089162e+03
## 150   2.178110e+03
## 151   3.068694e+02
## 152   2.568951e+03
## 153   2.754739e+02
## 154   1.466895e+03
## 155   3.517404e+03
## 156  -2.033949e+02
## 157   2.131845e+03
## 158   7.265544e+02
## 159   1.989222e+03
## 160   5.781691e+02
## 161   1.550509e+03
## 162   3.531506e+03
## 163   1.105419e+03
## 164   1.889830e+03
## 165  -5.209053e+02
## 166   1.783143e+03
## 167   1.719035e+03
## 168   1.980410e+03
## 169   2.016698e+03
## 170   1.491413e+02
## 171   4.703583e+02
## 172   4.870415e+03
## 173   1.022827e+03
## 174   4.716203e+02
## 175   3.051426e+03
## 176   1.032405e+03
## 177   3.782942e+02
## 178   1.188338e+03
## 179   2.976407e+03
## 180   3.305558e+03
## 181   5.671655e+02
## 182  -5.058227e+01
## 183   1.758029e+03
## 184   1.712866e+03
## 185  -1.566251e+03
## 186  -5.102232e+02
## 187  -1.935969e+03
## 188  -2.764258e+03
## 189  -1.056339e+03
## 190  -1.684247e+03
## 191   1.460874e+03
## 192  -6.034110e+03
## 193  -6.113516e+03
## 194   9.203114e+01
## 195   1.610615e+03
## 196  -5.403919e+02
## 197   1.362747e+03
## 198   5.084534e+02
## 199  -1.127656e+03
## 200   3.173340e+01
## 201  -4.724914e+02
## 202  -2.166501e+02
## 203  -1.785102e+03
## 204  -1.846581e+03
## 205   1.031554e+03
## 206   8.358227e-01
## 207  -1.370247e+02
## 208  -9.576028e+02
## 209  -1.130667e+03
## 210  -5.073435e+02
```

```
## 211   9.475587e+02
## 212   1.857088e+02
## 213  -2.608006e+03
## 214  -1.296137e+03
## 215  -1.274498e+03
## 216  -2.671443e+03
## 217   8.719969e+02
## 218  -7.203019e+02
## 219  -3.659173e+02
## 220  -1.056154e+02
## 221  -4.932846e+02
## 222  -1.120957e+04
## 223  -8.873711e+02
## 224   4.287456e+03
## 225  -1.022202e+03
## 226  -2.076771e+02
## 227  -9.197593e+02
## 228  -1.684611e+03
## 229  -3.731395e+02
## 230  -4.090157e+02
## 231   4.861774e+02
## 232  -9.114936e+02
## 233   7.172483e+01
## 234   5.856852e+02
## 235  -9.409479e+02
## 236  -1.616977e+03
## 237  -1.531064e+03
## 238   1.152730e+03
## 239   4.200797e+02
## 240  -1.206183e+03
## 241  -2.348799e+03
## 242  -4.864292e+02
## 243  -1.649671e+02
## 244  -1.489106e+03
## 245  -2.245619e+03
## 246   2.799500e+02
## 247  -3.730582e+02
## 248   5.942932e+02
## 249   5.530560e+02
## 250  -1.056116e+03
## 251  -2.160054e+03
## 252  -9.266741e+02
## 253  -1.014668e+03
## 254   1.141532e+03
## 255  -3.316980e+03
## 256   6.176416e+01
## 257   1.103574e+02
## 258   7.744649e+01
## 259   3.317625e+02
## 260  -5.690358e+02
## 261  -9.578674e+01
## 262  -8.053958e+02
## 263   1.419519e+03
## 264  -4.314738e+02
## 265  -1.002174e+03
## 266  -1.494481e+03
## 267  -3.216499e+02
## 268  -8.039414e+02
## 269  -3.074118e+02
## 270  -1.640867e+03
## 271   3.969153e+02
## 272  -5.148962e+02
## 273   6.283355e+02
## 274   4.113028e+02
## 275   6.448806e+02
## 276  -1.630449e+03
## 277   3.980174e+02
## 278  -1.131136e+03
## 279   9.739571e+02
## 280   1.864990e+03
## 281  -6.003738e+02
## 282  -4.109327e+02
## 283  -7.442080e+02
## 284  -2.308221e+02
## 285  -1.192772e+03
## 286  -4.411452e+02
## 287  -1.572505e+03
## 288  -2.639730e+03
## 289  -5.849031e+02
## 290   2.644260e+01
## 291  -6.006735e+02
## 292   4.552293e+02
## 293  -2.884250e+03
## 294  -1.866960e+03
## 295   7.821007e+02
## 296  -1.876109e+03
## 297   1.082355e+03
## 298  -5.821754e+02
## 299   4.962275e+01
## 300   6.484311e+02
## 301  -9.697073e+02
## 302  -1.518203e+02
## 303   1.388870e+03
## 304  -9.891007e+02
## 305   1.396426e+03
## 306  -9.718667e+02
## 307  -1.927554e+03
## 308   1.064335e+03
## 309  -1.232877e+03
## 310  -6.739533e+02
## 311  -5.242597e+02
## 312   1.008023e+03
## 313  -3.315135e+02
## 314  -1.543606e+03
## 315  -2.121779e+03
## 316   6.857378e+02
## 317  -5.377339e+01
## 318  -1.689313e+03
## 319  -2.254036e+03
## 320  -9.246163e+02
## 321  -1.671273e+03
## 322  -3.146930e+03
## 323  -1.179558e+02
## 324  -9.854245e+02
```

