HealthCareCost-Linear_Regression-.R

user

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```
    # Health Care Cost  w/ Linear Regression

# Understanding the data
# Age:age of primary beneficiary

# Sex: gender, [female, male]

# BMI: Body mass index, providing an understanding of body, weights that are relatively
# high or low relative to height, objective index of body weight (kg / m ^ 2) using the
# ratio of height to weight, ideally 18.5 to 24.9

# Children: number of children

# Smoker: smoking, [yes, no]

# Region: the beneficiary's residential area in the US, [northeast, southeast, southwest, northwest]

# Charges: Individual medical costs billed by health insurance, $ #predicted value
```

```r
# Load required libraries
library(ggplot2)
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
```

```r
library(gridExtra)
```

```
## Warning: package 'gridExtra' was built under R version 4.1.1
```

```
##
## Attaching package: 'gridExtra'
```

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

```r
library(psych)
```

```
## Warning: package 'psych' was built under R version 4.1.1
```

```
##
## Attaching package: 'psych'
```

```
## The following objects are masked from 'package:ggplot2':
##
##     %+%, alpha
```

```r
library(corrplot)
```

```
## Warning: package 'corrplot' was built under R version 4.1.1
```

```
## corrplot 0.90 loaded
```

```r
# Load the dataset
d<-read.csv("D:/Rprograms/insurance.csv")
#print(d)


# Print head
print(head(d))
```

```
##   age    sex    bmi children smoker    region   charges
## 1  19 female 27.900        0    yes southwest 16884.924
## 2  18   male 33.770        1     no southeast  1725.552
## 3  28   male 33.000        3     no southeast  4449.462
## 4  33   male 22.705        0     no northwest 21984.471
## 5  32   male 28.880        0     no northwest  3866.855
## 6  31 female 25.740        0     no southeast  3756.622
```

```r
# Print tail
print(tail(d))
```

```
##      age    sex   bmi children smoker    region   charges
## 1333  52 female 44.70        3     no southwest 11411.685
## 1334  50   male 30.97        3     no northwest 10600.548
## 1335  18 female 31.92        0     no northeast  2205.981
## 1336  18 female 36.85        0     no southeast  1629.833
## 1337  21 female 25.80        0     no southwest  2007.945
## 1338  61 female 29.07        0    yes northwest 29141.360
```

```r
# To View the contents in the dataet
View(d)
```

```r
# To print column names
print(colnames(d))
```

```
## [1] "age"      "sex"      "bmi"      "children" "smoker"   "region"   "charges"
```

```r
# Dimention of data
print(dim(d))
```

```
## [1] 1338    7
```

```r
# Print Statistical summary
describe(d)
```

```
##          vars    n     mean       sd  median  trimmed     mad     min      max
## age         1 1338    39.21    14.05   39.00    39.01   17.79   18.00    64.00
## sex*        2 1338     1.51     0.50    2.00     1.51    0.00    1.00     2.00
## bmi         3 1338    30.66     6.10   30.40    30.50    6.20   15.96    53.13
## children    4 1338     1.09     1.21    1.00     0.94    1.48    0.00     5.00
## smoker*     5 1338     1.20     0.40    1.00     1.13    0.00    1.00     2.00
## region*     6 1338     2.52     1.10    3.00     2.52    1.48    1.00     4.00
## charges     7 1338 13270.42 12110.01 9382.03 11076.02 7440.81 1121.87 63770.43
##              range  skew kurtosis     se
## age          46.00  0.06    -1.25   0.38
## sex*          1.00 -0.02    -2.00   0.01
## bmi          37.17  0.28    -0.06   0.17
## children      5.00  0.94     0.19   0.03
## smoker*       1.00  1.46     0.14   0.01
## region*       3.00 -0.04    -1.33   0.03
## charges   62648.55  1.51     1.59 331.07
```

```r
# Summary of the dataset
print(summary(d))
```

```
##       age            sex                 bmi           children
##  Min.   :18.00   Length:1338        Min.   :15.96   Min.   :0.000
##  1st Qu.:27.00   Class :character   1st Qu.:26.30   1st Qu.:0.000
##  Median :39.00   Mode  :character   Median :30.40   Median :1.000
```

```
##  Mean   :39.21                     Mean   :30.66   Mean   :1.095
##  3rd Qu.:51.00                     3rd Qu.:34.69   3rd Qu.:2.000
##  Max.   :64.00                     Max.   :53.13   Max.   :5.000
##     smoker             region             charges
##  Length:1338        Length:1338        Min.   : 1122
##  Class :character   Class :character   1st Qu.: 4740
##  Mode  :character   Mode  :character   Median : 9382
##                                        Mean   :13270
##                                        3rd Qu.:16640
##                                        Max.   :63770
```

```
# Internal structure of R object
print(str(d))
```

```
## 'data.frame':    1338 obs. of  7 variables:
##  $ age     : int  19 18 28 33 32 31 46 37 37 60 ...
##  $ sex     : chr  "female" "male" "male" "male" ...
##  $ bmi     : num  27.9 33.8 33 22.7 28.9 ...
##  $ children: int  0 1 3 0 0 0 1 3 2 0 ...
##  $ smoker  : chr  "yes" "no" "no" "no" ...
##  $ region  : chr  "southwest" "southeast" "southeast" "northwest" ...
##  $ charges : num  16885 1726 4449 21984 3867 ...
## NULL
```

```
# Display columns  and display some portions of the data
print(glimpse(d))
```

```
## Rows: 1,338
## Columns: 7
## $ age      <int> 19, 18, 28, 33, 32, 31, 46, 37, 37, 60, 25, 62, 23, 56, 27, 1~
## $ sex      <chr> "female", "male", "male", "male", "male", "female", "female",~
## $ bmi      <dbl> 27.900, 33.770, 33.000, 22.705, 28.880, 25.740, 33.440, 27.74~
## $ children <int> 0, 1, 3, 0, 0, 0, 1, 3, 2, 0, 0, 0, 0, 0, 0, 1, 1, 0, 0, 0, 0~
## $ smoker   <chr> "yes", "no", "no", "no", "no", "no", "no", "no", "no", "no", ~
## $ region   <chr> "southwest", "southeast", "southeast", "northwest", "northwes~
## $ charges  <dbl> 16884.924, 1725.552, 4449.462, 21984.471, 3866.855, 3756.622,~
##      age    sex    bmi children smoker    region   charges
```

```
## 1     19 female 27.900        0    yes southwest 16884.924
## 2     18   male 33.770        1     no southeast  1725.552
## 3     28   male 33.000        3     no southeast  4449.462
## 4     33   male 22.705        0     no northwest 21984.471
## 5     32   male 28.880        0     no northwest  3866.855
## 6     31 female 25.740        0     no southeast  3756.622
## 7     46 female 33.440        1     no southeast  8240.590
## 8     37 female 27.740        3     no northwest  7281.506
## 9     37   male 29.830        2     no northeast  6406.411
## 10    60 female 25.840        0     no northwest 28923.137
## 11    25   male 26.220        0     no northeast  2721.321
## 12    62 female 26.290        0    yes southeast 27808.725
## 13    23   male 34.400        0     no southwest  1826.843
## 14    56 female 39.820        0     no southeast 11090.718
## 15    27   male 42.130        0    yes southeast 39611.758
## 16    19   male 24.600        1     no southwest  1837.237
## 17    52 female 30.780        1     no northeast 10797.336
## 18    23   male 23.845        0     no northeast  2395.172
## 19    56   male 40.300        0     no southwest 10602.385
## 20    30   male 35.300        0    yes southwest 36837.467
## 21    60 female 36.005        0     no northeast 13228.847
## 22    30 female 32.400        1     no southwest  4149.736
## 23    18   male 34.100        0     no southeast  1137.011
## 24    34 female 31.920        1    yes northeast 37701.877
## 25    37   male 28.025        2     no northwest  6203.902
## 26    59 female 27.720        3     no southeast 14001.134
## 27    63 female 23.085        0     no northeast 14451.835
## 28    55 female 32.775        2     no northwest 12268.632
## 29    23   male 17.385        1     no northwest  2775.192
## 30    31   male 36.300        2    yes southwest 38711.000
## 31    22   male 35.600        0    yes southwest 35585.576
## 32    18 female 26.315        0     no northeast  2198.190
## 33    19 female 28.600        5     no southwest  4687.797
## 34    63   male 28.310        0     no northwest 13770.098
## 35    28   male 36.400        1    yes southwest 51194.559
## 36    19   male 20.425        0     no northwest  1625.434
```

```
## 37    62 female 32.965        3     no northwest 15612.193
## 38    26   male 20.800        0     no southwest  2302.300
## 39    35   male 36.670        1    yes northeast 39774.276
## 40    60   male 39.900        0    yes southwest 48173.361
## 41    24 female 26.600        0     no northeast  3046.062
## 42    31 female 36.630        2     no southeast  4949.759
## 43    41   male 21.780        1     no southeast  6272.477
## 44    37 female 30.800        2     no southeast  6313.759
## 45    38   male 37.050        1     no northeast  6079.672
## 46    55   male 37.300        0     no southwest 20630.284
## 47    18 female 38.665        2     no northeast  3393.356
## 48    28 female 34.770        0     no northwest  3556.922
## 49    60 female 24.530        0     no southeast 12629.897
## 50    36   male 35.200        1    yes southeast 38709.176
## 51    18 female 35.625        0     no northeast  2211.131
## 52    21 female 33.630        2     no northwest  3579.829
## 53    48   male 28.000        1    yes southwest 23568.272
## 54    36   male 34.430        0    yes southeast 37742.576
## 55    40 female 28.690        3     no northwest  8059.679
## 56    58   male 36.955        2    yes northwest 47496.494
## 57    58 female 31.825        2     no northeast 13607.369
## 58    18   male 31.680        2    yes southeast 34303.167
## 59    53 female 22.880        1    yes southeast 23244.790
## 60    34 female 37.335        2     no northwest  5989.524
## 61    43   male 27.360        3     no northeast  8606.217
## 62    25   male 33.660        4     no southeast  4504.662
## 63    64   male 24.700        1     no northwest 30166.618
## 64    28 female 25.935        1     no northwest  4133.642
## 65    20 female 22.420        0    yes northwest 14711.744
## 66    19 female 28.900        0     no southwest  1743.214
## 67    61 female 39.100        2     no southwest 14235.072
## 68    40   male 26.315        1     no northwest  6389.378
## 69    40 female 36.190        0     no southeast  5920.104
## 70    28   male 23.980        3    yes southeast 17663.144
## 71    27 female 24.750        0    yes southeast 16577.780
## 72    31   male 28.500        5     no northeast  6799.458
```

```
## 73    53 female 28.100        3     no southwest 11741.726
## 74    58   male 32.010        1     no southeast 11946.626
## 75    44   male 27.400        2     no southwest  7726.854
## 76    57   male 34.010        0     no northwest 11356.661
## 77    29 female 29.590        1     no southeast  3947.413
## 78    21   male 35.530        0     no southeast  1532.470
## 79    22 female 39.805        0     no northeast  2755.021
## 80    41 female 32.965        0     no northwest  6571.024
## 81    31   male 26.885        1     no northeast  4441.213
## 82    45 female 38.285        0     no northeast  7935.291
## 83    22   male 37.620        1    yes southeast 37165.164
## 84    48 female 41.230        4     no northwest 11033.662
## 85    37 female 34.800        2    yes southwest 39836.519
## 86    45   male 22.895        2    yes northwest 21098.554
## 87    57 female 31.160        0    yes northwest 43578.939
## 88    56 female 27.200        0     no southwest 11073.176
## 89    46 female 27.740        0     no northwest  8026.667
## 90    55 female 26.980        0     no northwest 11082.577
## 91    21 female 39.490        0     no southeast  2026.974
## 92    53 female 24.795        1     no northwest 10942.132
## 93    59   male 29.830        3    yes northeast 30184.937
## 94    35   male 34.770        2     no northwest  5729.005
## 95    64 female 31.300        2    yes southwest 47291.055
## 96    28 female 37.620        1     no southeast  3766.884
## 97    54 female 30.800        3     no southwest 12105.320
## 98    55   male 38.280        0     no southeast 10226.284
## 99    56   male 19.950        0    yes northeast 22412.648
## 100   38   male 19.300        0    yes southwest 15820.699
## 101   41 female 31.600        0     no southwest  6186.127
## 102   30   male 25.460        0     no northeast  3645.089
## 103   18 female 30.115        0     no northeast 21344.847
## 104   61 female 29.920        3    yes southeast 30942.192
## 105   34 female 27.500        1     no southwest  5003.853
## 106   20   male 28.025        1    yes northwest 17560.380
## 107   19 female 28.400        1     no southwest  2331.519
## 108   26   male 30.875        2     no northwest  3877.304
```

```
## 109   29   male 27.940        0     no southeast  2867.120
## 110   63   male 35.090        0    yes southeast 47055.532
## 111   54   male 33.630        1     no northwest 10825.254
## 112   55 female 29.700        2     no southwest 11881.358
## 113   37   male 30.800        0     no southwest  4646.759
## 114   21 female 35.720        0     no northwest  2404.734
## 115   52   male 32.205        3     no northeast 11488.317
## 116   60   male 28.595        0     no northeast 30259.996
## 117   58   male 49.060        0     no southeast 11381.325
## 118   29 female 27.940        1    yes southeast 19107.780
## 119   49 female 27.170        0     no southeast  8601.329
## 120   37 female 23.370        2     no northwest  6686.431
## 121   44   male 37.100        2     no southwest  7740.337
## 122   18   male 23.750        0     no northeast  1705.624
## 123   20 female 28.975        0     no northwest  2257.475
## 124   44   male 31.350        1    yes northeast 39556.495
## 125   47 female 33.915        3     no northwest 10115.009
## 126   26 female 28.785        0     no northeast  3385.399
## 127   19 female 28.300        0    yes southwest 17081.080
## 128   52 female 37.400        0     no southwest  9634.538
## 129   32 female 17.765        2    yes northwest 32734.186
## 130   38   male 34.700        2     no southwest  6082.405
## 131   59 female 26.505        0     no northeast 12815.445
## 132   61 female 22.040        0     no northeast 13616.359
## 133   53 female 35.900        2     no southwest 11163.568
## 134   19   male 25.555        0     no northwest  1632.564
## 135   20 female 28.785        0     no northeast  2457.211
## 136   22 female 28.050        0     no southeast  2155.682
## 137   19   male 34.100        0     no southwest  1261.442
## 138   22   male 25.175        0     no northwest  2045.685
## 139   54 female 31.900        3     no southeast 27322.734
## 140   22 female 36.000        0     no southwest  2166.732
## 141   34   male 22.420        2     no northeast 27375.905
## 142   26   male 32.490        1     no northeast  3490.549
## 143   34   male 25.300        2    yes southeast 18972.495
## 144   29   male 29.735        2     no northwest 18157.876
```

```
## 145   30   male 28.690        3    yes northwest 20745.989
## 146   29 female 38.830        3     no southeast  5138.257
## 147   46   male 30.495        3    yes northwest 40720.551
## 148   51 female 37.730        1     no southeast  9877.608
## 149   53 female 37.430        1     no northwest 10959.695
## 150   19   male 28.400        1     no southwest  1842.519
## 151   35   male 24.130        1     no northwest  5125.216
## 152   48   male 29.700        0     no southeast  7789.635
## 153   32 female 37.145        3     no northeast  6334.344
## 154   42 female 23.370        0    yes northeast 19964.746
## 155   40 female 25.460        1     no northeast  7077.189
## 156   44   male 39.520        0     no northwest  6948.701
## 157   48   male 24.420        0    yes southeast 21223.676
## 158   18   male 25.175        0    yes northeast 15518.180
## 159   30   male 35.530        0    yes southeast 36950.257
## 160   50 female 27.830        3     no southeast 19749.383
## 161   42 female 26.600        0    yes northwest 21348.706
## 162   18 female 36.850        0    yes southeast 36149.484
## 163   54   male 39.600        1     no southwest 10450.552
## 164   32 female 29.800        2     no southwest  5152.134
## 165   37   male 29.640        0     no northwest  5028.147
## 166   47   male 28.215        4     no northeast 10407.086
## 167   20 female 37.000        5     no southwest  4830.630
## 168   32 female 33.155        3     no northwest  6128.797
## 169   19 female 31.825        1     no northwest  2719.280
## 170   27   male 18.905        3     no northeast  4827.905
## 171   63   male 41.470        0     no southeast 13405.390
## 172   49   male 30.300        0     no southwest  8116.680
## 173   18   male 15.960        0     no northeast  1694.796
## 174   35 female 34.800        1     no southwest  5246.047
## 175   24 female 33.345        0     no northwest  2855.438
## 176   63 female 37.700        0    yes southwest 48824.450
## 177   38   male 27.835        2     no northwest  6455.863
## 178   54   male 29.200        1     no southwest 10436.096
## 179   46 female 28.900        2     no southwest  8823.279
## 180   41 female 33.155        3     no northeast  8538.288
```

```
## 181   58   male 28.595        0     no northwest 11735.879
## 182   18 female 38.280        0     no southeast  1631.821
## 183   22   male 19.950        3     no northeast  4005.423
## 184   44 female 26.410        0     no northwest  7419.478
## 185   44   male 30.690        2     no southeast  7731.427
## 186   36   male 41.895        3    yes northeast 43753.337
## 187   26 female 29.920        2     no southeast  3981.977
## 188   30 female 30.900        3     no southwest  5325.651
## 189   41 female 32.200        1     no southwest  6775.961
## 190   29 female 32.110        2     no northwest  4922.916
## 191   61   male 31.570        0     no southeast 12557.605
## 192   36 female 26.200        0     no southwest  4883.866
## 193   25   male 25.740        0     no southeast  2137.654
## 194   56 female 26.600        1     no northwest 12044.342
## 195   18   male 34.430        0     no southeast  1137.470
## 196   19   male 30.590        0     no northwest  1639.563
## 197   39 female 32.800        0     no southwest  5649.715
## 198   45 female 28.600        2     no southeast  8516.829
## 199   51 female 18.050        0     no northwest  9644.253
## 200   64 female 39.330        0     no northeast 14901.517
## 201   19 female 32.110        0     no northwest  2130.676
## 202   48 female 32.230        1     no southeast  8871.152
## 203   60 female 24.035        0     no northwest 13012.209
## 204   27 female 36.080        0    yes southeast 37133.898
## 205   46   male 22.300        0     no southwest  7147.105
## 206   28 female 28.880        1     no northeast  4337.735
## 207   59   male 26.400        0     no southeast 11743.299
## 208   35   male 27.740        2    yes northeast 20984.094
## 209   63 female 31.800        0     no southwest 13880.949
## 210   40   male 41.230        1     no northeast  6610.110
## 211   20   male 33.000        1     no southwest  1980.070
## 212   40   male 30.875        4     no northwest  8162.716
## 213   24   male 28.500        2     no northwest  3537.703
## 214   34 female 26.730        1     no southeast  5002.783
## 215   45 female 30.900        2     no southwest  8520.026
## 216   41 female 37.100        2     no southwest  7371.772
```

```
## 217   53 female 26.600        0     no northwest 10355.641
## 218   27   male 23.100        0     no southeast  2483.736
## 219   26 female 29.920        1     no southeast  3392.977
## 220   24 female 23.210        0     no southeast 25081.768
## 221   34 female 33.700        1     no southwest  5012.471
## 222   53 female 33.250        0     no northeast 10564.885
## 223   32   male 30.800        3     no southwest  5253.524
## 224   19   male 34.800        0    yes southwest 34779.615
## 225   42   male 24.640        0    yes southeast 19515.542
## 226   55   male 33.880        3     no southeast 11987.168
## 227   28   male 38.060        0     no southeast  2689.495
## 228   58 female 41.910        0     no southeast 24227.337
## 229   41 female 31.635        1     no northeast  7358.176
## 230   47   male 25.460        2     no northeast  9225.256
## 231   42 female 36.195        1     no northwest  7443.643
## 232   59 female 27.830        3     no southeast 14001.287
## 233   19 female 17.800        0     no southwest  1727.785
## 234   59   male 27.500        1     no southwest 12333.828
## 235   39   male 24.510        2     no northwest  6710.192
## 236   40 female 22.220        2    yes southeast 19444.266
## 237   18 female 26.730        0     no southeast  1615.767
## 238   31   male 38.390        2     no southeast  4463.205
## 239   19   male 29.070        0    yes northwest 17352.680
## 240   44   male 38.060        1     no southeast  7152.671
## 241   23 female 36.670        2    yes northeast 38511.628
## 242   33 female 22.135        1     no northeast  5354.075
## 243   55 female 26.800        1     no southwest 35160.135
## 244   40   male 35.300        3     no southwest  7196.867
## 245   63 female 27.740        0    yes northeast 29523.166
## 246   54   male 30.020        0     no northwest 24476.479
## 247   60 female 38.060        0     no southeast 12648.703
## 248   24   male 35.860        0     no southeast  1986.933
## 249   19   male 20.900        1     no southwest  1832.094
## 250   29   male 28.975        1     no northeast  4040.558
## 251   18   male 17.290        2    yes northeast 12829.455
## 252   63 female 32.200        2    yes southwest 47305.305
```

```
## 253   54   male 34.210        2    yes southeast 44260.750
## 254   27   male 30.300        3     no southwest  4260.744
## 255   50   male 31.825        0    yes northeast 41097.162
## 256   55 female 25.365        3     no northeast 13047.332
## 257   56   male 33.630        0    yes northwest 43921.184
## 258   38 female 40.150        0     no southeast  5400.980
## 259   51   male 24.415        4     no northwest 11520.100
## 260   19   male 31.920        0    yes northwest 33750.292
## 261   58 female 25.200        0     no southwest 11837.160
## 262   20 female 26.840        1    yes southeast 17085.268
## 263   52   male 24.320        3    yes northeast 24869.837
## 264   19   male 36.955        0    yes northwest 36219.405
## 265   53 female 38.060        3     no southeast 20462.998
## 266   46   male 42.350        3    yes southeast 46151.124
## 267   40   male 19.800        1    yes southeast 17179.522
## 268   59 female 32.395        3     no northeast 14590.632
## 269   45   male 30.200        1     no southwest  7441.053
## 270   49   male 25.840        1     no northeast  9282.481
## 271   18   male 29.370        1     no southeast  1719.436
## 272   50   male 34.200        2    yes southwest 42856.838
## 273   41   male 37.050        2     no northwest  7265.703
## 274   50   male 27.455        1     no northeast  9617.662
## 275   25   male 27.550        0     no northwest  2523.169
## 276   47 female 26.600        2     no northeast  9715.841
## 277   19   male 20.615        2     no northwest  2803.698
## 278   22 female 24.300        0     no southwest  2150.469
## 279   59   male 31.790        2     no southeast 12928.791
## 280   51 female 21.560        1     no southeast  9855.131
## 281   40 female 28.120        1    yes northeast 22331.567
## 282   54   male 40.565        3    yes northeast 48549.178
## 283   30   male 27.645        1     no northeast  4237.127
## 284   55 female 32.395        1     no northeast 11879.104
## 285   52 female 31.200        0     no southwest  9625.920
## 286   46   male 26.620        1     no southeast  7742.110
## 287   46 female 48.070        2     no northeast  9432.925
## 288   63 female 26.220        0     no northwest 14256.193
```

```
## 289   59 female 36.765        1    yes northeast 47896.791
## 290   52   male 26.400        3     no southeast 25992.821
## 291   28 female 33.400        0     no southwest  3172.018
## 292   29   male 29.640        1     no northeast 20277.808
## 293   25   male 45.540        2    yes southeast 42112.236
## 294   22 female 28.820        0     no southeast  2156.752
## 295   25   male 26.800        3     no southwest  3906.127
## 296   18   male 22.990        0     no northeast  1704.568
## 297   19   male 27.700        0    yes southwest 16297.846
## 298   47   male 25.410        1    yes southeast 21978.677
## 299   31   male 34.390        3    yes northwest 38746.355
## 300   48 female 28.880        1     no northwest  9249.495
## 301   36   male 27.550        3     no northeast  6746.743
## 302   53 female 22.610        3    yes northeast 24873.385
## 303   56 female 37.510        2     no southeast 12265.507
## 304   28 female 33.000        2     no southeast  4349.462
## 305   57 female 38.000        2     no southwest 12646.207
## 306   29   male 33.345        2     no northwest 19442.354
## 307   28 female 27.500        2     no southwest 20177.671
## 308   30 female 33.330        1     no southeast  4151.029
## 309   58   male 34.865        0     no northeast 11944.594
## 310   41 female 33.060        2     no northwest  7749.156
## 311   50   male 26.600        0     no southwest  8444.474
## 312   19 female 24.700        0     no southwest  1737.376
## 313   43   male 35.970        3    yes southeast 42124.515
## 314   49   male 35.860        0     no southeast  8124.408
## 315   27 female 31.400        0    yes southwest 34838.873
## 316   52   male 33.250        0     no northeast  9722.770
## 317   50   male 32.205        0     no northwest  8835.265
## 318   54   male 32.775        0     no northeast 10435.065
## 319   44 female 27.645        0     no northwest  7421.195
## 320   32   male 37.335        1     no northeast  4667.608
## 321   34   male 25.270        1     no northwest  4894.753
## 322   26 female 29.640        4     no northeast 24671.663
## 323   34   male 30.800        0    yes southwest 35491.640
## 324   57   male 40.945        0     no northeast 11566.301
```

```
## 325   29   male 27.200        0     no southwest  2866.091
## 326   40   male 34.105        1     no northeast  6600.206
## 327   27 female 23.210        1     no southeast  3561.889
## 328   45   male 36.480        2    yes northwest 42760.502
## 329   64 female 33.800        1    yes southwest 47928.030
## 330   52   male 36.700        0     no southwest  9144.565
## 331   61 female 36.385        1    yes northeast 48517.563
## 332   52   male 27.360        0    yes northwest 24393.622
## 333   61 female 31.160        0     no northwest 13429.035
## 334   56 female 28.785        0     no northeast 11658.379
## 335   43 female 35.720        2     no northeast 19144.577
## 336   64   male 34.500        0     no southwest 13822.803
## 337   60   male 25.740        0     no southeast 12142.579
## 338   62   male 27.550        1     no northwest 13937.666
## 339   50   male 32.300        1    yes northeast 41919.097
## 340   46 female 27.720        1     no southeast  8232.639
## 341   24 female 27.600        0     no southwest 18955.220
## 342   62   male 30.020        0     no northwest 13352.100
## 343   60 female 27.550        0     no northeast 13217.094
## 344   63   male 36.765        0     no northeast 13981.850
## 345   49 female 41.470        4     no southeast 10977.206
## 346   34 female 29.260        3     no southeast  6184.299
## 347   33   male 35.750        2     no southeast  4889.999
## 348   46   male 33.345        1     no northeast  8334.458
## 349   36 female 29.920        1     no southeast  5478.037
## 350   19   male 27.835        0     no northwest  1635.734
## 351   57 female 23.180        0     no northwest 11830.607
## 352   50 female 25.600        0     no southwest  8932.084
## 353   30 female 27.700        0     no southwest  3554.203
## 354   33   male 35.245        0     no northeast 12404.879
## 355   18 female 38.280        0     no southeast 14133.038
## 356   46   male 27.600        0     no southwest 24603.048
## 357   46   male 43.890        3     no southeast  8944.115
## 358   47   male 29.830        3     no northwest  9620.331
## 359   23   male 41.910        0     no southeast  1837.282
## 360   18 female 20.790        0     no southeast  1607.510
```

```
## 361   48 female 32.300        2     no northeast 10043.249
## 362   35   male 30.500        1     no southwest  4751.070
## 363   19 female 21.700        0    yes southwest 13844.506
## 364   21 female 26.400        1     no southwest  2597.779
## 365   21 female 21.890        2     no southeast  3180.510
## 366   49 female 30.780        1     no northeast  9778.347
## 367   56 female 32.300        3     no northeast 13430.265
## 368   42 female 24.985        2     no northwest  8017.061
## 369   44   male 32.015        2     no northwest  8116.269
## 370   18   male 30.400        3     no northeast  3481.868
## 371   61 female 21.090        0     no northwest 13415.038
## 372   57 female 22.230        0     no northeast 12029.287
## 373   42 female 33.155        1     no northeast  7639.417
## 374   26   male 32.900        2    yes southwest 36085.219
## 375   20   male 33.330        0     no southeast  1391.529
## 376   23 female 28.310        0    yes northwest 18033.968
## 377   39 female 24.890        3    yes northeast 21659.930
## 378   24   male 40.150        0    yes southeast 38126.247
## 379   64 female 30.115        3     no northwest 16455.708
## 380   62   male 31.460        1     no southeast 27000.985
## 381   27 female 17.955        2    yes northeast 15006.579
## 382   55   male 30.685        0    yes northeast 42303.692
## 383   55   male 33.000        0     no southeast 20781.489
## 384   35 female 43.340        2     no southeast  5846.918
## 385   44   male 22.135        2     no northeast  8302.536
## 386   19   male 34.400        0     no southwest  1261.859
## 387   58 female 39.050        0     no southeast 11856.412
## 388   50   male 25.365        2     no northwest 30284.643
## 389   26 female 22.610        0     no northwest  3176.816
## 390   24 female 30.210        3     no northwest  4618.080
## 391   48   male 35.625        4     no northeast 10736.871
## 392   19 female 37.430        0     no northwest  2138.071
## 393   48   male 31.445        1     no northeast  8964.061
## 394   49   male 31.350        1     no northeast  9290.139
## 395   46 female 32.300        2     no northeast  9411.005
## 396   46   male 19.855        0     no northwest  7526.706
```

```
## 397   43 female 34.400        3     no southwest  8522.003
## 398   21   male 31.020        0     no southeast 16586.498
## 399   64   male 25.600        2     no southwest 14988.432
## 400   18 female 38.170        0     no southeast  1631.668
## 401   51 female 20.600        0     no southwest  9264.797
## 402   47   male 47.520        1     no southeast  8083.920
## 403   64 female 32.965        0     no northwest 14692.669
## 404   49   male 32.300        3     no northwest 10269.460
## 405   31   male 20.400        0     no southwest  3260.199
## 406   52 female 38.380        2     no northeast 11396.900
## 407   33 female 24.310        0     no southeast  4185.098
## 408   47 female 23.600        1     no southwest  8539.671
## 409   38   male 21.120        3     no southeast  6652.529
## 410   32   male 30.030        1     no southeast  4074.454
## 411   19   male 17.480        0     no northwest  1621.340
## 412   44 female 20.235        1    yes northeast 19594.810
## 413   26 female 17.195        2    yes northeast 14455.644
## 414   25   male 23.900        5     no southwest  5080.096
## 415   19 female 35.150        0     no northwest  2134.901
## 416   43 female 35.640        1     no southeast  7345.727
## 417   52   male 34.100        0     no southeast  9140.951
## 418   36 female 22.600        2    yes southwest 18608.262
## 419   64   male 39.160        1     no southeast 14418.280
## 420   63 female 26.980        0    yes northwest 28950.469
## 421   64   male 33.880        0    yes southeast 46889.261
## 422   61   male 35.860        0    yes southeast 46599.108
## 423   40   male 32.775        1    yes northeast 39125.332
## 424   25   male 30.590        0     no northeast  2727.395
## 425   48   male 30.200        2     no southwest  8968.330
## 426   45   male 24.310        5     no southeast  9788.866
## 427   38 female 27.265        1     no northeast  6555.070
## 428   18 female 29.165        0     no northeast  7323.735
## 429   21 female 16.815        1     no northeast  3167.456
## 430   27 female 30.400        3     no northwest 18804.752
## 431   19   male 33.100        0     no southwest 23082.955
## 432   29 female 20.235        2     no northwest  4906.410
```

```
## 433   42   male 26.900        0     no southwest  5969.723
## 434   60 female 30.500        0     no southwest 12638.195
## 435   31   male 28.595        1     no northwest  4243.590
## 436   60   male 33.110        3     no southeast 13919.823
## 437   22   male 31.730        0     no northeast  2254.797
## 438   35   male 28.900        3     no southwest  5926.846
## 439   52 female 46.750        5     no southeast 12592.534
## 440   26   male 29.450        0     no northeast  2897.323
## 441   31 female 32.680        1     no northwest  4738.268
## 442   33 female 33.500        0    yes southwest 37079.372
## 443   18   male 43.010        0     no southeast  1149.396
## 444   59 female 36.520        1     no southeast 28287.898
## 445   56   male 26.695        1    yes northwest 26109.329
## 446   45 female 33.100        0     no southwest  7345.084
## 447   60   male 29.640        0     no northeast 12731.000
## 448   56 female 25.650        0     no northwest 11454.022
## 449   40 female 29.600        0     no southwest  5910.944
## 450   35   male 38.600        1     no southwest  4762.329
## 451   39   male 29.600        4     no southwest  7512.267
## 452   30   male 24.130        1     no northwest  4032.241
## 453   24   male 23.400        0     no southwest  1969.614
## 454   20   male 29.735        0     no northwest  1769.532
## 455   32   male 46.530        2     no southeast  4686.389
## 456   59   male 37.400        0     no southwest 21797.000
## 457   55 female 30.140        2     no southeast 11881.970
## 458   57 female 30.495        0     no northwest 11840.775
## 459   56   male 39.600        0     no southwest 10601.412
## 460   40 female 33.000        3     no southeast  7682.670
## 461   49 female 36.630        3     no southeast 10381.479
## 462   42   male 30.000        0    yes southwest 22144.032
## 463   62 female 38.095        2     no northeast 15230.324
## 464   56   male 25.935        0     no northeast 11165.418
## 465   19   male 25.175        0     no northwest  1632.036
## 466   30 female 28.380        1    yes southeast 19521.968
## 467   60 female 28.700        1     no southwest 13224.693
## 468   56 female 33.820        2     no northwest 12643.378
```

```
## 469   28 female 24.320        1     no northeast 23288.928
## 470   18 female 24.090        1     no southeast  2201.097
## 471   27   male 32.670        0     no southeast  2497.038
## 472   18 female 30.115        0     no northeast  2203.472
## 473   19 female 29.800        0     no southwest  1744.465
## 474   47 female 33.345        0     no northeast 20878.784
## 475   54   male 25.100        3    yes southwest 25382.297
## 476   61   male 28.310        1    yes northwest 28868.664
## 477   24   male 28.500        0    yes northeast 35147.528
## 478   25   male 35.625        0     no northwest  2534.394
## 479   21   male 36.850        0     no southeast  1534.304
## 480   23   male 32.560        0     no southeast  1824.285
## 481   63   male 41.325        3     no northwest 15555.189
## 482   49   male 37.510        2     no southeast  9304.702
## 483   18 female 31.350        0     no southeast  1622.188
## 484   51 female 39.500        1     no southwest  9880.068
## 485   48   male 34.300        3     no southwest  9563.029
## 486   31 female 31.065        0     no northeast  4347.023
## 487   54 female 21.470        3     no northwest 12475.351
## 488   19   male 28.700        0     no southwest  1253.936
## 489   44 female 38.060        0    yes southeast 48885.136
## 490   53   male 31.160        1     no northwest 10461.979
## 491   19 female 32.900        0     no southwest  1748.774
## 492   61 female 25.080        0     no southeast 24513.091
## 493   18 female 25.080        0     no northeast  2196.473
## 494   61   male 43.400        0     no southwest 12574.049
## 495   21   male 25.700        4    yes southwest 17942.106
## 496   20   male 27.930        0     no northeast  1967.023
## 497   31 female 23.600        2     no southwest  4931.647
## 498   45   male 28.700        2     no southwest  8027.968
## 499   44 female 23.980        2     no southeast  8211.100
## 500   62 female 39.200        0     no southwest 13470.860
## 501   29   male 34.400        0    yes southwest 36197.699
## 502   43   male 26.030        0     no northeast  6837.369
## 503   51   male 23.210        1    yes southeast 22218.115
## 504   19   male 30.250        0    yes southeast 32548.340
```

```
## 505   38 female 28.930        1     no southeast  5974.385
## 506   37   male 30.875        3     no northwest  6796.863
## 507   22   male 31.350        1     no northwest  2643.269
## 508   21   male 23.750        2     no northwest  3077.095
## 509   24 female 25.270        0     no northeast  3044.213
## 510   57 female 28.700        0     no southwest 11455.280
## 511   56   male 32.110        1     no northeast 11763.001
## 512   27   male 33.660        0     no southeast  2498.414
## 513   51   male 22.420        0     no northeast  9361.327
## 514   19   male 30.400        0     no southwest  1256.299
## 515   39   male 28.300        1    yes southwest 21082.160
## 516   58   male 35.700        0     no southwest 11362.755
## 517   20   male 35.310        1     no southeast 27724.289
## 518   45   male 30.495        2     no northwest  8413.463
## 519   35 female 31.000        1     no southwest  5240.765
## 520   31   male 30.875        0     no northeast  3857.759
## 521   50 female 27.360        0     no northeast 25656.575
## 522   32 female 44.220        0     no southeast  3994.178
## 523   51 female 33.915        0     no northeast  9866.305
## 524   38 female 37.730        0     no southeast  5397.617
## 525   42   male 26.070        1    yes southeast 38245.593
## 526   18 female 33.880        0     no southeast 11482.635
## 527   19 female 30.590        2     no northwest 24059.680
## 528   51 female 25.800        1     no southwest  9861.025
## 529   46   male 39.425        1     no northeast  8342.909
## 530   18   male 25.460        0     no northeast  1708.001
## 531   57   male 42.130        1    yes southeast 48675.518
## 532   62 female 31.730        0     no northeast 14043.477
## 533   59   male 29.700        2     no southeast 12925.886
## 534   37   male 36.190        0     no southeast 19214.706
## 535   64   male 40.480        0     no southeast 13831.115
## 536   38   male 28.025        1     no northeast  6067.127
## 537   33 female 38.900        3     no southwest  5972.378
## 538   46 female 30.200        2     no southwest  8825.086
## 539   46 female 28.050        1     no southeast  8233.097
## 540   53   male 31.350        0     no southeast 27346.042
```