```
## 325  -6.053777e+02
## 326  -1.369617e+03
## 327  -1.256947e+03
## 328  -1.356607e+03
## 329  -1.116679e+03
## 330  -1.393370e+03
## 331  -2.625829e+03
## 332  -2.266191e+02
## 333  -1.700803e+03
## 334  -1.031086e+03
## 335  -1.490309e+03
## 336  -8.466529e+02
## 337  -1.447203e+03
## 338  -5.320302e+02
## 339   3.085861e+02
## 340  -1.306740e+03
## 341  -1.803485e+03
## 342  -1.305298e+03
## 343   2.109460e+03
## 344  -1.135180e+03
## 345  -1.433005e+03
## 346   1.286034e+03
## 347   6.035781e+02
## 348  -2.899363e+01
## 349   4.546724e+02
## 350  -1.656115e+03
## 351  -1.464876e+03
## 352  -3.042612e+03
## 353  -1.358575e+03
## 354  -1.000780e+03
## 355   2.317219e+03
## 356  -5.977691e+01
## 357  -1.016093e+03
## 358   9.124903e+02
## 359  -5.774612e+02
## 360   1.825902e+03
## 361  -8.038204e+01
## 362  -1.659925e+03
## 363  -5.302931e+02
## 364  -1.548872e+02
## 365  -9.617993e+02
## 366  -1.922598e+03
## 367  -2.242937e+03
## 368  -5.114653e+02
## 369  -1.611002e+03
## 370  -1.013404e+01
## 371  -2.582581e+03
## 372  -3.107424e+02
## 373  -1.390216e+03
## 374  -1.537167e+03
## 375  -8.740960e+02
## 376  -1.907460e+03
## 377  -2.409460e+03
## 378   3.613948e+02
## 379  -1.583279e+03
## 380  -1.867560e+03
## 381  -1.605028e+03
## 382  -5.006420e+02
## 383  -5.119253e+02
## 384   2.177965e+02
## 385  -3.988243e+02
## 386  -5.325101e+02
## 387   4.518592e+02
## 388  -8.309439e+02
## 389  -2.130872e+03
## 390   5.579990e+02
## 391  -1.669423e+03
## 392  -1.855685e+03
## 393  -8.635318e+02
## 394  -4.920196e+03
## 395  -3.984613e+02
## 396  -2.223172e+03
## 397   3.249632e+02
## 398   1.125916e+02
## 399   1.014021e+03
## 400   1.116113e+03
## 401  -6.318577e+02
## 402   3.227774e+02
## 403  -4.507263e+03
## 404   1.357229e+02
## 405  -4.159366e+02
## 406  -6.879636e+02
## 407   2.722361e+02
## 408   2.817883e+02
## 409  -8.886656e+02
## 410   1.229761e+03
## 411  -2.470056e+03
## 412   3.713519e+02
## 413  -2.228170e+03
## 414   8.101506e+02
## 415   1.365838e+02
## 416  -7.121871e+02
## 417  -1.751710e+02
## 418   9.184049e+01
## 419  -7.120486e+02
## 420  -2.696049e+02
## 421  -5.714443e+02
## 422  -9.665637e+02
## 423  -1.440698e+03
## 424   2.128021e+02
## 425  -1.303943e+03
## 426  -1.360522e+03
## 427   5.639292e+02
## 428   1.622232e+03
## 429  -8.842128e+02
## 430   1.502932e+03
## 431   1.432321e+03
## 432   3.881510e+02
## 433  -6.554327e+02
## 434  -5.595684e+02
## 435   2.413636e+01
## 436  -1.805163e+02
## 437   2.483585e+02
## 438  -2.012814e+03
```

```
## 439   7.208435e+01
## 440   1.819879e+03
## 441   1.716215e+03
## 442  -4.938884e+02
## 443   2.039684e+02
## 444   7.648639e+02
## 445   3.006722e+02
## 446  -6.274163e+02
## 447   8.793519e+02
## 448   3.118182e+02
## 449   1.655166e+03
## 450  -2.804574e+03
## 451  -1.084648e+03
## 452  -2.168131e+02
## 453   6.157918e+02
## 454   1.064554e+03
## 455   1.520699e+02
## 456  -4.073544e+02
## 457   6.293358e+02
## 458  -2.414711e+02
## 459  -1.987298e+03
## 460   4.487862e+02
## 461  -5.464750e+02
## 462   1.457357e+03
## 463  -1.136820e+03
## 464  -3.006683e+03
## 465  -2.128066e+03
## 466   1.326814e+03
## 467  -1.165917e+03
## 468   7.232377e+02
## 469   2.383344e+03
## 470  -2.887268e+02
## 471  -5.114739e+02
## 472  -2.430454e+02
## 473  -5.369399e+02
## 474   9.546825e+02
## 475  -8.544384e+02
## 476  -1.310126e+03
## 477  -1.009390e+03
## 478  -6.399915e+02
## 479  -2.955252e+02
## 480   1.494559e+03
## 481  -2.281182e+02
## 482   1.220837e+03
## 483   1.286564e+02
## 484  -6.007642e+02
## 485  -7.276983e+02
## 486  -9.614706e+02
## 487  -9.772648e+02
## 488  -1.673736e+03
## 489   1.416169e+03
## 490  -2.147824e+03
## 491  -2.463233e+02
## 492  -5.650585e+02
## 493  -9.071844e+02
## 494   6.694830e+01
## 495   1.425964e+03
## 496   2.431852e+02
## 497   4.637970e+02
## 498   2.024989e+02
## 499   4.225798e+01
## 500  -5.275218e+02
## 501  -2.072760e+03
## 502  -9.211735e+02
## 503  -8.412008e+02
## 504  -6.224975e+02
## 505  -1.635331e+03
## 506   1.165975e+02
## 507   1.252549e+03
## 508   5.357626e+02
## 509  -1.340184e+03
## 510  -1.186193e+03
## 511   3.470650e+02
## 512   5.221967e+00
## 513   2.053028e+03
## 514  -9.352063e+01
## 515   3.596541e+02
## 516  -8.329119e+02
## 517   7.356074e+02
## 518  -1.473652e+02
## 519  -1.388869e+03
## 520  -5.588481e+02
## 521  -1.079479e+03
## 522   9.696669e+02
## 523  -1.892910e+03
## 524   6.174340e+03
## 525   2.335896e+01
## 526  -1.005370e+03
## 527  -1.909226e+02
## 528  -5.394124e+02
## 529  -3.810354e+02
## 530   2.144004e+03
## 531  -1.239506e+03
## 532  -3.397346e+02
## 533  -2.356370e+02
## 534   1.937942e+02
## 535   1.681191e+03
## 536  -1.643203e+02
## 537  -4.190634e+02
## 538  -1.607212e+03
## 539   7.932703e+02
## 540   7.881647e+02
## 541  -1.384406e+03
## 542   1.284633e+03
## 543  -3.634428e+02
## 544  -7.680965e+01
## 545   9.199866e+02
## 546  -1.080983e+03
## 547   1.091613e+03
## 548  -4.368686e+02
## 549   6.530072e+02
## 550   1.072316e+03
## 551  -1.028498e+03
## 552  -1.046690e+02
```