```
## 541   34 female 38.000        3     no southwest  6196.448
## 542   20 female 31.790        2     no southeast  3056.388
## 543   63 female 36.300        0     no southeast 13887.204
## 544   54 female 47.410        0    yes southeast 63770.428
## 545   54   male 30.210        0     no northwest 10231.500
## 546   49   male 25.840        2    yes northwest 23807.241
## 547   28   male 35.435        0     no northeast  3268.847
## 548   54 female 46.700        2     no southwest 11538.421
## 549   25 female 28.595        0     no northeast  3213.622
## 550   43 female 46.200        0    yes southeast 45863.205
## 551   63   male 30.800        0     no southwest 13390.559
## 552   32 female 28.930        0     no southeast  3972.925
## 553   62   male 21.400        0     no southwest 12957.118
## 554   52 female 31.730        2     no northwest 11187.657
## 555   25 female 41.325        0     no northeast 17878.901
## 556   28   male 23.800        2     no southwest  3847.674
## 557   46   male 33.440        1     no northeast  8334.590
## 558   34   male 34.210        0     no southeast  3935.180
## 559   35 female 34.105        3    yes northwest 39983.426
## 560   19   male 35.530        0     no northwest  1646.430
## 561   46 female 19.950        2     no northwest  9193.838
## 562   54 female 32.680        0     no northeast 10923.933
## 563   27   male 30.500        0     no southwest  2494.022
## 564   50   male 44.770        1     no southeast  9058.730
## 565   18 female 32.120        2     no southeast  2801.259
## 566   19 female 30.495        0     no northwest  2128.431
## 567   38 female 40.565        1     no northwest  6373.557
## 568   41   male 30.590        2     no northwest  7256.723
## 569   49 female 31.900        5     no southwest 11552.904
## 570   48   male 40.565        2    yes northwest 45702.022
## 571   31 female 29.100        0     no southwest  3761.292
## 572   18 female 37.290        1     no southeast  2219.445
## 573   30 female 43.120        2     no southeast  4753.637
## 574   62 female 36.860        1     no northeast 31620.001
## 575   57 female 34.295        2     no northeast 13224.057
## 576   58 female 27.170        0     no northwest 12222.898
```

```
## 577   22   male 26.840        0     no southeast  1665.000
## 578   31 female 38.095        1    yes northeast 58571.074
## 579   52   male 30.200        1     no southwest  9724.530
## 580   25 female 23.465        0     no northeast  3206.491
## 581   59   male 25.460        1     no northeast 12913.992
## 582   19   male 30.590        0     no northwest  1639.563
## 583   39   male 45.430        2     no southeast  6356.271
## 584   32 female 23.650        1     no southeast 17626.240
## 585   19   male 20.700        0     no southwest  1242.816
## 586   33 female 28.270        1     no southeast  4779.602
## 587   21   male 20.235        3     no northeast  3861.210
## 588   34 female 30.210        1    yes northwest 43943.876
## 589   61 female 35.910        0     no northeast 13635.638
## 590   38 female 30.690        1     no southeast  5976.831
## 591   58 female 29.000        0     no southwest 11842.442
## 592   47   male 19.570        1     no northwest  8428.069
## 593   20   male 31.130        2     no southeast  2566.471
## 594   21 female 21.850        1    yes northeast 15359.104
## 595   41   male 40.260        0     no southeast  5709.164
## 596   46 female 33.725        1     no northeast  8823.986
## 597   42 female 29.480        2     no southeast  7640.309
## 598   34 female 33.250        1     no northeast  5594.846
## 599   43   male 32.600        2     no southwest  7441.501
## 600   52 female 37.525        2     no northwest 33471.972
## 601   18 female 39.160        0     no southeast  1633.044
## 602   51   male 31.635        0     no northwest  9174.136
## 603   56 female 25.300        0     no southwest 11070.535
## 604   64 female 39.050        3     no southeast 16085.128
## 605   19 female 28.310        0    yes northwest 17468.984
## 606   51 female 34.100        0     no southeast  9283.562
## 607   27 female 25.175        0     no northeast  3558.620
## 608   59 female 23.655        0    yes northwest 25678.778
## 609   28   male 26.980        2     no northeast  4435.094
## 610   30   male 37.800        2    yes southwest 39241.442
## 611   47 female 29.370        1     no southeast  8547.691
## 612   38 female 34.800        2     no southwest  6571.544
```

```
## 613   18 female 33.155        0     no northeast  2207.697
## 614   34 female 19.000        3     no northeast  6753.038
## 615   20 female 33.000        0     no southeast  1880.070
## 616   47 female 36.630        1    yes southeast 42969.853
## 617   56 female 28.595        0     no northeast 11658.115
## 618   49   male 25.600        2    yes southwest 23306.547
## 619   19 female 33.110        0    yes southeast 34439.856
## 620   55 female 37.100        0     no southwest 10713.644
## 621   30   male 31.400        1     no southwest  3659.346
## 622   37   male 34.100        4    yes southwest 40182.246
## 623   49 female 21.300        1     no southwest  9182.170
## 624   18   male 33.535        0    yes northeast 34617.841
## 625   59   male 28.785        0     no northwest 12129.614
## 626   29 female 26.030        0     no northwest  3736.465
## 627   36   male 28.880        3     no northeast  6748.591
## 628   33   male 42.460        1     no southeast 11326.715
## 629   58   male 38.000        0     no southwest 11365.952
## 630   44 female 38.950        0    yes northwest 42983.459
## 631   53   male 36.100        1     no southwest 10085.846
## 632   24   male 29.300        0     no southwest  1977.815
## 633   29 female 35.530        0     no southeast  3366.670
## 634   40   male 22.705        2     no northeast  7173.360
## 635   51   male 39.700        1     no southwest  9391.346
## 636   64   male 38.190        0     no northeast 14410.932
## 637   19 female 24.510        1     no northwest  2709.112
## 638   35 female 38.095        2     no northeast 24915.046
## 639   39   male 26.410        0    yes northeast 20149.323
## 640   56   male 33.660        4     no southeast 12949.155
## 641   33   male 42.400        5     no southwest  6666.243
## 642   42   male 28.310        3    yes northwest 32787.459
## 643   61   male 33.915        0     no northeast 13143.865
## 644   23 female 34.960        3     no northwest  4466.621
## 645   43   male 35.310        2     no southeast 18806.145
## 646   48   male 30.780        3     no northeast 10141.136
## 647   39   male 26.220        1     no northwest  6123.569
## 648   40 female 23.370        3     no northeast  8252.284
```

```
## 649   18   male 28.500        0     no northeast  1712.227
## 650   58 female 32.965        0     no northeast 12430.953
## 651   49 female 42.680        2     no southeast  9800.888
## 652   53 female 39.600        1     no southeast 10579.711
## 653   48 female 31.130        0     no southeast  8280.623
## 654   45 female 36.300        2     no southeast  8527.532
## 655   59 female 35.200        0     no southeast 12244.531
## 656   52 female 25.300        2    yes southeast 24667.419
## 657   26 female 42.400        1     no southwest  3410.324
## 658   27   male 33.155        2     no northwest  4058.712
## 659   48 female 35.910        1     no northeast 26392.260
## 660   57 female 28.785        4     no northeast 14394.398
## 661   37   male 46.530        3     no southeast  6435.624
## 662   57 female 23.980        1     no southeast 22192.437
## 663   32 female 31.540        1     no northeast  5148.553
## 664   18   male 33.660        0     no southeast  1136.399
## 665   64 female 22.990        0    yes southeast 27037.914
## 666   43   male 38.060        2    yes southeast 42560.430
## 667   49   male 28.700        1     no southwest  8703.456
## 668   40 female 32.775        2    yes northwest 40003.332
## 669   62   male 32.015        0    yes northeast 45710.208
## 670   40 female 29.810        1     no southeast  6500.236
## 671   30   male 31.570        3     no southeast  4837.582
## 672   29 female 31.160        0     no northeast  3943.595
## 673   36   male 29.700        0     no southeast  4399.731
## 674   41 female 31.020        0     no southeast  6185.321
## 675   44 female 43.890        2    yes southeast 46200.985
## 676   45   male 21.375        0     no northwest  7222.786
## 677   55 female 40.810        3     no southeast 12485.801
## 678   60   male 31.350        3    yes northwest 46130.526
## 679   56   male 36.100        3     no southwest 12363.547
## 680   49 female 23.180        2     no northwest 10156.783
## 681   21 female 17.400        1     no southwest  2585.269
## 682   19   male 20.300        0     no southwest  1242.260
## 683   39   male 35.300        2    yes southwest 40103.890
## 684   53   male 24.320        0     no northwest  9863.472
```

```
## 685   33 female 18.500        1     no southwest  4766.022
## 686   53   male 26.410        2     no northeast 11244.377
## 687   42   male 26.125        2     no northeast  7729.646
## 688   40   male 41.690        0     no southeast  5438.749
## 689   47 female 24.100        1     no southwest 26236.580
## 690   27   male 31.130        1    yes southeast 34806.468
## 691   21   male 27.360        0     no northeast  2104.113
## 692   47   male 36.200        1     no southwest  8068.185
## 693   20   male 32.395        1     no northwest  2362.229
## 694   24   male 23.655        0     no northwest  2352.968
## 695   27 female 34.800        1     no southwest  3577.999
## 696   26 female 40.185        0     no northwest  3201.245
## 697   53 female 32.300        2     no northeast 29186.482
## 698   41   male 35.750        1    yes southeast 40273.645
## 699   56   male 33.725        0     no northwest 10976.246
## 700   23 female 39.270        2     no southeast  3500.612
## 701   21 female 34.870        0     no southeast  2020.552
## 702   50 female 44.745        0     no northeast  9541.696
## 703   53   male 41.470        0     no southeast  9504.310
## 704   34 female 26.410        1     no northwest  5385.338
## 705   47 female 29.545        1     no northwest  8930.935
## 706   33 female 32.900        2     no southwest  5375.038
## 707   51 female 38.060        0    yes southeast 44400.406
## 708   49   male 28.690        3     no northwest 10264.442
## 709   31 female 30.495        3     no northeast  6113.231
## 710   36 female 27.740        0     no northeast  5469.007
## 711   18   male 35.200        1     no southeast  1727.540
## 712   50 female 23.540        2     no southeast 10107.221
## 713   43 female 30.685        2     no northwest  8310.839
## 714   20   male 40.470        0     no northeast  1984.453
## 715   24 female 22.600        0     no southwest  2457.502
## 716   60   male 28.900        0     no southwest 12146.971
## 717   49 female 22.610        1     no northwest  9566.991
## 718   60   male 24.320        1     no northwest 13112.605
## 719   51 female 36.670        2     no northwest 10848.134
## 720   58 female 33.440        0     no northwest 12231.614
```

```
## 721   51 female 40.660        0     no northeast  9875.680
## 722   53   male 36.600        3     no southwest 11264.541
## 723   62   male 37.400        0     no southwest 12979.358
## 724   19   male 35.400        0     no southwest  1263.249
## 725   50 female 27.075        1     no northeast 10106.134
## 726   30 female 39.050        3    yes southeast 40932.429
## 727   41   male 28.405        1     no northwest  6664.686
## 728   29 female 21.755        1    yes northeast 16657.717
## 729   18 female 40.280        0     no northeast  2217.601
## 730   41 female 36.080        1     no southeast  6781.354
## 731   35   male 24.420        3    yes southeast 19361.999
## 732   53   male 21.400        1     no southwest 10065.413
## 733   24 female 30.100        3     no southwest  4234.927
## 734   48 female 27.265        1     no northeast  9447.250
## 735   59 female 32.100        3     no southwest 14007.222
## 736   49 female 34.770        1     no northwest  9583.893
## 737   37 female 38.390        0    yes southeast 40419.019
## 738   26   male 23.700        2     no southwest  3484.331
## 739   23   male 31.730        3    yes northeast 36189.102
## 740   29   male 35.500        2    yes southwest 44585.456
## 741   45   male 24.035        2     no northeast  8604.484
## 742   27   male 29.150        0    yes southeast 18246.496
## 743   53   male 34.105        0    yes northeast 43254.418
## 744   31 female 26.620        0     no southeast  3757.845
## 745   50   male 26.410        0     no northwest  8827.210
## 746   50 female 30.115        1     no northwest  9910.360
## 747   34   male 27.000        2     no southwest 11737.849
## 748   19   male 21.755        0     no northwest  1627.282
## 749   47 female 36.000        1     no southwest  8556.907
## 750   28   male 30.875        0     no northwest  3062.508
## 751   37 female 26.400        0    yes southeast 19539.243
## 752   21   male 28.975        0     no northwest  1906.358
## 753   64   male 37.905        0     no northwest 14210.536
## 754   58 female 22.770        0     no southeast 11833.782
## 755   24   male 33.630        4     no northeast 17128.426
## 756   31   male 27.645        2     no northeast  5031.270
```

```
## 757   39 female 22.800        3     no northeast  7985.815
## 758   47 female 27.830        0    yes southeast 23065.421
## 759   30   male 37.430        3     no northeast  5428.728
## 760   18   male 38.170        0    yes southeast 36307.798
## 761   22 female 34.580        2     no northeast  3925.758
## 762   23   male 35.200        1     no southwest  2416.955
## 763   33   male 27.100        1    yes southwest 19040.876
## 764   27   male 26.030        0     no northeast  3070.809
## 765   45 female 25.175        2     no northeast  9095.068
## 766   57 female 31.825        0     no northwest 11842.624
## 767   47   male 32.300        1     no southwest  8062.764
## 768   42 female 29.000        1     no southwest  7050.642
## 769   64 female 39.700        0     no southwest 14319.031
## 770   38 female 19.475        2     no northwest  6933.242
## 771   61   male 36.100        3     no southwest 27941.288
## 772   53 female 26.700        2     no southwest 11150.780
## 773   44 female 36.480        0     no northeast 12797.210
## 774   19 female 28.880        0    yes northwest 17748.506
## 775   41   male 34.200        2     no northwest  7261.741
## 776   51   male 33.330        3     no southeast 10560.492
## 777   40   male 32.300        2     no northwest  6986.697
## 778   45   male 39.805        0     no northeast  7448.404
## 779   35   male 34.320        3     no southeast  5934.380
## 780   53   male 28.880        0     no northwest  9869.810
## 781   30   male 24.400        3    yes southwest 18259.216
## 782   18   male 41.140        0     no southeast  1146.797
## 783   51   male 35.970        1     no southeast  9386.161
## 784   50 female 27.600        1    yes southwest 24520.264
## 785   31 female 29.260        1     no southeast  4350.514
## 786   35 female 27.700        3     no southwest  6414.178
## 787   60   male 36.955        0     no northeast 12741.167
## 788   21   male 36.860        0     no northwest  1917.318
## 789   29   male 22.515        3     no northeast  5209.579
## 790   62 female 29.920        0     no southeast 13457.961
## 791   39 female 41.800        0     no southeast  5662.225
## 792   19   male 27.600        0     no southwest  1252.407
```

```
## 793   22 female 23.180        0     no northeast  2731.912
## 794   53   male 20.900        0    yes southeast 21195.818
## 795   39 female 31.920        2     no northwest  7209.492
## 796   27   male 28.500        0    yes northwest 18310.742
## 797   30   male 44.220        2     no southeast  4266.166
## 798   30 female 22.895        1     no northeast  4719.524
## 799   58 female 33.100        0     no southwest 11848.141
## 800   33   male 24.795        0    yes northeast 17904.527
## 801   42 female 26.180        1     no southeast  7046.722
## 802   64 female 35.970        0     no southeast 14313.846
## 803   21   male 22.300        1     no southwest  2103.080
## 804   18 female 42.240        0    yes southeast 38792.686
## 805   23   male 26.510        0     no southeast  1815.876
## 806   45 female 35.815        0     no northwest  7731.858
## 807   40 female 41.420        1     no northwest 28476.735
## 808   19 female 36.575        0     no northwest  2136.882
## 809   18   male 30.140        0     no southeast  1131.507
## 810   25   male 25.840        1     no northeast  3309.793
## 811   46 female 30.800        3     no southwest  9414.920
## 812   33 female 42.940        3     no northwest  6360.994
## 813   54   male 21.010        2     no southeast 11013.712
## 814   28   male 22.515        2     no northeast  4428.888
## 815   36   male 34.430        2     no southeast  5584.306
## 816   20 female 31.460        0     no southeast  1877.929
## 817   24 female 24.225        0     no northwest  2842.761
## 818   23   male 37.100        3     no southwest  3597.596
## 819   47 female 26.125        1    yes northeast 23401.306
## 820   33 female 35.530        0    yes northwest 55135.402
## 821   45   male 33.700        1     no southwest  7445.918
## 822   26   male 17.670        0     no northwest  2680.949
## 823   18 female 31.130        0     no southeast  1621.883
## 824   44 female 29.810        2     no southeast  8219.204
## 825   60   male 24.320        0     no northwest 12523.605
## 826   64 female 31.825        2     no northeast 16069.085
## 827   56   male 31.790        2    yes southeast 43813.866
## 828   36   male 28.025        1    yes northeast 20773.628
```

```
## 829   41   male 30.780        3    yes northeast 39597.407
## 830   39   male 21.850        1     no northwest  6117.494
## 831   63   male 33.100        0     no southwest 13393.756
## 832   36 female 25.840        0     no northwest  5266.366
## 833   28 female 23.845        2     no northwest  4719.737
## 834   58   male 34.390        0     no northwest 11743.934
## 835   36   male 33.820        1     no northwest  5377.458
## 836   42   male 35.970        2     no southeast  7160.330
## 837   36   male 31.500        0     no southwest  4402.233
## 838   56 female 28.310        0     no northeast 11657.719
## 839   35 female 23.465        2     no northeast  6402.291
## 840   59 female 31.350        0     no northwest 12622.180
## 841   21   male 31.100        0     no southwest  1526.312
## 842   59   male 24.700        0     no northeast 12323.936
## 843   23 female 32.780        2    yes southeast 36021.011
## 844   57 female 29.810        0    yes southeast 27533.913
## 845   53   male 30.495        0     no northeast 10072.055
## 846   60 female 32.450        0    yes southeast 45008.955
## 847   51 female 34.200        1     no southwest  9872.701
## 848   23   male 50.380        1     no southeast  2438.055
## 849   27 female 24.100        0     no southwest  2974.126
## 850   55   male 32.775        0     no northwest 10601.632
## 851   37 female 30.780        0    yes northeast 37270.151
## 852   61   male 32.300        2     no northwest 14119.620
## 853   46 female 35.530        0    yes northeast 42111.665
## 854   53 female 23.750        2     no northeast 11729.680
## 855   49 female 23.845        3    yes northeast 24106.913
## 856   20 female 29.600        0     no southwest  1875.344
## 857   48 female 33.110        0    yes southeast 40974.165
## 858   25   male 24.130        0    yes northwest 15817.986
## 859   25 female 32.230        1     no southeast 18218.161
## 860   57   male 28.100        0     no southwest 10965.446
## 861   37 female 47.600        2    yes southwest 46113.511
## 862   38 female 28.000        3     no southwest  7151.092
## 863   55 female 33.535        2     no northwest 12269.689
## 864   36 female 19.855        0     no northeast  5458.046
```