```
## 553   1.007671e+02
## 554  -7.399772e+02
## 555  -5.675466e+02
## 556  -5.542876e+02
## 557  -8.494359e+02
## 558   3.041429e+03
## 559  -1.539514e+03
## 560   1.267966e+03
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## 566   2.168365e+02
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## 580  -9.270661e+02
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## 582  -4.576132e+02
## 583  -1.526394e+03
## 584  -1.994898e+03
## 585  -4.011535e+02
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## 587  -4.340695e+02
## 588   1.227362e+03
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## 592  -6.467804e+02
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## 596  -1.595068e+02
## 597  -1.048085e+03
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## 645   1.021119e+03
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## 649  -2.971646e+02
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## 662   8.054875e+02
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## 677  -3.565548e+01
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## 679   6.987258e+02
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## 681  -1.321285e+03
## 682  -1.964665e+02
## 683  -1.051116e+03
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## 732   9.776383e+02
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## 736   5.520455e+02
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## 773  -1.334818e+03
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## 776   5.278460e+02
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## 787   6.256238e+02
## 788   5.322353e+02
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## 790  -1.048228e+03
## 791  -4.506808e+02
## 792   2.249642e+01
## 793  -1.459118e+03
## 794  -1.034592e+03
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## 796  -1.106076e+03
## 797   2.719713e+03
## 798   1.011838e+02
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## 830  -1.541536e+02
## 831  -1.028234e+03
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## 833   6.971467e+02
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## 902  -7.515262e+02
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## 904  -1.805394e+02
## 905  -9.214893e+02
## 906   4.936192e+02
## 907   4.985386e+02
## 908  -5.090600e+02
## 909  -1.514047e+03
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## 1018 -6.203281e+02
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## 1023  4.043231e+02
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## 1145  1.350427e+03
## 1146 -1.534017e+03
## 1147 -7.830570e+02
## 1148  1.401587e+02
## 1149  2.267319e+01
## 1150  6.827330e+02
## 1151  2.044107e+03
## 1152  8.773570e+02
## 1153  8.476709e+02
## 1154  1.541123e+02
## 1155 -5.391053e+02
## 1156  6.050432e+01
## 1157 -8.376484e+01
## 1158  1.159516e+03
## 1159 -2.366392e+03
## 1160  9.482119e+02
## 1161  2.868901e+02
## 1162  2.557008e+02
## 1163  1.534838e+03
## 1164  1.215999e+03
## 1165  3.375899e+02
## 1166  2.811816e+02
## 1167 -8.043174e+01
## 1168 -3.615674e+02
## 1169  8.789916e+02
## 1170  7.367545e+02
## 1171 -1.059461e+03
## 1172 -8.594503e+02
## 1173  3.649619e+01
## 1174  3.167106e+02
## 1175  1.875950e+02
## 1176  2.142092e+03
## 1177  1.808915e+03
## 1178  5.367846e+02
## 1179 -3.444149e+02
## 1180  1.687330e+03
## 1181  2.674145e+02
## 1182  7.446923e+01
## 1183  1.567083e+03
## 1184  7.437833e+02
## 1185  1.674672e+03
## 1186 -9.158290e+02
## 1187  1.698756e+02
## 1188 -3.336236e+02
## 1189  2.635860e+02
## 1190  1.671203e+03
## 1191  3.671893e+02
## 1192  6.204064e+02
## 1193  1.624106e+02
## 1194 -1.304714e+01
## 1195 -1.170911e+03
## 1196  1.289112e+03
## 1197  2.034281e+03
## 1198  1.264476e+03
## 1199  6.651730e+02
## 1200 -3.428120e+01
## 1201  1.006482e+03
## 1202 -8.159552e+02
## 1203 -6.587492e+02
## 1204 -6.319125e+02
## 1205 -6.756204e+01
## 1206 -6.450232e+01
## 1207 -5.871168e+02
## 1208 -3.680937e+02
## 1209 -1.701717e+02
## 1210  1.104098e+02
## 1211  8.251156e+02
## 1212  1.983124e+03
## 1213 -3.860187e+02
## 1214 -6.036504e+02
## 1215  1.870725e+03
## 1216  1.755247e+03
## 1217  1.179659e+02
## 1218  6.792457e+02
## 1219  2.592072e+02
## 1220 -1.709285e+02
## 1221 -6.967532e+02
## 1222  3.757499e+02
## 1223  5.472879e+02
## 1224  1.161977e+02
## 1225  1.156841e+03
## 1226 -9.598125e+00
## 1227 -7.502478e+02
## 1228 -5.410792e+02
## 1229 -5.835441e+02
## 1230  6.980920e+02
## 1231  1.291886e+03
## 1232 -1.400520e+03
## 1233 -1.265170e+03
## 1234  3.298687e+02
## 1235  5.976531e+02
## 1236 -3.996118e+02
```