```
## 865   51   male 25.400        0     no southwest  8782.469
## 866   40   male 29.900        2     no southwest  6600.361
## 867   18   male 37.290        0     no southeast  1141.445
## 868   57   male 43.700        1     no southwest 11576.130
## 869   61   male 23.655        0     no northeast 13129.603
## 870   25 female 24.300        3     no southwest  4391.652
## 871   50   male 36.200        0     no southwest  8457.818
## 872   26 female 29.480        1     no southeast  3392.365
## 873   42   male 24.860        0     no southeast  5966.887
## 874   43   male 30.100        1     no southwest  6849.026
## 875   44   male 21.850        3     no northeast  8891.139
## 876   23 female 28.120        0     no northwest  2690.114
## 877   49 female 27.100        1     no southwest 26140.360
## 878   33   male 33.440        5     no southeast  6653.789
## 879   41   male 28.800        1     no southwest  6282.235
## 880   37 female 29.500        2     no southwest  6311.952
## 881   22   male 34.800        3     no southwest  3443.064
## 882   23   male 27.360        1     no northwest  2789.057
## 883   21 female 22.135        0     no northeast  2585.851
## 884   51 female 37.050        3    yes northeast 46255.113
## 885   25   male 26.695        4     no northwest  4877.981
## 886   32   male 28.930        1    yes southeast 19719.695
## 887   57   male 28.975        0    yes northeast 27218.437
## 888   36 female 30.020        0     no northwest  5272.176
## 889   22   male 39.500        0     no southwest  1682.597
## 890   57   male 33.630        1     no northwest 11945.133
## 891   64 female 26.885        0    yes northwest 29330.983
## 892   36 female 29.040        4     no southeast  7243.814
## 893   54   male 24.035        0     no northeast 10422.917
## 894   47   male 38.940        2    yes southeast 44202.654
## 895   62   male 32.110        0     no northeast 13555.005
## 896   61 female 44.000        0     no southwest 13063.883
## 897   43 female 20.045        2    yes northeast 19798.055
## 898   19   male 25.555        1     no northwest  2221.564
## 899   18 female 40.260        0     no southeast  1634.573
## 900   19 female 22.515        0     no northwest  2117.339
```

```
## 901   49   male 22.515        0     no northeast  8688.859
## 902   60   male 40.920        0    yes southeast 48673.559
## 903   26   male 27.265        3     no northeast  4661.286
## 904   49   male 36.850        0     no southeast  8125.784
## 905   60 female 35.100        0     no southwest 12644.589
## 906   26 female 29.355        2     no northeast  4564.191
## 907   27   male 32.585        3     no northeast  4846.920
## 908   44 female 32.340        1     no southeast  7633.721
## 909   63   male 39.800        3     no southwest 15170.069
## 910   32 female 24.600        0    yes southwest 17496.306
## 911   22   male 28.310        1     no northwest  2639.043
## 912   18   male 31.730        0    yes northeast 33732.687
## 913   59 female 26.695        3     no northwest 14382.709
## 914   44 female 27.500        1     no southwest  7626.993
## 915   33   male 24.605        2     no northwest  5257.508
## 916   24 female 33.990        0     no southeast  2473.334
## 917   43 female 26.885        0    yes northwest 21774.322
## 918   45   male 22.895        0    yes northeast 35069.375
## 919   61 female 28.200        0     no southwest 13041.921
## 920   35 female 34.210        1     no southeast  5245.227
## 921   62 female 25.000        0     no southwest 13451.122
## 922   62 female 33.200        0     no southwest 13462.520
## 923   38   male 31.000        1     no southwest  5488.262
## 924   34   male 35.815        0     no northwest  4320.411
## 925   43   male 23.200        0     no southwest  6250.435
## 926   50   male 32.110        2     no northeast 25333.333
## 927   19 female 23.400        2     no southwest  2913.569
## 928   57 female 20.100        1     no southwest 12032.326
## 929   62 female 39.160        0     no southeast 13470.804
## 930   41   male 34.210        1     no southeast  6289.755
## 931   26   male 46.530        1     no southeast  2927.065
## 932   39 female 32.500        1     no southwest  6238.298
## 933   46   male 25.800        5     no southwest 10096.970
## 934   45 female 35.300        0     no southwest  7348.142
## 935   32   male 37.180        2     no southeast  4673.392
## 936   59 female 27.500        0     no southwest 12233.828
```

```
## 937   44   male 29.735        2     no northeast 32108.663
## 938   39 female 24.225        5     no northwest  8965.796
## 939   18   male 26.180        2     no southeast  2304.002
## 940   53   male 29.480        0     no southeast  9487.644
## 941   18   male 23.210        0     no southeast  1121.874
## 942   50 female 46.090        1     no southeast  9549.565
## 943   18 female 40.185        0     no northeast  2217.469
## 944   19   male 22.610        0     no northwest  1628.471
## 945   62   male 39.930        0     no southeast 12982.875
## 946   56 female 35.800        1     no southwest 11674.130
## 947   42   male 35.800        2     no southwest  7160.094
## 948   37   male 34.200        1    yes northeast 39047.285
## 949   42   male 31.255        0     no northwest  6358.776
## 950   25   male 29.700        3    yes southwest 19933.458
## 951   57   male 18.335        0     no northeast 11534.873
## 952   51   male 42.900        2    yes southeast 47462.894
## 953   30 female 28.405        1     no northwest  4527.183
## 954   44   male 30.200        2    yes southwest 38998.546
## 955   34   male 27.835        1    yes northwest 20009.634
## 956   31   male 39.490        1     no southeast  3875.734
## 957   54   male 30.800        1    yes southeast 41999.520
## 958   24   male 26.790        1     no northwest 12609.887
## 959   43   male 34.960        1    yes northeast 41034.221
## 960   48   male 36.670        1     no northwest 28468.919
## 961   19 female 39.615        1     no northwest  2730.108
## 962   29 female 25.900        0     no southwest  3353.284
## 963   63 female 35.200        1     no southeast 14474.675
## 964   46   male 24.795        3     no northeast  9500.573
## 965   52   male 36.765        2     no northwest 26467.097
## 966   35   male 27.100        1     no southwest  4746.344
## 967   51   male 24.795        2    yes northwest 23967.383
## 968   44   male 25.365        1     no northwest  7518.025
## 969   21   male 25.745        2     no northeast  3279.869
## 970   39 female 34.320        5     no southeast  8596.828
## 971   50 female 28.160        3     no southeast 10702.642
## 972   34 female 23.560        0     no northeast  4992.376
```

```
## 973   22 female 20.235        0     no northwest  2527.819
## 974   19 female 40.500        0     no southwest  1759.338
## 975   26   male 35.420        0     no southeast  2322.622
## 976   29   male 22.895        0    yes northeast 16138.762
## 977   48   male 40.150        0     no southeast  7804.160
## 978   26   male 29.150        1     no southeast  2902.907
## 979   45 female 39.995        3     no northeast  9704.668
## 980   36 female 29.920        0     no southeast  4889.037
## 981   54   male 25.460        1     no northeast 25517.114
## 982   34   male 21.375        0     no northeast  4500.339
## 983   31   male 25.900        3    yes southwest 19199.944
## 984   27 female 30.590        1     no northeast 16796.412
## 985   20   male 30.115        5     no northeast  4915.060
## 986   44 female 25.800        1     no southwest  7624.630
## 987   43   male 30.115        3     no northwest  8410.047
## 988   45 female 27.645        1     no northwest 28340.189
## 989   34   male 34.675        0     no northeast  4518.826
## 990   24 female 20.520        0    yes northeast 14571.891
## 991   26 female 19.800        1     no southwest  3378.910
## 992   38 female 27.835        2     no northeast  7144.863
## 993   50 female 31.600        2     no southwest 10118.424
## 994   38   male 28.270        1     no southeast  5484.467
## 995   27 female 20.045        3    yes northwest 16420.495
## 996   39 female 23.275        3     no northeast  7986.475
## 997   39 female 34.100        3     no southwest  7418.522
## 998   63 female 36.850        0     no southeast 13887.969
## 999   33 female 36.290        3     no northeast  6551.750
## 1000  36 female 26.885        0     no northwest  5267.818
## 1001  30   male 22.990        2    yes northwest 17361.766
## 1002  24   male 32.700        0    yes southwest 34472.841
## 1003  24   male 25.800        0     no southwest  1972.950
## 1004  48   male 29.600        0     no southwest 21232.182
## 1005  47   male 19.190        1     no northeast  8627.541
## 1006  29   male 31.730        2     no northwest  4433.388
## 1007  28   male 29.260        2     no northeast  4438.263
## 1008  47   male 28.215        3    yes northwest 24915.221
```

```
## 1009  25   male 24.985        2     no northeast 23241.475
## 1010  51   male 27.740        1     no northeast  9957.722
## 1011  48 female 22.800        0     no southwest  8269.044
## 1012  43   male 20.130        2    yes southeast 18767.738
## 1013  61 female 33.330        4     no southeast 36580.282
## 1014  48   male 32.300        1     no northwest  8765.249
## 1015  38 female 27.600        0     no southwest  5383.536
## 1016  59   male 25.460        0     no northwest 12124.992
## 1017  19 female 24.605        1     no northwest  2709.244
## 1018  26 female 34.200        2     no southwest  3987.926
## 1019  54 female 35.815        3     no northwest 12495.291
## 1020  21 female 32.680        2     no northwest 26018.951
## 1021  51   male 37.000        0     no southwest  8798.593
## 1022  22 female 31.020        3    yes southeast 35595.590
## 1023  47   male 36.080        1    yes southeast 42211.138
## 1024  18   male 23.320        1     no southeast  1711.027
## 1025  47 female 45.320        1     no southeast  8569.862
## 1026  21 female 34.600        0     no southwest  2020.177
## 1027  19   male 26.030        1    yes northwest 16450.895
## 1028  23   male 18.715        0     no northwest 21595.382
## 1029  54   male 31.600        0     no southwest  9850.432
## 1030  37 female 17.290        2     no northeast  6877.980
## 1031  46 female 23.655        1    yes northwest 21677.283
## 1032  55 female 35.200        0    yes southeast 44423.803
## 1033  30 female 27.930        0     no northeast  4137.523
## 1034  18   male 21.565        0    yes northeast 13747.872
## 1035  61   male 38.380        0     no northwest 12950.071
## 1036  54 female 23.000        3     no southwest 12094.478
## 1037  22   male 37.070        2    yes southeast 37484.449
## 1038  45 female 30.495        1    yes northwest 39725.518
## 1039  22   male 28.880        0     no northeast  2250.835
## 1040  19   male 27.265        2     no northwest 22493.660
## 1041  35 female 28.025        0    yes northwest 20234.855
## 1042  18   male 23.085        0     no northeast  1704.700
## 1043  20   male 30.685        0    yes northeast 33475.817
## 1044  28 female 25.800        0     no southwest  3161.454
```

```
## 1045  55   male 35.245        1     no northeast 11394.066
## 1046  43 female 24.700        2    yes northwest 21880.820
## 1047  43 female 25.080        0     no northeast  7325.048
## 1048  22   male 52.580        1    yes southeast 44501.398
## 1049  25 female 22.515        1     no northwest  3594.171
## 1050  49   male 30.900        0    yes southwest 39727.614
## 1051  44 female 36.955        1     no northwest  8023.135
## 1052  64   male 26.410        0     no northeast 14394.558
## 1053  49   male 29.830        1     no northeast  9288.027
## 1054  47   male 29.800        3    yes southwest 25309.489
## 1055  27 female 21.470        0     no northwest  3353.470
## 1056  55   male 27.645        0     no northwest 10594.502
## 1057  48 female 28.900        0     no southwest  8277.523
## 1058  45 female 31.790        0     no southeast 17929.303
## 1059  24 female 39.490        0     no southeast  2480.979
## 1060  32   male 33.820        1     no northwest  4462.722
## 1061  24   male 32.010        0     no southeast  1981.582
## 1062  57   male 27.940        1     no southeast 11554.224
## 1063  59   male 41.140        1    yes southeast 48970.248
## 1064  36   male 28.595        3     no northwest  6548.195
## 1065  29 female 25.600        4     no southwest  5708.867
## 1066  42 female 25.300        1     no southwest  7045.499
## 1067  48   male 37.290        2     no southeast  8978.185
## 1068  39   male 42.655        0     no northeast  5757.413
## 1069  63   male 21.660        1     no northwest 14349.854
## 1070  54 female 31.900        1     no southeast 10928.849
## 1071  37   male 37.070        1    yes southeast 39871.704
## 1072  63   male 31.445        0     no northeast 13974.456
## 1073  21   male 31.255        0     no northwest  1909.527
## 1074  54 female 28.880        2     no northeast 12096.651
## 1075  60 female 18.335        0     no northeast 13204.286
## 1076  32 female 29.590        1     no southeast  4562.842
## 1077  47 female 32.000        1     no southwest  8551.347
## 1078  21   male 26.030        0     no northeast  2102.265
## 1079  28   male 31.680        0    yes southeast 34672.147
## 1080  63   male 33.660        3     no southeast 15161.534
```

```
## 1081  18   male 21.780        2     no southeast 11884.049
## 1082  32   male 27.835        1     no northwest  4454.403
## 1083  38   male 19.950        1     no northwest  5855.903
## 1084  32   male 31.500        1     no southwest  4076.497
## 1085  62 female 30.495        2     no northwest 15019.760
## 1086  39 female 18.300        5    yes southwest 19023.260
## 1087  55   male 28.975        0     no northeast 10796.350
## 1088  57   male 31.540        0     no northwest 11353.228
## 1089  52   male 47.740        1     no southeast  9748.911
## 1090  56   male 22.100        0     no southwest 10577.087
## 1091  47   male 36.190        0    yes southeast 41676.081
## 1092  55 female 29.830        0     no northeast 11286.539
## 1093  23   male 32.700        3     no southwest  3591.480
## 1094  22 female 30.400        0    yes northwest 33907.548
## 1095  50 female 33.700        4     no southwest 11299.343
## 1096  18 female 31.350        4     no northeast  4561.189
## 1097  51 female 34.960        2    yes northeast 44641.197
## 1098  22   male 33.770        0     no southeast  1674.632
## 1099  52 female 30.875        0     no northeast 23045.566
## 1100  25 female 33.990        1     no southeast  3227.121
## 1101  33 female 19.095        2    yes northeast 16776.304
## 1102  53   male 28.600        3     no southwest 11253.421
## 1103  29   male 38.940        1     no southeast  3471.410
## 1104  58   male 36.080        0     no southeast 11363.283
## 1105  37   male 29.800        0     no southwest 20420.605
## 1106  54 female 31.240        0     no southeast 10338.932
## 1107  49 female 29.925        0     no northwest  8988.159
## 1108  50 female 26.220        2     no northwest 10493.946
## 1109  26   male 30.000        1     no southwest  2904.088
## 1110  45   male 20.350        3     no southeast  8605.362
## 1111  54 female 32.300        1     no northeast 11512.405
## 1112  38   male 38.390        3    yes southeast 41949.244
## 1113  48 female 25.850        3    yes southeast 24180.933
## 1114  28 female 26.315        3     no northwest  5312.170
## 1115  23   male 24.510        0     no northeast  2396.096
## 1116  55   male 32.670        1     no southeast 10807.486
```

```
## 1117  41   male 29.640        5     no northeast  9222.403
## 1118  25   male 33.330        2    yes southeast 36124.574
## 1119  33   male 35.750        1    yes southeast 38282.749
## 1120  30 female 19.950        3     no northwest  5693.431
## 1121  23 female 31.400        0    yes southwest 34166.273
## 1122  46   male 38.170        2     no southeast  8347.164
## 1123  53 female 36.860        3    yes northwest 46661.442
## 1124  27 female 32.395        1     no northeast 18903.491
## 1125  23 female 42.750        1    yes northeast 40904.200
## 1126  63 female 25.080        0     no northwest 14254.608
## 1127  55   male 29.900        0     no southwest 10214.636
## 1128  35 female 35.860        2     no southeast  5836.520
## 1129  34   male 32.800        1     no southwest 14358.364
## 1130  19 female 18.600        0     no southwest  1728.897
## 1131  39 female 23.870        5     no southeast  8582.302
## 1132  27   male 45.900        2     no southwest  3693.428
## 1133  57   male 40.280        0     no northeast 20709.020
## 1134  52 female 18.335        0     no northwest  9991.038
## 1135  28   male 33.820        0     no northwest 19673.336
## 1136  50 female 28.120        3     no northwest 11085.587
## 1137  44 female 25.000        1     no southwest  7623.518
## 1138  26 female 22.230        0     no northwest  3176.288
## 1139  33   male 30.250        0     no southeast  3704.354
## 1140  19 female 32.490        0    yes northwest 36898.733
## 1141  50   male 37.070        1     no southeast  9048.027
## 1142  41 female 32.600        3     no southwest  7954.517
## 1143  52 female 24.860        0     no southeast 27117.994
## 1144  39   male 32.340        2     no southeast  6338.076
## 1145  50   male 32.300        2     no southwest  9630.397
## 1146  52   male 32.775        3     no northwest 11289.109
## 1147  60   male 32.800        0    yes southwest 52590.829
## 1148  20 female 31.920        0     no northwest  2261.569
## 1149  55   male 21.500        1     no southwest 10791.960
## 1150  42   male 34.100        0     no southwest  5979.731
## 1151  18 female 30.305        0     no northeast  2203.736
## 1152  58 female 36.480        0     no northwest 12235.839
```

```
## 1153  43 female 32.560        3    yes southeast 40941.285
## 1154  35 female 35.815        1     no northwest  5630.458
## 1155  48 female 27.930        4     no northwest 11015.175
## 1156  36 female 22.135        3     no northeast  7228.216
## 1157  19   male 44.880        0    yes southeast 39722.746
## 1158  23 female 23.180        2     no northwest 14426.074
## 1159  20 female 30.590        0     no northeast  2459.720
## 1160  32 female 41.100        0     no southwest  3989.841
## 1161  43 female 34.580        1     no northwest  7727.253
## 1162  34   male 42.130        2     no southeast  5124.189
## 1163  30   male 38.830        1     no southeast 18963.172
## 1164  18 female 28.215        0     no northeast  2200.831
## 1165  41 female 28.310        1     no northwest  7153.554
## 1166  35 female 26.125        0     no northeast  5227.989
## 1167  57   male 40.370        0     no southeast 10982.501
## 1168  29 female 24.600        2     no southwest  4529.477
## 1169  32   male 35.200        2     no southwest  4670.640
## 1170  37 female 34.105        1     no northwest  6112.353
## 1171  18   male 27.360        1    yes northeast 17178.682
## 1172  43 female 26.700        2    yes southwest 22478.600
## 1173  56 female 41.910        0     no southeast 11093.623
## 1174  38   male 29.260        2     no northwest  6457.843
## 1175  29   male 32.110        2     no northwest  4433.916
## 1176  22 female 27.100        0     no southwest  2154.361
## 1177  52 female 24.130        1    yes northwest 23887.663
## 1178  40 female 27.400        1     no southwest  6496.886
## 1179  23 female 34.865        0     no northeast  2899.489
## 1180  31   male 29.810        0    yes southeast 19350.369
## 1181  42 female 41.325        1     no northeast  7650.774
## 1182  24 female 29.925        0     no northwest  2850.684
## 1183  25 female 30.300        0     no southwest  2632.992
## 1184  48 female 27.360        1     no northeast  9447.382
## 1185  23 female 28.490        1    yes southeast 18328.238
## 1186  45   male 23.560        2     no northeast  8603.823
## 1187  20   male 35.625        3    yes northwest 37465.344
## 1188  62 female 32.680        0     no northwest 13844.797
```

```
## 1189  43 female 25.270        1    yes northeast 21771.342
## 1190  23 female 28.000        0     no southwest 13126.677
## 1191  31 female 32.775        2     no northwest  5327.400
## 1192  41 female 21.755        1     no northeast 13725.472
## 1193  58 female 32.395        1     no northeast 13019.161
## 1194  48 female 36.575        0     no northwest  8671.191
## 1195  31 female 21.755        0     no northwest  4134.082
## 1196  19 female 27.930        3     no northwest 18838.704
## 1197  19 female 30.020        0    yes northwest 33307.551
## 1198  41   male 33.550        0     no southeast  5699.837
## 1199  40   male 29.355        1     no northwest  6393.603
## 1200  31 female 25.800        2     no southwest  4934.705
## 1201  37   male 24.320        2     no northwest  6198.752
## 1202  46   male 40.375        2     no northwest  8733.229
## 1203  22   male 32.110        0     no northwest  2055.325
## 1204  51   male 32.300        1     no northeast  9964.060
## 1205  18 female 27.280        3    yes southeast 18223.451
## 1206  35   male 17.860        1     no northwest  5116.500
## 1207  59 female 34.800        2     no southwest 36910.608
## 1208  36   male 33.400        2    yes southwest 38415.474
## 1209  37 female 25.555        1    yes northeast 20296.863
## 1210  59   male 37.100        1     no southwest 12347.172
## 1211  36   male 30.875        1     no northwest  5373.364
## 1212  39   male 34.100        2     no southeast 23563.016
## 1213  18   male 21.470        0     no northeast  1702.455
## 1214  52 female 33.300        2     no southwest 10806.839
## 1215  27 female 31.255        1     no northwest  3956.071
## 1216  18   male 39.140        0     no northeast 12890.058
## 1217  40   male 25.080        0     no southeast  5415.661
## 1218  29   male 37.290        2     no southeast  4058.116
## 1219  46 female 34.600        1    yes southwest 41661.602
## 1220  38 female 30.210        3     no northwest  7537.164
## 1221  30 female 21.945        1     no northeast  4718.204
## 1222  40   male 24.970        2     no southeast  6593.508
## 1223  50   male 25.300        0     no southeast  8442.667
## 1224  20 female 24.420        0    yes southeast 26125.675
```

```
## 1225  41   male 23.940        1     no northeast  6858.480
## 1226  33 female 39.820        1     no southeast  4795.657
## 1227  38   male 16.815        2     no northeast  6640.545
## 1228  42   male 37.180        2     no southeast  7162.012
## 1229  56   male 34.430        0     no southeast 10594.226
## 1230  58   male 30.305        0     no northeast 11938.256
## 1231  52   male 34.485        3    yes northwest 60021.399
## 1232  20 female 21.800        0    yes southwest 20167.336
## 1233  54 female 24.605        3     no northwest 12479.709
## 1234  58   male 23.300        0     no southwest 11345.519
## 1235  45 female 27.830        2     no southeast  8515.759
## 1236  26   male 31.065        0     no northwest  2699.568
## 1237  63 female 21.660        0     no northeast 14449.854
## 1238  58 female 28.215        0     no northwest 12224.351
## 1239  37   male 22.705        3     no northeast  6985.507
## 1240  25 female 42.130        1     no southeast  3238.436
## 1241  52   male 41.800        2    yes southeast 47269.854
## 1242  64   male 36.960        2    yes southeast 49577.662
## 1243  22 female 21.280        3     no northwest  4296.271
## 1244  28 female 33.110        0     no southeast  3171.615
## 1245  18   male 33.330        0     no southeast  1135.941
## 1246  28   male 24.300        5     no southwest  5615.369
## 1247  45 female 25.700        3     no southwest  9101.798
## 1248  33   male 29.400        4     no southwest  6059.173
## 1249  18 female 39.820        0     no southeast  1633.962
## 1250  32   male 33.630        1    yes northeast 37607.528
## 1251  24   male 29.830        0    yes northeast 18648.422
## 1252  19   male 19.800        0     no southwest  1241.565
## 1253  20   male 27.300        0    yes southwest 16232.847
## 1254  40 female 29.300        4     no southwest 15828.822
## 1255  34 female 27.720        0     no southeast  4415.159
## 1256  42 female 37.900        0     no southwest  6474.013
## 1257  51 female 36.385        3     no northwest 11436.738
## 1258  54 female 27.645        1     no northwest 11305.935
## 1259  55   male 37.715        3     no northwest 30063.581
## 1260  52 female 23.180        0     no northeast 10197.772
```

```
## 1261  32 female 20.520        0     no northeast  4544.235
## 1262  28   male 37.100        1     no southwest  3277.161
## 1263  41 female 28.050        1     no southeast  6770.193
## 1264  43 female 29.900        1     no southwest  7337.748
## 1265  49 female 33.345        2     no northeast 10370.913
## 1266  64   male 23.760        0    yes southeast 26926.514
## 1267  55 female 30.500        0     no southwest 10704.470
## 1268  24   male 31.065        0    yes northeast 34254.053
## 1269  20 female 33.300        0     no southwest  1880.487
## 1270  45   male 27.500        3     no southwest  8615.300
## 1271  26   male 33.915        1     no northwest  3292.530
## 1272  25 female 34.485        0     no northwest  3021.809
## 1273  43   male 25.520        5     no southeast 14478.330
## 1274  35   male 27.610        1     no southeast  4747.053
## 1275  26   male 27.060        0    yes southeast 17043.341
## 1276  57   male 23.700        0     no southwest 10959.330
## 1277  22 female 30.400        0     no northeast  2741.948
## 1278  32 female 29.735        0     no northwest  4357.044
## 1279  39   male 29.925        1    yes northeast 22462.044
## 1280  25 female 26.790        2     no northwest  4189.113
## 1281  48 female 33.330        0     no southeast  8283.681
## 1282  47 female 27.645        2    yes northwest 24535.699
## 1283  18 female 21.660        0    yes northeast 14283.459
## 1284  18   male 30.030        1     no southeast  1720.354
## 1285  61   male 36.300        1    yes southwest 47403.880
## 1286  47 female 24.320        0     no northeast  8534.672
## 1287  28 female 17.290        0     no northeast  3732.625
## 1288  36 female 25.900        1     no southwest  5472.449
## 1289  20   male 39.400        2    yes southwest 38344.566
## 1290  44   male 34.320        1     no southeast  7147.473
## 1291  38 female 19.950        2     no northeast  7133.903
## 1292  19   male 34.900        0    yes southwest 34828.654
## 1293  21   male 23.210        0     no southeast  1515.345
## 1294  46   male 25.745        3     no northwest  9301.894
## 1295  58   male 25.175        0     no northeast 11931.125
## 1296  20   male 22.000        1     no southwest  1964.780
```

```
## 1297  18   male 26.125        0     no northeast  1708.926
## 1298  28 female 26.510        2     no southeast  4340.441
## 1299  33   male 27.455        2     no northwest  5261.469
## 1300  19 female 25.745        1     no northwest  2710.829
## 1301  45   male 30.360        0    yes southeast 62592.873
## 1302  62   male 30.875        3    yes northwest 46718.163
## 1303  25 female 20.800        1     no southwest  3208.787
## 1304  43   male 27.800        0    yes southwest 37829.724
## 1305  42   male 24.605        2    yes northeast 21259.378
## 1306  24 female 27.720        0     no southeast  2464.619
## 1307  29 female 21.850        0    yes northeast 16115.305
## 1308  32   male 28.120        4    yes northwest 21472.479
## 1309  25 female 30.200        0    yes southwest 33900.653
## 1310  41   male 32.200        2     no southwest  6875.961
## 1311  42   male 26.315        1     no northwest  6940.910
## 1312  33 female 26.695        0     no northwest  4571.413
## 1313  34   male 42.900        1     no southwest  4536.259
## 1314  19 female 34.700        2    yes southwest 36397.576
## 1315  30 female 23.655        3    yes northwest 18765.875
## 1316  18   male 28.310        1     no northeast 11272.331
## 1317  19 female 20.600        0     no southwest  1731.677
## 1318  18   male 53.130        0     no southeast  1163.463
## 1319  35   male 39.710        4     no northeast 19496.719
## 1320  39 female 26.315        2     no northwest  7201.701
## 1321  31   male 31.065        3     no northwest  5425.023
## 1322  62   male 26.695        0    yes northeast 28101.333
## 1323  62   male 38.830        0     no southeast 12981.346
## 1324  42 female 40.370        2    yes southeast 43896.376
## 1325  31   male 25.935        1     no northwest  4239.893
## 1326  61   male 33.535        0     no northeast 13143.337
## 1327  42 female 32.870        0     no northeast  7050.021
## 1328  51   male 30.030        1     no southeast  9377.905
## 1329  23 female 24.225        2     no northeast 22395.744
## 1330  52   male 38.600        2     no southwest 10325.206
## 1331  57 female 25.740        2     no southeast 12629.166
## 1332  23 female 33.400        0     no southwest 10795.937
```

```
## 1333  52 female 44.700        3     no southwest 11411.685
## 1334  50   male 30.970        3     no northwest 10600.548
## 1335  18 female 31.920        0     no northeast  2205.981
## 1336  18 female 36.850        0     no southeast  1629.833
## 1337  21 female 25.800        0     no southwest  2007.945
## 1338  61 female 29.070        0    yes northwest 29141.360

# To print unique columns
print(unique(d$age))

##  [1] 19 18 28 33 32 31 46 37 60 25 62 23 56 27 52 30 34 59 63 55 22 26 35 24 41
## [26] 38 36 21 48 40 58 53 43 64 20 61 44 57 29 45 54 49 47 51 42 50 39

print(unique(d$bmi))

##   [1] 27.900 33.770 33.000 22.705 28.880 25.740 33.440 27.740 29.830 25.840
##  [11] 26.220 26.290 34.400 39.820 42.130 24.600 30.780 23.845 40.300 35.300
##  [21] 36.005 32.400 34.100 31.920 28.025 27.720 23.085 32.775 17.385 36.300
##  [31] 35.600 26.315 28.600 28.310 36.400 20.425 32.965 20.800 36.670 39.900
##  [41] 26.600 36.630 21.780 30.800 37.050 37.300 38.665 34.770 24.530 35.200
##  [51] 35.625 33.630 28.000 34.430 28.690 36.955 31.825 31.680 22.880 37.335
##  [61] 27.360 33.660 24.700 25.935 22.420 28.900 39.100 36.190 23.980 24.750
##  [71] 28.500 28.100 32.010 27.400 34.010 29.590 35.530 39.805 26.885 38.285
##  [81] 37.620 41.230 34.800 22.895 31.160 27.200 26.980 39.490 24.795 31.300
##  [91] 38.280 19.950 19.300 31.600 25.460 30.115 29.920 27.500 28.400 30.875
## [101] 27.940 35.090 29.700 35.720 32.205 28.595 49.060 27.170 23.370 37.100
## [111] 23.750 28.975 31.350 33.915 28.785 28.300 37.400 17.765 34.700 26.505
## [121] 22.040 35.900 25.555 28.050 25.175 31.900 36.000 32.490 25.300 29.735
## [131] 38.830 30.495 37.730 37.430 24.130 37.145 39.520 24.420 27.830 36.850
## [141] 39.600 29.800 29.640 28.215 37.000 33.155 18.905 41.470 30.300 15.960
## [151] 33.345 37.700 27.835 29.200 26.410 30.690 41.895 30.900 32.200 32.110
## [161] 31.570 26.200 30.590 32.800 18.050 39.330 32.230 24.035 36.080 22.300
## [171] 26.400 31.800 26.730 23.100 23.210 33.700 33.250 24.640 33.880 38.060
## [181] 41.910 31.635 36.195 17.800 24.510 22.220 38.390 29.070 22.135 26.800
## [191] 30.020 35.860 20.900 17.290 34.210 25.365 40.150 24.415 25.200 26.840
## [201] 24.320 42.350 19.800 32.395 30.200 29.370 34.200 27.455 27.550 20.615
## [211] 24.300 31.790 21.560 28.120 40.565 27.645 31.200 26.620 48.070 36.765
```

```
## [221] 33.400 45.540 28.820 22.990 27.700 25.410 34.390 22.610 37.510 38.000
## [231] 33.330 34.865 33.060 35.970 31.400 25.270 40.945 34.105 36.480 33.800
## [241] 36.700 36.385 34.500 32.300 27.600 29.260 35.750 23.180 25.600 35.245
## [251] 43.890 20.790 30.500 21.700 21.890 24.985 32.015 30.400 21.090 22.230
## [261] 32.900 24.890 31.460 17.955 30.685 43.340 39.050 30.210 31.445 19.855
## [271] 31.020 38.170 20.600 47.520 20.400 38.380 24.310 23.600 21.120 30.030
## [281] 17.480 20.235 17.195 23.900 35.150 35.640 22.600 39.160 27.265 29.165
## [291] 16.815 33.100 26.900 33.110 31.730 46.750 29.450 32.680 33.500 43.010
## [301] 36.520 26.695 25.650 29.600 38.600 23.400 46.530 30.140 30.000 38.095
## [311] 28.380 28.700 33.820 24.090 32.670 25.100 32.560 41.325 39.500 34.300
## [321] 31.065 21.470 25.080 43.400 25.700 27.930 39.200 26.030 30.250 28.930
## [331] 35.700 35.310 31.000 44.220 26.070 25.800 39.425 40.480 38.900 47.410
## [341] 35.435 46.700 46.200 21.400 23.800 44.770 32.120 29.100 37.290 43.120
## [351] 36.860 34.295 23.465 45.430 23.650 20.700 28.270 35.910 29.000 19.570
## [361] 31.130 21.850 40.260 33.725 29.480 32.600 37.525 23.655 37.800 19.000
## [371] 21.300 33.535 42.460 38.950 36.100 29.300 39.700 38.190 42.400 34.960
## [381] 42.680 31.540 29.810 21.375 40.810 17.400 20.300 18.500 26.125 41.690
## [391] 24.100 36.200 40.185 39.270 34.870 44.745 29.545 23.540 40.470 40.660
## [401] 36.600 35.400 27.075 28.405 21.755 40.280 30.100 32.100 23.700 35.500
## [411] 29.150 27.000 37.905 22.770 22.800 34.580 27.100 19.475 26.700 34.320
## [421] 24.400 41.140 22.515 41.800 26.180 42.240 26.510 35.815 41.420 36.575
## [431] 42.940 21.010 24.225 17.670 31.500 31.100 32.780 32.450 50.380 47.600
## [441] 25.400 29.900 43.700 24.860 28.800 29.500 29.040 38.940 44.000 20.045
## [451] 40.920 35.100 29.355 32.585 32.340 39.800 24.605 33.990 28.200 25.000
## [461] 33.200 23.200 20.100 32.500 37.180 46.090 39.930 35.800 31.255 18.335
## [471] 42.900 26.790 39.615 25.900 25.745 28.160 23.560 40.500 35.420 39.995
## [481] 34.675 20.520 23.275 36.290 32.700 19.190 20.130 23.320 45.320 34.600
## [491] 18.715 21.565 23.000 37.070 52.580 42.655 21.660 32.000 18.300 47.740
## [501] 22.100 19.095 31.240 29.925 20.350 25.850 42.750 18.600 23.870 45.900
## [511] 21.500 30.305 44.880 41.100 40.370 28.490 33.550 40.375 27.280 17.860
## [521] 33.300 39.140 21.945 24.970 23.940 34.485 21.800 23.300 36.960 21.280
## [531] 29.400 27.300 37.900 37.715 23.760 25.520 27.610 27.060 39.400 34.900
## [541] 22.000 30.360 27.800 53.130 39.710 32.870 44.700 30.970

print(unique(d$charges))
```

```
##    [1] 16884.924  1725.552  4449.462 21984.471  3866.855  3756.622  8240.590
##    [8]  7281.506  6406.411 28923.137  2721.321 27808.725  1826.843 11090.718
##   [15] 39611.758  1837.237 10797.336  2395.172 10602.385 36837.467 13228.847
##   [22]  4149.736  1137.011 37701.877  6203.902 14001.134 14451.835 12268.632
##   [29]  2775.192 38711.000 35585.576  2198.190  4687.797 13770.098 51194.559
##   [36]  1625.434 15612.193  2302.300 39774.276 48173.361  3046.062  4949.759
##   [43]  6272.477  6313.759  6079.672 20630.284  3393.356  3556.922 12629.897
##   [50] 38709.176  2211.131  3579.829 23568.272 37742.576  8059.679 47496.494
##   [57] 13607.369 34303.167 23244.790  5989.524  8606.217  4504.662 30166.618
##   [64]  4133.642 14711.744  1743.214 14235.072  6389.378  5920.104 17663.144
##   [71] 16577.780  6799.458 11741.726 11946.626  7726.854 11356.661  3947.413
##   [78]  1532.470  2755.021  6571.024  4441.213  7935.291 37165.164 11033.662
##   [85] 39836.519 21098.554 43578.939 11073.176  8026.667 11082.577  2026.974
##   [92] 10942.132 30184.937  5729.005 47291.055  3766.884 12105.320 10226.284
##   [99] 22412.648 15820.699  6186.127  3645.089 21344.847 30942.192  5003.853
##  [106] 17560.380  2331.519  3877.304  2867.120 47055.532 10825.254 11881.358
##  [113]  4646.759  2404.734 11488.317 30259.996 11381.325 19107.780  8601.329
##  [120]  6686.431  7740.337  1705.624  2257.475 39556.495 10115.009  3385.399
##  [127] 17081.080  9634.538 32734.186  6082.405 12815.445 13616.359 11163.568
##  [134]  1632.564  2457.211  2155.682  1261.442  2045.685 27322.734  2166.732
##  [141] 27375.905  3490.549 18972.495 18157.876 20745.989  5138.257 40720.551
##  [148]  9877.608 10959.695  1842.519  5125.216  7789.635  6334.344 19964.746
##  [155]  7077.189  6948.701 21223.676 15518.180 36950.257 19749.383 21348.706
##  [162] 36149.484 10450.552  5152.134  5028.147 10407.086  4830.630  6128.797
##  [169]  2719.280  4827.905 13405.390  8116.680  1694.796  5246.047  2855.438
##  [176] 48824.450  6455.863 10436.096  8823.279  8538.288 11735.879  1631.821
##  [183]  4005.423  7419.478  7731.427 43753.337  3981.977  5325.651  6775.961
##  [190]  4922.916 12557.605  4883.866  2137.654 12044.342  1137.470  1639.563
##  [197]  5649.715  8516.829  9644.253 14901.517  2130.676  8871.152 13012.209
##  [204] 37133.898  7147.105  4337.735 11743.299 20984.094 13880.949  6610.110
##  [211]  1980.070  8162.716  3537.703  5002.783  8520.026  7371.772 10355.641
##  [218]  2483.736  3392.977 25081.768  5012.471 10564.885  5253.524 34779.615
##  [225] 19515.542 11987.168  2689.495 24227.337  7358.176  9225.256  7443.643
##  [232] 14001.287  1727.785 12333.828  6710.192 19444.266  1615.767  4463.205
##  [239] 17352.680  7152.671 38511.628  5354.075 35160.135  7196.867 29523.166
##  [246] 24476.479 12648.703  1986.933  1832.094  4040.558 12829.455 47305.305
```