```
## 1237  9.258469e+02
## 1238 -6.310387e+02
## 1239 -1.719098e+02
## 1240  2.386800e+02
## 1241  2.035928e+03
## 1242  5.962975e+01
## 1243 -3.100037e+02
## 1244 -3.679984e+02
## 1245 -1.538432e+03
## 1246 -8.368250e+01
## 1247 -6.291047e+02
## 1248 -7.848874e+02
## 1249 -6.607120e+02
## 1250  3.582480e+01
## 1251  2.236842e+03
## 1252  8.082202e+01
## 1253 -8.785896e+02
## 1254  2.143580e+02
## 1255  4.190891e+02
## 1256 -1.689170e+02
## 1257  1.574684e+03
## 1258  1.951330e+02
## 1259  8.985664e+02
## 1260  3.705945e+02
## 1261  2.141340e+02
## 1262  1.722067e+03
## 1263 -7.887443e+02
## 1264  1.070919e+03
## 1265 -8.845575e+02
## 1266  1.481566e+03
## 1267 -1.920268e+03
## 1268 -1.992691e+02
## 1269  1.487081e+03
## 1270  1.287081e+03
## 1271 -5.431972e+02
## 1272 -6.502880e+02
## 1273 -1.011828e+03
## 1274 -1.124540e+03
## 1275  1.146143e+03
## 1276 -1.860359e+02
## 1277 -6.497611e+02
## 1278  7.663240e+02
## 1279 -7.359239e+02
## 1280  4.165764e+02
## 1281  1.463433e+03
## 1282 -1.028912e+03
## 1283 -3.201218e+02
## 1284  5.332982e+02
## 1285 -2.037360e+02
## 1286  1.235587e+02
## 1287 -1.113301e+02
## 1288 -1.305906e+02
## 1289 -7.520810e+02
## 1290 -3.326588e+02
## 1291  8.753891e+02
## 1292  1.857758e+02
## 1293  8.788188e+02
## 1294  2.412756e+02
## 1295 -8.929972e+02
## 1296  3.627004e+02
## 1297  1.476462e+02
## 1298 -6.303842e+02
## 1299 -1.720049e+02
## 1300  5.879510e+02
## 1301 -2.569672e+01
## 1302 -1.875929e+03
## 1303 -4.041895e+02
## 1304  2.462711e+02
## 1305 -1.325689e+03
## 1306  8.831508e+02
## 1307 -4.907537e+02
## 1308  2.133868e+03
## 1309  9.549205e+02
## 1310  1.456223e+03
## 1311  1.013954e+03
## 1312  1.473717e+03
## 1313  1.625719e+03
## 1314 -2.313381e+03
## 1315 -5.018595e+02
## 1316  2.393233e+02
## 1317  6.042386e+02
## 1318  8.144548e+02
## 1319  8.229925e+01
## 1320 -7.463969e+02
## 1321  9.704581e+02
## 1322 -4.049314e+02
## 1323  8.029186e+02
## 1324  1.425303e+03
## 1325  2.120673e+02
## 1326  1.567276e+02
## 1327 -4.780831e+02
## 1328  2.101116e+03
## 1329 -7.795772e+02
## 1330  1.019834e+03
## 1331  7.331550e+02
## 1332 -2.743421e+02
## 1333  9.324912e+02
## 1334  9.807046e+02
## 1335 -2.068422e+03
## 1336  1.305577e+03
## 1337  1.176965e+03
## 1338  8.765921e+02
## 1339 -1.039163e+02
## 1340  1.733690e+03
## 1341  9.651860e+02
## 1342 -1.085842e+03
## 1343  3.617027e+01
## 1344  1.326654e+02
## 1345  2.698916e+02
## 1346 -1.188372e+02
## 1347  3.591464e+02
## 1348 -1.013918e+03
## 1349  4.759173e+02
## 1350 -1.377541e+03
```