```
##  [253] 44260.750  4260.744 41097.162 13047.332 43921.184  5400.980 11520.100
##  [260] 33750.292 11837.160 17085.268 24869.837 36219.405 20462.998 46151.124
##  [267] 17179.522 14590.632  7441.053  9282.481  1719.436 42856.838  7265.703
##  [274]  9617.662  2523.169  9715.841  2803.698  2150.469 12928.791  9855.131
##  [281] 22331.567 48549.178  4237.127 11879.104  9625.920  7742.110  9432.925
##  [288] 14256.193 47896.791 25992.821  3172.018 20277.808 42112.236  2156.752
##  [295]  3906.127  1704.568 16297.846 21978.677 38746.355  9249.495  6746.743
##  [302] 24873.385 12265.507  4349.462 12646.207 19442.354 20177.671  4151.029
##  [309] 11944.594  7749.156  8444.474  1737.376 42124.515  8124.408 34838.873
##  [316]  9722.770  8835.265 10435.065  7421.195  4667.608  4894.753 24671.663
##  [323] 35491.640 11566.301  2866.091  6600.206  3561.889 42760.502 47928.030
##  [330]  9144.565 48517.563 24393.622 13429.035 11658.379 19144.577 13822.803
##  [337] 12142.579 13937.666 41919.097  8232.639 18955.220 13352.100 13217.094
##  [344] 13981.850 10977.206  6184.299  4889.999  8334.458  5478.037  1635.734
##  [351] 11830.607  8932.084  3554.203 12404.879 14133.038 24603.048  8944.115
##  [358]  9620.331  1837.282  1607.510 10043.249  4751.070 13844.506  2597.779
##  [365]  3180.510  9778.347 13430.265  8017.061  8116.269  3481.868 13415.038
##  [372] 12029.287  7639.417 36085.219  1391.529 18033.968 21659.930 38126.247
##  [379] 16455.708 27000.985 15006.579 42303.692 20781.489  5846.918  8302.536
##  [386]  1261.859 11856.412 30284.643  3176.816  4618.080 10736.871  2138.071
##  [393]  8964.061  9290.139  9411.005  7526.706  8522.003 16586.498 14988.432
##  [400]  1631.668  9264.797  8083.920 14692.669 10269.460  3260.199 11396.900
##  [407]  4185.098  8539.671  6652.529  4074.454  1621.340 19594.810 14455.644
##  [414]  5080.096  2134.901  7345.727  9140.951 18608.262 14418.280 28950.469
##  [421] 46889.261 46599.108 39125.332  2727.395  8968.330  9788.866  6555.070
##  [428]  7323.735  3167.456 18804.752 23082.955  4906.410  5969.723 12638.195
##  [435]  4243.590 13919.823  2254.797  5926.846 12592.534  2897.323  4738.268
##  [442] 37079.372  1149.396 28287.898 26109.329  7345.084 12731.000 11454.022
##  [449]  5910.944  4762.329  7512.267  4032.241  1969.614  1769.532  4686.389
##  [456] 21797.000 11881.970 11840.775 10601.412  7682.670 10381.479 22144.032
##  [463] 15230.324 11165.418  1632.036 19521.968 13224.693 12643.378 23288.928
##  [470]  2201.097  2497.038  2203.472  1744.465 20878.784 25382.297 28868.664
##  [477] 35147.528  2534.394  1534.304  1824.285 15555.189  9304.702  1622.188
##  [484]  9880.068  9563.029  4347.023 12475.351  1253.936 48885.136 10461.979
##  [491]  1748.774 24513.091  2196.473 12574.049 17942.106  1967.023  4931.647
##  [498]  8027.968  8211.100 13470.860 36197.699  6837.369 22218.115 32548.340
```

```
##  [505]  5974.385  6796.863  2643.269  3077.095  3044.213 11455.280 11763.001
##  [512]  2498.414  9361.327  1256.299 21082.160 11362.755 27724.289  8413.463
##  [519]  5240.765  3857.759 25656.575  3994.178  9866.305  5397.617 38245.593
##  [526] 11482.635 24059.680  9861.025  8342.909  1708.001 48675.518 14043.477
##  [533] 12925.886 19214.706 13831.115  6067.127  5972.378  8825.086  8233.097
##  [540] 27346.042  6196.448  3056.388 13887.204 63770.428 10231.500 23807.241
##  [547]  3268.847 11538.421  3213.622 45863.205 13390.559  3972.925 12957.118
##  [554] 11187.657 17878.901  3847.674  8334.590  3935.180 39983.426  1646.430
##  [561]  9193.838 10923.933  2494.022  9058.730  2801.259  2128.431  6373.557
##  [568]  7256.723 11552.904 45702.022  3761.292  2219.445  4753.637 31620.001
##  [575] 13224.057 12222.898  1665.000 58571.074  9724.530  3206.491 12913.992
##  [582]  6356.271 17626.240  1242.816  4779.602  3861.210 43943.876 13635.638
##  [589]  5976.831 11842.442  8428.069  2566.471 15359.104  5709.164  8823.986
##  [596]  7640.309  5594.846  7441.501 33471.972  1633.044  9174.136 11070.535
##  [603] 16085.128 17468.984  9283.562  3558.620 25678.778  4435.094 39241.442
##  [610]  8547.691  6571.544  2207.697  6753.038  1880.070 42969.853 11658.115
##  [617] 23306.547 34439.856 10713.644  3659.346 40182.246  9182.170 34617.841
##  [624] 12129.614  3736.465  6748.591 11326.715 11365.952 42983.459 10085.846
##  [631]  1977.815  3366.670  7173.360  9391.346 14410.932  2709.112 24915.046
##  [638] 20149.323 12949.155  6666.243 32787.459 13143.865  4466.621 18806.145
##  [645] 10141.136  6123.569  8252.284  1712.227 12430.953  9800.888 10579.711
##  [652]  8280.623  8527.532 12244.531 24667.419  3410.324  4058.712 26392.260
##  [659] 14394.398  6435.624 22192.437  5148.553  1136.399 27037.914 42560.430
##  [666]  8703.456 40003.332 45710.208  6500.236  4837.582  3943.595  4399.731
##  [673]  6185.321 46200.985  7222.786 12485.801 46130.526 12363.547 10156.783
##  [680]  2585.269  1242.260 40103.890  9863.472  4766.022 11244.377  7729.646
##  [687]  5438.749 26236.580 34806.468  2104.113  8068.185  2362.229  2352.968
##  [694]  3577.999  3201.245 29186.482 40273.645 10976.246  3500.612  2020.552
##  [701]  9541.696  9504.310  5385.338  8930.935  5375.038 44400.406 10264.442
##  [708]  6113.231  5469.007  1727.540 10107.221  8310.839  1984.453  2457.502
##  [715] 12146.971  9566.991 13112.605 10848.134 12231.614  9875.680 11264.541
##  [722] 12979.358  1263.249 10106.134 40932.429  6664.686 16657.717  2217.601
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##  [736] 40419.019  3484.331 36189.102 44585.456  8604.484 18246.496 43254.418
##  [743]  3757.845  8827.210  9910.360 11737.849  1627.282  8556.907  3062.508
##  [750] 19539.243  1906.358 14210.536 11833.782 17128.426  5031.270  7985.815
```

```
##  [757] 23065.421  5428.728 36307.798  3925.758  2416.955 19040.876  3070.809
##  [764]  9095.068 11842.624  8062.764  7050.642 14319.031  6933.242 27941.288
##  [771] 11150.780 12797.210 17748.506  7261.741 10560.492  6986.697  7448.404
##  [778]  5934.380  9869.810 18259.216  1146.797  9386.161 24520.264  4350.514
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##  [799] 17904.527  7046.722 14313.846  2103.080 38792.686  1815.876  7731.858
##  [806] 28476.735  2136.882  1131.507  3309.793  9414.920  6360.994 11013.712
##  [813]  4428.888  5584.306  1877.929  2842.761  3597.596 23401.306 55135.402
##  [820]  7445.918  2680.949  1621.883  8219.204 12523.605 16069.085 43813.866
##  [827] 20773.628 39597.407  6117.494 13393.756  5266.366  4719.737 11743.934
##  [834]  5377.458  7160.330  4402.233 11657.719  6402.291 12622.180  1526.312
##  [841] 12323.936 36021.011 27533.913 10072.055 45008.955  9872.701  2438.055
##  [848]  2974.126 10601.632 37270.151 14119.620 42111.665 11729.680 24106.913
##  [855]  1875.344 40974.165 15817.986 18218.161 10965.446 46113.511  7151.092
##  [862] 12269.689  5458.046  8782.469  6600.361  1141.445 11576.130 13129.603
##  [869]  4391.652  8457.818  3392.365  5966.887  6849.026  8891.139  2690.114
##  [876] 26140.360  6653.789  6282.235  6311.952  3443.064  2789.057  2585.851
##  [883] 46255.113  4877.981 19719.695 27218.437  5272.176  1682.597 11945.133
##  [890] 29330.983  7243.814 10422.917 44202.654 13555.005 13063.883 19798.055
##  [897]  2221.564  1634.573  2117.339  8688.859 48673.559  4661.286  8125.784
##  [904] 12644.589  4564.191  4846.920  7633.721 15170.069 17496.306  2639.043
##  [911] 33732.687 14382.709  7626.993  5257.508  2473.334 21774.322 35069.375
##  [918] 13041.921  5245.227 13451.122 13462.520  5488.262  4320.411  6250.435
##  [925] 25333.333  2913.569 12032.326 13470.804  6289.755  2927.065  6238.298
##  [932] 10096.970  7348.142  4673.392 12233.828 32108.663  8965.796  2304.002
##  [939]  9487.644  1121.874  9549.565  2217.469  1628.471 12982.875 11674.130
##  [946]  7160.094 39047.285  6358.776 19933.458 11534.873 47462.894  4527.183
##  [953] 38998.546 20009.634  3875.734 41999.520 12609.887 41034.221 28468.919
##  [960]  2730.108  3353.284 14474.675  9500.573 26467.097  4746.344 23967.383
##  [967]  7518.025  3279.869  8596.828 10702.642  4992.376  2527.819  1759.338
##  [974]  2322.622 16138.762  7804.160  2902.907  9704.668  4889.037 25517.114
##  [981]  4500.339 19199.944 16796.412  4915.060  7624.630  8410.047 28340.189
##  [988]  4518.826 14571.891  3378.910  7144.863 10118.424  5484.467 16420.495
##  [995]  7986.475  7418.522 13887.969  6551.750  5267.818 17361.766 34472.841
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```

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## [1009]  9957.722  8269.044 18767.738 36580.282  8765.249  5383.536 12124.992
## [1016]  2709.244  3987.926 12495.291 26018.951  8798.593 35595.590 42211.138
## [1023]  1711.027  8569.862  2020.177 16450.895 21595.382  9850.432  6877.980
## [1030] 21677.283 44423.803  4137.523 13747.872 12950.071 12094.478 37484.449
## [1037] 39725.518  2250.835 22493.660 20234.855  1704.700 33475.817  3161.454
## [1044] 11394.066 21880.820  7325.048 44501.398  3594.171 39727.614  8023.135
## [1051] 14394.558  9288.027 25309.489  3353.470 10594.502  8277.523 17929.303
## [1058]  2480.979  4462.722  1981.582 11554.224 48970.248  6548.195  5708.867
## [1065]  7045.499  8978.185  5757.413 14349.854 10928.849 39871.704 13974.456
## [1072]  1909.527 12096.651 13204.286  4562.842  8551.347  2102.265 34672.147
## [1079] 15161.534 11884.049  4454.403  5855.903  4076.497 15019.760 19023.260
## [1086] 10796.350 11353.228  9748.911 10577.087 41676.081 11286.539  3591.480
## [1093] 33907.548 11299.343  4561.189 44641.197  1674.632 23045.566  3227.121
## [1100] 16776.304 11253.421  3471.410 11363.283 20420.605 10338.932  8988.159
## [1107] 10493.946  2904.088  8605.362 11512.405 41949.244 24180.933  5312.170
## [1114]  2396.096 10807.486  9222.403 36124.574 38282.749  5693.431 34166.273
## [1121]  8347.164 46661.442 18903.491 40904.200 14254.608 10214.636  5836.520
## [1128] 14358.364  1728.897  8582.302  3693.428 20709.020  9991.038 19673.336
## [1135] 11085.587  7623.518  3176.288  3704.354 36898.733  9048.027  7954.517
## [1142] 27117.994  6338.076  9630.397 11289.109 52590.829  2261.569 10791.960
## [1149]  5979.731  2203.736 12235.839 40941.285  5630.458 11015.175  7228.216
## [1156] 39722.746 14426.074  2459.720  3989.841  7727.253  5124.189 18963.172
## [1163]  2200.831  7153.554  5227.989 10982.501  4529.477  4670.640  6112.353
## [1170] 17178.682 22478.600 11093.623  6457.843  4433.916  2154.361 23887.663
## [1177]  6496.886  2899.489 19350.369  7650.774  2850.684  2632.992  9447.382
## [1184] 18328.238  8603.823 37465.344 13844.797 21771.342 13126.677  5327.400
## [1191] 13725.472 13019.161  8671.191  4134.082 18838.704 33307.551  5699.837
## [1198]  6393.603  4934.705  6198.752  8733.229  2055.325  9964.060 18223.451
## [1205]  5116.500 36910.608 38415.474 20296.863 12347.172  5373.364 23563.016
## [1212]  1702.455 10806.839  3956.071 12890.058  5415.661  4058.116 41661.602
## [1219]  7537.164  4718.204  6593.508  8442.667 26125.675  6858.480  4795.657
## [1226]  6640.545  7162.012 10594.226 11938.256 60021.399 20167.336 12479.709
## [1233] 11345.519  8515.759  2699.568 14449.854 12224.351  6985.507  3238.436
## [1240] 47269.854 49577.662  4296.271  3171.615  1135.941  5615.369  9101.798
## [1247]  6059.173  1633.962 37607.528 18648.422  1241.565 16232.847 15828.822
## [1254]  4415.159  6474.013 11436.738 11305.935 30063.581 10197.772  4544.235
```

```
## [1261]  3277.161  6770.193  7337.748 10370.913 26926.514 10704.470 34254.053
## [1268]  1880.487  8615.300  3292.530  3021.809 14478.330  4747.053 17043.341
## [1275] 10959.330  2741.948  4357.044 22462.044  4189.113  8283.681 24535.699
## [1282] 14283.459  1720.354 47403.880  8534.672  3732.625  5472.449 38344.566
## [1289]  7147.473  7133.903 34828.654  1515.345  9301.894 11931.125  1964.780
## [1296]  1708.926  4340.441  5261.469  2710.829 62592.873 46718.163  3208.787
## [1303] 37829.724 21259.378  2464.619 16115.305 21472.479 33900.653  6875.961
## [1310]  6940.910  4571.413  4536.259 36397.576 18765.875 11272.331  1731.677
## [1317]  1163.463 19496.719  7201.701  5425.023 28101.333 12981.346 43896.376
## [1324]  4239.893 13143.337  7050.021  9377.905 22395.744 10325.206 12629.166
## [1331] 10795.937 11411.685 10600.548  2205.981  1629.833  2007.945 29141.360

# statistical values
print(is.na(d))

##           age   sex   bmi children smoker region charges
##    [1,] FALSE FALSE FALSE    FALSE  FALSE  FALSE   FALSE
##    [2,] FALSE FALSE FALSE    FALSE  FALSE  FALSE   FALSE
##    [3,] FALSE FALSE FALSE    FALSE  FALSE  FALSE   FALSE
##    [4,] FALSE FALSE FALSE    FALSE  FALSE  FALSE   FALSE
##    [5,] FALSE FALSE FALSE    FALSE  FALSE  FALSE   FALSE
##    [6,] FALSE FALSE FALSE    FALSE  FALSE  FALSE   FALSE
##    [7,] FALSE FALSE FALSE    FALSE  FALSE  FALSE   FALSE
##    [8,] FALSE FALSE FALSE    FALSE  FALSE  FALSE   FALSE
##    [9,] FALSE FALSE FALSE    FALSE  FALSE  FALSE   FALSE
##   [10,] FALSE FALSE FALSE    FALSE  FALSE  FALSE   FALSE
##   [11,] FALSE FALSE FALSE    FALSE  FALSE  FALSE   FALSE
##   [12,] FALSE FALSE FALSE    FALSE  FALSE  FALSE   FALSE
##   [13,] FALSE FALSE FALSE    FALSE  FALSE  FALSE   FALSE
##   [14,] FALSE FALSE FALSE    FALSE  FALSE  FALSE   FALSE
##   [15,] FALSE FALSE FALSE    FALSE  FALSE  FALSE   FALSE
##   [16,] FALSE FALSE FALSE    FALSE  FALSE  FALSE   FALSE
##   [17,] FALSE FALSE FALSE    FALSE  FALSE  FALSE   FALSE
##   [18,] FALSE FALSE FALSE    FALSE  FALSE  FALSE   FALSE
##   [19,] FALSE FALSE FALSE    FALSE  FALSE  FALSE   FALSE
##   [20,] FALSE FALSE FALSE    FALSE  FALSE  FALSE   FALSE
```

```
##   [21,] FALSE FALSE FALSE    FALSE  FALSE  FALSE   FALSE
##   [22,] FALSE FALSE FALSE    FALSE  FALSE  FALSE   FALSE
##   [23,] FALSE FALSE FALSE    FALSE  FALSE  FALSE   FALSE
##   [24,] FALSE FALSE FALSE    FALSE  FALSE  FALSE   FALSE
##   [25,] FALSE FALSE FALSE    FALSE  FALSE  FALSE   FALSE
##   [26,] FALSE FALSE FALSE    FALSE  FALSE  FALSE   FALSE
##   [27,] FALSE FALSE FALSE    FALSE  FALSE  FALSE   FALSE
##   [28,] FALSE FALSE FALSE    FALSE  FALSE  FALSE   FALSE
##   [29,] FALSE FALSE FALSE    FALSE  FALSE  FALSE   FALSE
##   [30,] FALSE FALSE FALSE    FALSE  FALSE  FALSE   FALSE
##   [31,] FALSE FALSE FALSE    FALSE  FALSE  FALSE   FALSE
##   [32,] FALSE FALSE FALSE    FALSE  FALSE  FALSE   FALSE
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## [1305,] FALSE FALSE FALSE    FALSE  FALSE  FALSE   FALSE
## [1306,] FALSE FALSE FALSE    FALSE  FALSE  FALSE   FALSE
## [1307,] FALSE FALSE FALSE    FALSE  FALSE  FALSE   FALSE
## [1308,] FALSE FALSE FALSE    FALSE  FALSE  FALSE   FALSE
## [1309,] FALSE FALSE FALSE    FALSE  FALSE  FALSE   FALSE
## [1310,] FALSE FALSE FALSE    FALSE  FALSE  FALSE   FALSE
## [1311,] FALSE FALSE FALSE    FALSE  FALSE  FALSE   FALSE
## [1312,] FALSE FALSE FALSE    FALSE  FALSE  FALSE   FALSE
## [1313,] FALSE FALSE FALSE    FALSE  FALSE  FALSE   FALSE
## [1314,] FALSE FALSE FALSE    FALSE  FALSE  FALSE   FALSE
## [1315,] FALSE FALSE FALSE    FALSE  FALSE  FALSE   FALSE
## [1316,] FALSE FALSE FALSE    FALSE  FALSE  FALSE   FALSE
```

```
## [1317,] FALSE FALSE FALSE    FALSE  FALSE  FALSE   FALSE
## [1318,] FALSE FALSE FALSE    FALSE  FALSE  FALSE   FALSE
## [1319,] FALSE FALSE FALSE    FALSE  FALSE  FALSE   FALSE
## [1320,] FALSE FALSE FALSE    FALSE  FALSE  FALSE   FALSE
## [1321,] FALSE FALSE FALSE    FALSE  FALSE  FALSE   FALSE
## [1322,] FALSE FALSE FALSE    FALSE  FALSE  FALSE   FALSE
## [1323,] FALSE FALSE FALSE    FALSE  FALSE  FALSE   FALSE
## [1324,] FALSE FALSE FALSE    FALSE  FALSE  FALSE   FALSE
## [1325,] FALSE FALSE FALSE    FALSE  FALSE  FALSE   FALSE
## [1326,] FALSE FALSE FALSE    FALSE  FALSE  FALSE   FALSE
## [1327,] FALSE FALSE FALSE    FALSE  FALSE  FALSE   FALSE
## [1328,] FALSE FALSE FALSE    FALSE  FALSE  FALSE   FALSE
## [1329,] FALSE FALSE FALSE    FALSE  FALSE  FALSE   FALSE
## [1330,] FALSE FALSE FALSE    FALSE  FALSE  FALSE   FALSE
## [1331,] FALSE FALSE FALSE    FALSE  FALSE  FALSE   FALSE
## [1332,] FALSE FALSE FALSE    FALSE  FALSE  FALSE   FALSE
## [1333,] FALSE FALSE FALSE    FALSE  FALSE  FALSE   FALSE
## [1334,] FALSE FALSE FALSE    FALSE  FALSE  FALSE   FALSE
## [1335,] FALSE FALSE FALSE    FALSE  FALSE  FALSE   FALSE
## [1336,] FALSE FALSE FALSE    FALSE  FALSE  FALSE   FALSE
## [1337,] FALSE FALSE FALSE    FALSE  FALSE  FALSE   FALSE
## [1338,] FALSE FALSE FALSE    FALSE  FALSE  FALSE   FALSE

print(ncol(d))

## [1] 7

print(nrow(d))

## [1] 1338

print(max(d$charges))

## [1] 63770.43

print(min(d$charges))

## [1] 1121.874
```

```
print(sort(d$charges))
```

```
##    [1]  1121.874  1131.507  1135.941  1136.399  1137.011  1137.470  1141.445
##    [8]  1146.797  1149.396  1163.463  1241.565  1242.260  1242.816  1252.407
##   [15]  1253.936  1256.299  1261.442  1261.859  1263.249  1391.529  1515.345
##   [22]  1526.312  1532.470  1534.304  1607.510  1615.767  1621.340  1621.883
##   [29]  1622.188  1625.434  1627.282  1628.471  1629.833  1631.668  1631.821
##   [36]  1632.036  1632.564  1633.044  1633.962  1634.573  1635.734  1639.563
##   [43]  1639.563  1646.430  1665.000  1674.632  1682.597  1694.796  1702.455
##   [50]  1704.568  1704.700  1705.624  1708.001  1708.926  1711.027  1712.227
##   [57]  1719.436  1720.354  1725.552  1727.540  1727.785  1728.897  1731.677
##   [64]  1737.376  1743.214  1744.465  1748.774  1759.338  1769.532  1815.876
##   [71]  1824.285  1826.843  1832.094  1837.237  1837.282  1842.519  1875.344
##   [78]  1877.929  1880.070  1880.487  1906.358  1909.527  1917.318  1964.780
##   [85]  1967.023  1969.614  1972.950  1977.815  1980.070  1981.582  1984.453
##   [92]  1986.933  2007.945  2020.177  2020.552  2026.974  2045.685  2055.325
##   [99]  2102.265  2103.080  2104.113  2117.339  2128.431  2130.676  2134.901
##  [106]  2136.882  2137.654  2138.071  2150.469  2154.361  2155.682  2156.752
##  [113]  2166.732  2196.473  2198.190  2200.831  2201.097  2203.472  2203.736
##  [120]  2205.981  2207.697  2211.131  2217.469  2217.601  2219.445  2221.564
##  [127]  2250.835  2254.797  2257.475  2261.569  2302.300  2304.002  2322.622
##  [134]  2331.519  2352.968  2362.229  2395.172  2396.096  2404.734  2416.955
##  [141]  2438.055  2457.211  2457.502  2459.720  2464.619  2473.334  2480.979
##  [148]  2483.736  2494.022  2497.038  2498.414  2523.169  2527.819  2534.394
##  [155]  2566.471  2585.269  2585.851  2597.779  2632.992  2639.043  2643.269
##  [162]  2680.949  2689.495  2690.114  2699.568  2709.112  2709.244  2710.829
##  [169]  2719.280  2721.321  2727.395  2730.108  2731.912  2741.948  2755.021
##  [176]  2775.192  2789.057  2801.259  2803.698  2842.761  2850.684  2855.438
##  [183]  2866.091  2867.120  2897.323  2899.489  2902.907  2904.088  2913.569
##  [190]  2927.065  2974.126  3021.809  3044.213  3046.062  3056.388  3062.508
##  [197]  3070.809  3077.095  3161.454  3167.456  3171.615  3172.018  3176.288
##  [204]  3176.816  3180.510  3201.245  3206.491  3208.787  3213.622  3227.121
##  [211]  3238.436  3260.199  3268.847  3277.161  3279.869  3292.530  3309.793
##  [218]  3353.284  3353.470  3366.670  3378.910  3385.399  3392.365  3392.977
##  [225]  3393.356  3410.324  3443.064  3471.410  3481.868  3484.331  3490.549
##  [232]  3500.612  3537.703  3554.203  3556.922  3558.620  3561.889  3577.999
```

```
##  [239]  3579.829  3591.480  3594.171  3597.596  3645.089  3659.346  3693.428
##  [246]  3704.354  3732.625  3736.465  3756.622  3757.845  3761.292  3766.884
##  [253]  3847.674  3857.759  3861.210  3866.855  3875.734  3877.304  3906.127
##  [260]  3925.758  3935.180  3943.595  3947.413  3956.071  3972.925  3981.977
##  [267]  3987.926  3989.841  3994.178  4005.423  4032.241  4040.558  4058.116
##  [274]  4058.712  4074.454  4076.497  4133.642  4134.082  4137.523  4149.736
##  [281]  4151.029  4185.098  4189.113  4234.927  4237.127  4239.893  4243.590
##  [288]  4260.744  4266.166  4296.271  4320.411  4337.735  4340.441  4347.023
##  [295]  4349.462  4350.514  4357.044  4391.652  4399.731  4402.233  4415.159
##  [302]  4428.888  4433.388  4433.916  4435.094  4438.263  4441.213  4449.462
##  [309]  4454.403  4462.722  4463.205  4466.621  4500.339  4504.662  4518.826
##  [316]  4527.183  4529.477  4536.259  4544.235  4561.189  4562.842  4564.191
##  [323]  4571.413  4618.080  4646.759  4661.286  4667.608  4670.640  4673.392
##  [330]  4686.389  4687.797  4718.204  4719.524  4719.737  4738.268  4746.344
##  [337]  4747.053  4751.070  4753.637  4762.329  4766.022  4779.602  4795.657
##  [344]  4827.905  4830.630  4837.582  4846.920  4877.981  4883.866  4889.037
##  [351]  4889.999  4894.753  4906.410  4915.060  4922.916  4931.647  4934.705
##  [358]  4949.759  4992.376  5002.783  5003.853  5012.471  5028.147  5031.270
##  [365]  5080.096  5116.500  5124.189  5125.216  5138.257  5148.553  5152.134
##  [372]  5209.579  5227.989  5240.765  5245.227  5246.047  5253.524  5257.508
##  [379]  5261.469  5266.366  5267.818  5272.176  5312.170  5325.651  5327.400
##  [386]  5354.075  5373.364  5375.038  5377.458  5383.536  5385.338  5397.617
##  [393]  5400.980  5415.661  5425.023  5428.728  5438.749  5458.046  5469.007
##  [400]  5472.449  5478.037  5484.467  5488.262  5584.306  5594.846  5615.369
##  [407]  5630.458  5649.715  5662.225  5693.431  5699.837  5708.867  5709.164
##  [414]  5729.005  5757.413  5836.520  5846.918  5855.903  5910.944  5920.104
##  [421]  5926.846  5934.380  5966.887  5969.723  5972.378  5974.385  5976.831
##  [428]  5979.731  5989.524  6059.173  6067.127  6079.672  6082.405  6112.353
##  [435]  6113.231  6117.494  6123.569  6128.797  6184.299  6185.321  6186.127
##  [442]  6196.448  6198.752  6203.902  6238.298  6250.435  6272.477  6282.235
##  [449]  6289.755  6311.952  6313.759  6334.344  6338.076  6356.271  6358.776
##  [456]  6360.994  6373.557  6389.378  6393.603  6402.291  6406.411  6414.178
##  [463]  6435.624  6455.863  6457.843  6474.013  6496.886  6500.236  6548.195
##  [470]  6551.750  6555.070  6571.024  6571.544  6593.508  6600.206  6600.361
##  [477]  6610.110  6640.545  6652.529  6653.789  6664.686  6666.243  6686.431
##  [484]  6710.192  6746.743  6748.591  6753.038  6770.193  6775.961  6781.354
```

```
##  [491]  6796.863  6799.458  6837.369  6849.026  6858.480  6875.961  6877.980
##  [498]  6933.242  6940.910  6948.701  6985.507  6986.697  7045.499  7046.722
##  [505]  7050.021  7050.642  7077.189  7133.903  7144.863  7147.105  7147.473
##  [512]  7151.092  7152.671  7153.554  7160.094  7160.330  7162.012  7173.360
##  [519]  7196.867  7201.701  7209.492  7222.786  7228.216  7243.814  7256.723
##  [526]  7261.741  7265.703  7281.506  7323.735  7325.048  7337.748  7345.084
##  [533]  7345.727  7348.142  7358.176  7371.772  7418.522  7419.478  7421.195
##  [540]  7441.053  7441.501  7443.643  7445.918  7448.404  7512.267  7518.025
##  [547]  7526.706  7537.164  7623.518  7624.630  7626.993  7633.721  7639.417
##  [554]  7640.309  7650.774  7682.670  7726.854  7727.253  7729.646  7731.427
##  [561]  7731.858  7740.337  7742.110  7749.156  7789.635  7804.160  7935.291
##  [568]  7954.517  7985.815  7986.475  8017.061  8023.135  8026.667  8027.968
##  [575]  8059.679  8062.764  8068.185  8083.920  8116.269  8116.680  8124.408
##  [582]  8125.784  8162.716  8211.100  8219.204  8232.639  8233.097  8240.590
##  [589]  8252.284  8269.044  8277.523  8280.623  8283.681  8302.536  8310.839
##  [596]  8334.458  8334.590  8342.909  8347.164  8410.047  8413.463  8428.069
##  [603]  8442.667  8444.474  8457.818  8515.759  8516.829  8520.026  8522.003
##  [610]  8527.532  8534.672  8538.288  8539.671  8547.691  8551.347  8556.907
##  [617]  8569.862  8582.302  8596.828  8601.329  8603.823  8604.484  8605.362
##  [624]  8606.217  8615.300  8627.541  8671.191  8688.859  8703.456  8733.229
##  [631]  8765.249  8782.469  8798.593  8823.279  8823.986  8825.086  8827.210
##  [638]  8835.265  8871.152  8891.139  8930.935  8932.084  8944.115  8964.061
##  [645]  8965.796  8968.330  8978.185  8988.159  9048.027  9058.730  9095.068
##  [652]  9101.798  9140.951  9144.565  9174.136  9182.170  9193.838  9222.403
##  [659]  9225.256  9249.495  9264.797  9282.481  9283.562  9288.027  9290.139
##  [666]  9301.894  9304.702  9361.327  9377.905  9386.161  9391.346  9411.005
##  [673]  9414.920  9432.925  9447.250  9447.382  9487.644  9500.573  9504.310
##  [680]  9541.696  9549.565  9563.029  9566.991  9583.893  9617.662  9620.331
##  [687]  9625.920  9630.397  9634.538  9644.253  9704.668  9715.841  9722.770
##  [694]  9724.530  9748.911  9778.347  9788.866  9800.888  9850.432  9855.131
##  [701]  9861.025  9863.472  9866.305  9869.810  9872.701  9875.680  9877.608
##  [708]  9880.068  9910.360  9957.722  9964.060  9991.038 10043.249 10065.413
##  [715] 10072.055 10085.846 10096.970 10106.134 10107.221 10115.009 10118.424
##  [722] 10141.136 10156.783 10197.772 10214.636 10226.284 10231.500 10264.442
##  [729] 10269.460 10325.206 10338.932 10355.641 10370.913 10381.479 10407.086
##  [736] 10422.917 10435.065 10436.096 10450.552 10461.979 10493.946 10560.492
```

```
##  [743] 10564.885 10577.087 10579.711 10594.226 10594.502 10600.548 10601.412
##  [750] 10601.632 10602.385 10702.642 10704.470 10713.644 10736.871 10791.960
##  [757] 10795.937 10796.350 10797.336 10806.839 10807.486 10825.254 10848.134
##  [764] 10923.933 10928.849 10942.132 10959.330 10959.695 10965.446 10976.246
##  [771] 10977.206 10982.501 11013.712 11015.175 11033.662 11070.535 11073.176
##  [778] 11082.577 11085.587 11090.718 11093.623 11150.780 11163.568 11165.418
##  [785] 11187.657 11244.377 11253.421 11264.541 11272.331 11286.539 11289.109
##  [792] 11299.343 11305.935 11326.715 11345.519 11353.228 11356.661 11362.755
##  [799] 11363.283 11365.952 11381.325 11394.066 11396.900 11411.685 11436.738
##  [806] 11454.022 11455.280 11482.635 11488.317 11512.405 11520.100 11534.873
##  [813] 11538.421 11552.904 11554.224 11566.301 11576.130 11657.719 11658.115
##  [820] 11658.379 11674.130 11729.680 11735.879 11737.849 11741.726 11743.299
##  [827] 11743.934 11763.001 11830.607 11833.782 11837.160 11840.775 11842.442
##  [834] 11842.624 11848.141 11856.412 11879.104 11881.358 11881.970 11884.049
##  [841] 11931.125 11938.256 11944.594 11945.133 11946.626 11987.168 12029.287
##  [848] 12032.326 12044.342 12094.478 12096.651 12105.320 12124.992 12129.614
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##  [876] 12523.605 12557.605 12574.049 12592.534 12609.887 12622.180 12629.166
##  [883] 12629.897 12638.195 12643.378 12644.589 12646.207 12648.703 12731.000
##  [890] 12741.167 12797.210 12815.445 12829.455 12890.058 12913.992 12925.886
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##  [904] 13012.209 13019.161 13041.921 13047.332 13063.883 13112.605 13126.677
##  [911] 13129.603 13143.337 13143.865 13204.286 13217.094 13224.057 13224.693
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##  [974] 14478.330 14571.891 14590.632 14692.669 14711.744 14901.517 14988.432
##  [981] 15006.579 15019.760 15161.534 15170.069 15230.324 15359.104 15518.180
##  [988] 15555.189 15612.193 15817.986 15820.699 15828.822 16069.085 16085.128
```