```
## 1351 -4.472144e+01
## 1352 -2.950364e+03
## 1353 -6.049270e+02
## 1354 -6.932448e+02
## 1355  1.727530e+03
## 1356 -2.255271e+03
## 1357  3.745274e+02
## 1358 -1.924131e+02
## 1359 -3.507214e+02
## 1360  3.975805e+02
## 1361  1.372329e+03
## 1362 -1.883103e+03
## 1363 -1.410892e+03
## 1364 -2.122474e+03
## 1365  5.042815e+01
## 1366  4.112138e+01
## 1367  1.959071e+02
## 1368  1.211568e+03
## 1369  8.881354e+02
## 1370  1.581046e+03
## 1371  5.414090e+02
## 1372  9.245285e+02
## 1373 -1.440929e+03
## 1374 -7.345515e+02
## 1375  3.063414e+02
## 1376  1.408987e+03
## 1377 -7.695674e+02
## 1378  1.763745e+02
## 1379  2.683827e+03
## 1380 -3.078902e+02
## 1381  1.679465e+03
## 1382  6.052390e+02
## 1383 -3.153055e+03
## 1384  2.325177e+03
## 1385  8.137724e+02
## 1386  5.335008e+02
## 1387  3.100618e+02
## 1388 -1.811064e+03
## 1389 -6.448888e+01
## 1390 -3.813985e+02
## 1391 -7.212167e+02
## 1392  1.302946e+03
## 1393  1.589377e+02
## 1394 -1.578103e+03
## 1395 -3.074326e+01
## 1396  8.259053e+02
## 1397  1.550300e+03
## 1398 -4.720589e+02
## 1399  2.347399e+01
## 1400  9.712404e+02
## 1401 -1.991389e+03
## 1402 -4.788342e+02
## 1403  2.893366e+03
## 1404 -5.853607e+02
## 1405  2.474503e+02
## 1406 -2.798614e+01
## 1407 -1.708524e+02
## 1408 -1.412328e+03
## 1409  1.348513e+03
## 1410 -9.948795e+02
## 1411  1.648603e+03
## 1412 -7.696202e+02
## 1413  6.744554e+02
## 1414 -1.051443e+03
## 1415 -4.368652e+02
## 1416 -1.970361e+03
## 1417 -3.795472e+02
## 1418 -5.319846e+01
## 1419 -6.868644e+01
## 1420 -1.505088e+02
## 1421 -1.100088e+03
## 1422  3.241593e+02
## 1423 -6.789331e+02
## 1424  6.463383e+02
## 1425 -1.384249e+02
## 1426  1.192990e+03
## 1427  7.274134e+02
## 1428 -2.491580e+02
## 1429  3.024240e+02
## 1430  1.613249e+02
## 1431  1.236001e+03
## 1432 -1.366357e+03
## 1433  2.587748e+03
## 1434  8.908950e+01
## 1435 -1.340682e+03
## 1436 -3.375429e+03
```

So now that we have two models, the question would be, which one is better? In order to answer this question, we need to cross validated the combinaion of each model. let us start with the first model.

cross- validation (leave one out) for the model on all six regressors

```
n <- length(Toyotacor$Price)
diff <- dim(n)
percdiff <- dim(n)
for (k in 1:n) {
  train1 <- c(1:n)
  train <- train1[train1 !=k ]
  m2 <- lm(Price~ ., data = Toyotacor[train,])
  pred <- predict(m2, newdat = Toyotacor[-train,])
  obs <- Toyotacor$Price[-train]
  diff[k] <- obs - pred
  percdiff[k] <- abs(diff[k]) / obs
}
Toyotacor.m2.me <- mean(diff)
Toyotacor.m2.rmse <- sqrt(mean(diff**2))
Toyotacor.m2.mape <- 100*(mean(percdiff))
```

```
Toyotacor.m2.me
```

```
## [1] -1.842833
```

```
Toyotacor.m2.rmse
```

```
## [1] 1350.015
```

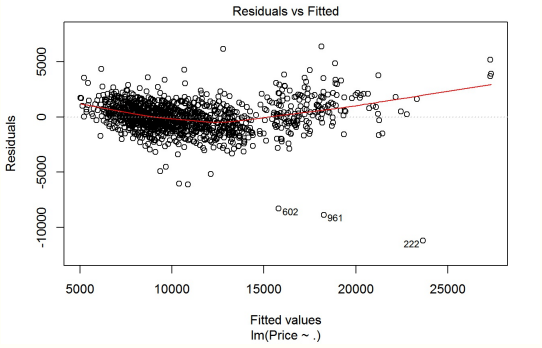
```
Toyotacor.m2.mape
```

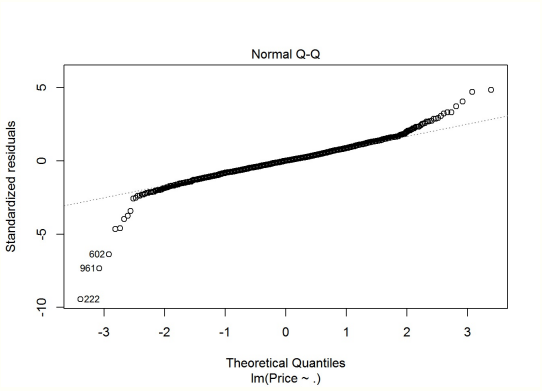
```
## [1] 9.53237
```

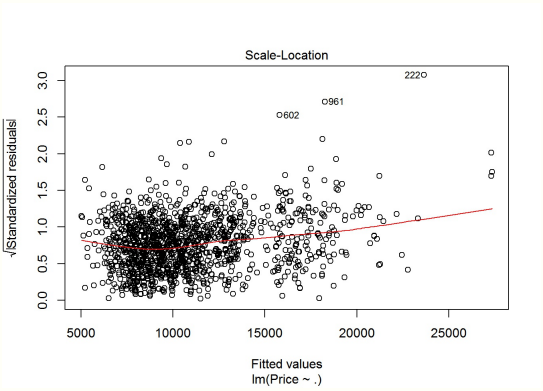
```
predicted.price
```

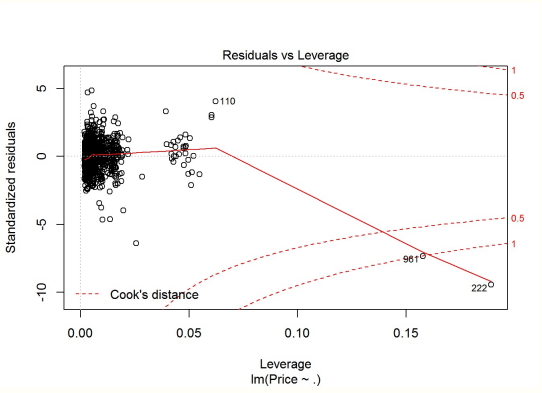
```
##        1
## 22772.63
```

```
#check if assumptions are met...
plot(Toyotacor.m1)
```










```
ggsave("HW3 Graph/ToyotaCorlin.pdf")
```

```
## Saving 7 x 5 in image
```