```
##  [995] 16115.305 16138.762 16232.847 16297.846 16420.495 16450.895 16455.708
## [1002] 16577.780 16586.498 16657.717 16776.304 16796.412 16884.924 17043.341
## [1009] 17081.080 17085.268 17128.426 17178.682 17179.522 17352.680 17361.766
## [1016] 17468.984 17496.306 17560.380 17626.240 17663.144 17748.506 17878.901
## [1023] 17904.527 17929.303 17942.106 18033.968 18157.876 18218.161 18223.451
## [1030] 18246.496 18259.216 18310.742 18328.238 18608.262 18648.422 18765.875
## [1037] 18767.738 18804.752 18806.145 18838.704 18903.491 18955.220 18963.172
## [1044] 18972.495 19023.260 19040.876 19107.780 19144.577 19199.944 19214.706
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## [1086] 21232.182 21259.378 21344.847 21348.706 21472.479 21595.382 21659.930
## [1093] 21677.283 21771.342 21774.322 21797.000 21880.820 21978.677 21984.471
## [1100] 22144.032 22192.437 22218.115 22331.567 22395.744 22412.648 22462.044
## [1107] 22478.600 22493.660 23045.566 23065.421 23082.955 23241.475 23244.790
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## [1121] 23967.383 24059.680 24106.913 24180.933 24227.337 24393.622 24476.479
## [1128] 24513.091 24520.264 24535.699 24603.048 24667.419 24671.663 24869.837
## [1135] 24873.385 24915.046 24915.221 25081.768 25309.489 25333.333 25382.297
## [1142] 25517.114 25656.575 25678.778 25992.821 26018.951 26109.329 26125.675
## [1149] 26140.360 26236.580 26392.260 26467.097 26926.514 27000.985 27037.914
## [1156] 27117.994 27218.437 27322.734 27346.042 27375.905 27533.913 27724.289
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## [1170] 28868.664 28923.137 28950.469 29141.360 29186.482 29330.983 29523.166
## [1177] 30063.581 30166.618 30184.937 30259.996 30284.643 30942.192 31620.001
## [1184] 32108.663 32548.340 32734.186 32787.459 33307.551 33471.972 33475.817
## [1191] 33732.687 33750.292 33900.653 33907.548 34166.273 34254.053 34303.167
## [1198] 34439.856 34472.841 34617.841 34672.147 34779.615 34806.468 34828.654
## [1205] 34838.873 35069.375 35147.528 35160.135 35491.640 35585.576 35595.590
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## [1247] 39047.285 39125.332 39241.442 39556.495 39597.407 39611.758 39722.746
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## [1261] 40103.890 40182.246 40273.645 40419.019 40720.551 40904.200 40932.429
## [1268] 40941.285 40974.165 41034.221 41097.162 41661.602 41676.081 41919.097
## [1275] 41949.244 41999.520 42111.665 42112.236 42124.515 42211.138 42303.692
## [1282] 42560.430 42760.502 42856.838 42969.853 42983.459 43254.418 43578.939
## [1289] 43753.337 43813.866 43896.376 43921.184 43943.876 44202.654 44260.750
## [1296] 44400.406 44423.803 44501.398 44585.456 44641.197 45008.955 45702.022
## [1303] 45710.208 45863.205 46113.511 46130.526 46151.124 46200.985 46255.113
## [1310] 46599.108 46661.442 46718.163 46889.261 47055.532 47269.854 47291.055
## [1317] 47305.305 47403.880 47462.894 47496.494 47896.791 47928.030 48173.361
## [1324] 48517.563 48549.178 48673.559 48675.518 48824.450 48885.136 48970.248
## [1331] 49577.662 51194.559 52590.829 55135.402 58571.074 60021.399 62592.873
## [1338] 63770.428

print(which.max(d$charges))# Return the index of the first maximum value

## [1] 544

print(which.min(d$charges))# Return the index of the first minimum value

## [1] 941

print(mean(d$charges))

## [1] 13270.42

print(mean(d$charges,trim=0.10))

## [1] 11076.02

print(var(d$charges))

## [1] 146652372

print(median(d$charges))

## [1] 9382.033
```

```
print(mad(d$charges))# mean absolute division
```

```
## [1] 7440.809
```

```
print(sd(d$charges))
```

```
## [1] 12110.01
```

```
print(range(d$charges))
```

```
## [1]  1121.874 63770.428
```

```
print(quantile(d$charges))
```

```
##        0%       25%       50%       75%      100% 
##  1121.874  4740.287  9382.033 16639.913 63770.428 
```

```
print(IQR(d$charges))
```

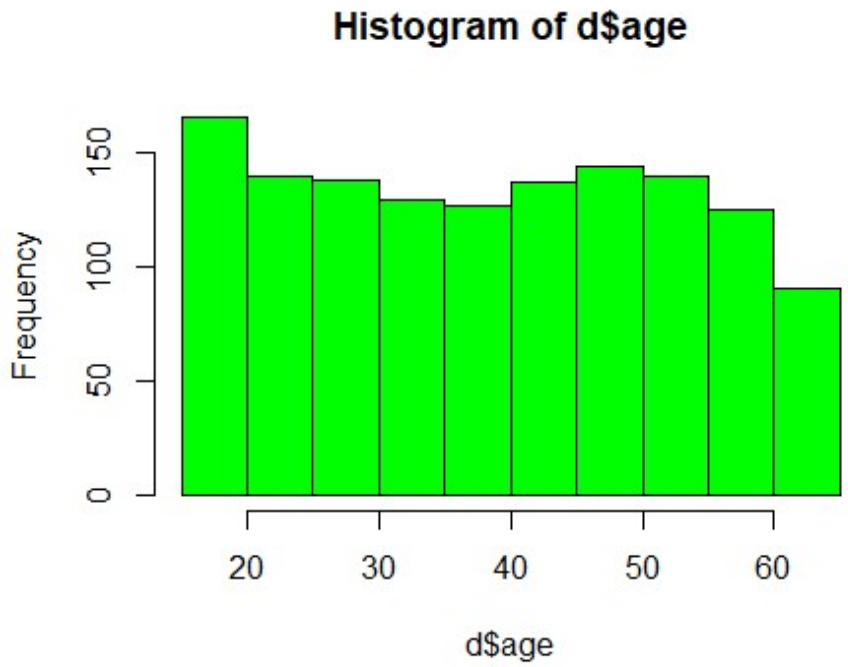
```
## [1] 11899.63
```

```
print(t.test(d$charges))
```

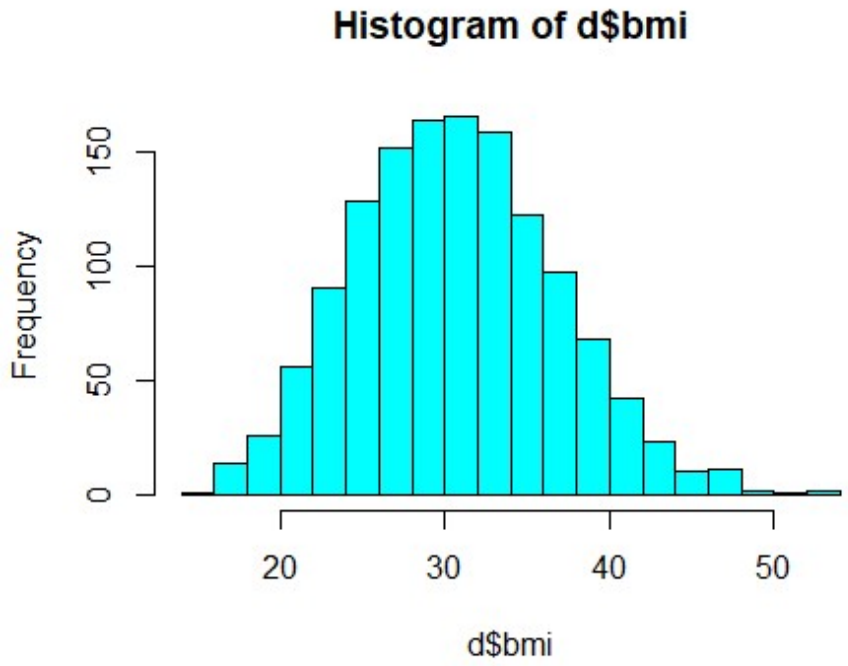
```
## 
##  One Sample t-test
## 
## data:  d$charges
## t = 40.084, df = 1337, p-value < 2.2e-16
## alternative hypothesis: true mean is not equal to 0
## 95 percent confidence interval:
##  12620.95 13919.89
## sample estimates:
## mean of x 
##  13270.42
```

```r
 # Data visualisation

# Histogram of Numerical data
hist(d$age,breaks=15,col="green")
```

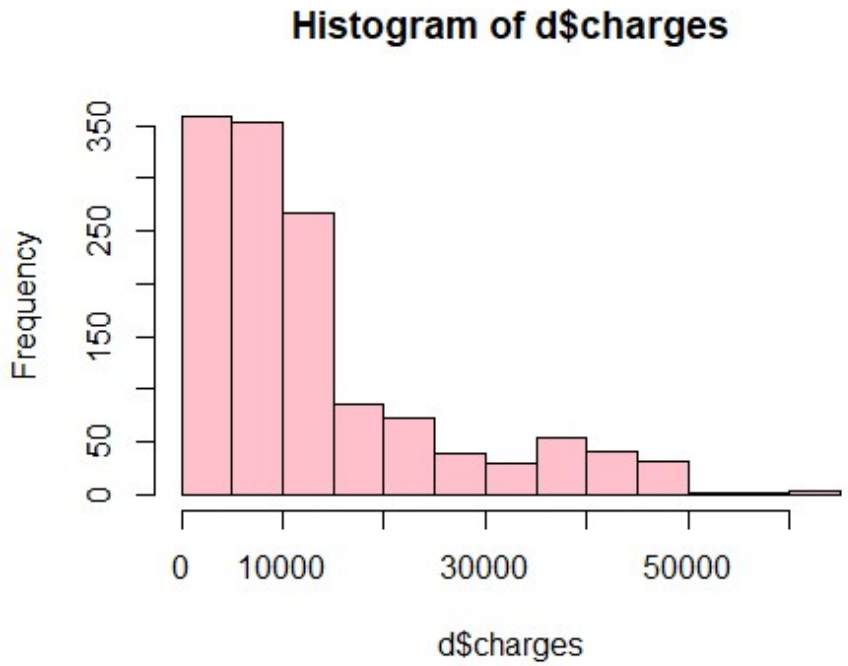


```r
hist(d$bmi,breaks=15,col="cyan")
```




```r
# BMI values are normally disributed.
```

```
hist(d$charges,breaks=15,col="pink")
```




```
# As we expected, the figure shows right skewed distribution


# To see the distribution of data
table(d$region)

##
## northeast northwest southeast southwest
##       324       325       364       325

table(d$age)
```

```
##
## 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43
## 69 68 29 28 28 28 28 28 28 28 28 27 27 27 26 26 26 25 25 25 25 25 27 27 27 27
## 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64
## 27 29 29 29 29 28 29 29 29 28 28 26 26 26 25 25 23 23 23 23 22

table(d$sex)

##
## female   male
##    662    676

table(d$smoker)

##
##   no  yes
## 1064  274

table(d$children)

##
##   0   1   2   3   4   5
## 574 324 240 157  25  18

table(d$bmi)

##
##  15.96 16.815 17.195  17.29 17.385   17.4  17.48  17.67 17.765   17.8  17.86
##      1      2      1      3      1      1      1      1      1      1      1
## 17.955  18.05   18.3 18.335   18.5   18.6 18.715 18.905     19 19.095  19.19
##      1      1      1      3      1      1      1      1      1      1      1
##   19.3 19.475  19.57   19.8 19.855  19.95 20.045   20.1  20.13 20.235   20.3
##      1      1      1      3      2      6      2      1      1      4      1
##  20.35   20.4 20.425  20.52   20.6 20.615   20.7  20.79   20.8   20.9  21.01
##      1      1      1      2      2      1      1      1      2      2      1
##  21.09  21.12  21.28   21.3 21.375   21.4  21.47   21.5  21.56 21.565  21.66
##      1      1      1      1      2      2      3      1      1      1      3
##   21.7 21.755  21.78   21.8  21.85  21.89 21.945     22  22.04   22.1 22.135
```

```
##      1      4      2      1      4      1      1      1      1      1      4
##  22.22  22.23   22.3  22.42 22.515   22.6  22.61 22.705  22.77   22.8  22.88
##      1      2      2      3      5      2      4      3      1      2      1
## 22.895  22.99     23 23.085   23.1  23.18   23.2  23.21 23.275   23.3  23.32
##      4      3      1      2      1      5      1      5      1      1      1
##  23.37   23.4 23.465  23.54  23.56   23.6  23.65 23.655   23.7  23.75  23.76
##      3      2      2      1      2      2      1      5      2      3      1
##   23.8 23.845  23.87   23.9  23.94  23.98 24.035  24.09   24.1  24.13 24.225
##      1      3      1      1      1      3      3      1      2      4      3
##   24.3  24.31  24.32   24.4 24.415  24.42  24.51  24.53   24.6 24.605  24.64
##      3      2      7      1      1      3      3      1      3      4      1
##   24.7  24.75 24.795  24.86  24.89  24.97 24.985     25  25.08   25.1 25.175
##      4      1      4      2      1      1      2      2      5      1      6
##   25.2  25.27   25.3 25.365   25.4  25.41  25.46  25.52 25.555   25.6  25.65
##      1      3      5      3      1      1      7      1      3      4      1
##   25.7  25.74 25.745   25.8  25.84  25.85   25.9 25.935  26.03  26.07 26.125
##      2      4      3      7      5      1      3      3      5      1      4
##  26.18   26.2  26.22  26.29 26.315   26.4  26.41 26.505  26.51   26.6  26.62
##      2      1      4      1      5      4      6      1      2      6      2
## 26.695   26.7  26.73  26.79   26.8  26.84 26.885   26.9  26.98     27  27.06
##      5      2      2      2      2      2      4      1      3      1      1
## 27.075   27.1  27.17   27.2 27.265  27.28   27.3  27.36   27.4 27.455   27.5
##      1      4      2      2      4      1      1      7      2      2      6
##  27.55   27.6  27.61 27.645   27.7  27.72  27.74   27.8  27.83 27.835   27.9
##      4      5      1      7      3      4      6      1      4      5      1
##  27.93  27.94     28 28.025  28.05   28.1  28.12  28.16   28.2 28.215  28.27
##      4      3      3      5      3      2      4      1      1      4      2
##   28.3  28.31  28.38   28.4 28.405  28.49   28.5 28.595   28.6  28.69   28.7
##      2      9      1      2      2      1      5      6      3      3      5
## 28.785   28.8  28.82  28.88   28.9  28.93 28.975     29  29.04  29.07   29.1
##      5      1      1      8      5      3      5      2      1      2      1
##  29.15 29.165   29.2  29.26   29.3 29.355  29.37   29.4  29.45  29.48   29.5
##      2      1      1      4      2      2      2      1      1      3      1
## 29.545  29.59   29.6  29.64   29.7 29.735   29.8  29.81  29.83   29.9  29.92
##      1      2      4      5      5      4      4      4      6      3      6
## 29.925     30  30.02  30.03   30.1 30.115  30.14   30.2  30.21  30.25   30.3
```

```
##      3      2      4      3      2      6      2      6      4      2      3
## 30.305  30.36   30.4 30.495   30.5  30.59 30.685  30.69  30.78   30.8 30.875
##      2      1      5      8      4      7      3      2      5      8      8
##   30.9  30.97     31  31.02 31.065   31.1  31.13  31.16   31.2  31.24 31.255
##      3      1      2      3      4      1      4      4      1      1      3
##   31.3  31.35   31.4 31.445  31.46   31.5  31.54  31.57   31.6 31.635  31.68
##      1      8      3      2      2      2      2      2      3      2      2
##  31.73  31.79   31.8 31.825   31.9  31.92     32  32.01 32.015   32.1  32.11
##      6      4      1      5      3      5      1      2      2      1      7
##  32.12   32.2 32.205  32.23   32.3  32.34 32.395   32.4  32.45  32.49   32.5
##      1      3      2      2     13      2      5      1      1      2      1
##  32.56 32.585   32.6  32.67  32.68   32.7 32.775  32.78   32.8  32.87   32.9
##      2      1      2      2      4      2      7      1      3      1      3
## 32.965     33  33.06   33.1  33.11 33.155   33.2  33.25   33.3  33.33 33.345
##      4      6      1      4      4      5      1      3      2      7      5
##   33.4  33.44   33.5 33.535  33.55  33.63  33.66   33.7 33.725  33.77   33.8
##      3      4      1      3      1      6      5      3      2      2      1
##  33.82  33.88 33.915  33.99  34.01   34.1 34.105   34.2  34.21 34.295   34.3
##      4      3      4      2      1      8      4      5      4      1      1
##  34.32  34.39   34.4  34.43 34.485   34.5  34.58   34.6 34.675   34.7  34.77
##      3      2      4      4      2      1      2      2      1      2      3
##   34.8 34.865  34.87   34.9  34.96  35.09   35.1  35.15   35.2 35.245   35.3
##      7      2      1      1      3      1      1      1      7      2      4
##  35.31   35.4  35.42 35.435   35.5  35.53   35.6 35.625  35.64   35.7  35.72
##      2      1      1      1      1      6      1      4      1      1      2
##  35.75   35.8 35.815  35.86   35.9  35.91  35.97     36 36.005  36.08   36.1
##      3      2      4      4      1      2      4      2      1      4      3
##  36.19 36.195   36.2  36.29   36.3 36.385   36.4  36.48  36.52 36.575   36.6
##      3      1      2      1      4      2      1      3      1      2      1
##  36.63  36.67   36.7 36.765  36.85  36.86 36.955  36.96     37  37.05  37.07
##      3      4      1      3      5      3      4      1      2      3      3
##   37.1 37.145  37.18  37.29   37.3 37.335   37.4  37.43  37.51 37.525  37.62
##      6      1      2      4      1      2      3      3      2      1      2
##   37.7 37.715  37.73   37.8   37.9 37.905     38  38.06 38.095  38.17  38.19
##      1      1      2      1      1      1      3      7      3      3      1
##  38.28 38.285  38.38  38.39   38.6 38.665  38.83   38.9  38.94  38.95  39.05
```

```
##      3      1      2      3      2      1      3      1      2      1      3
##   39.1  39.14  39.16   39.2  39.27  39.33   39.4 39.425  39.49   39.5  39.52
##      1      1      3      1      1      1      1      1      3      2      1
##   39.6 39.615   39.7  39.71   39.8 39.805  39.82   39.9  39.93 39.995  40.15
##      3      1      2      1      1      2      3      1      1      1      3
## 40.185  40.26  40.28   40.3  40.37 40.375  40.47  40.48   40.5 40.565  40.66
##      2      2      2      1      2      1      1      1      1      3      1
##  40.81  40.92 40.945   41.1  41.14  41.23 41.325  41.42  41.47  41.69   41.8
##      1      1      1      1      2      2      3      1      3      1      2
## 41.895  41.91  42.13  42.24  42.35   42.4  42.46 42.655  42.68  42.75   42.9
##      1      3      4      1      1      2      1      1      1      1      2
##  42.94  43.01  43.12  43.34   43.4   43.7  43.89     44  44.22   44.7 44.745
##      1      1      1      1      1      1      2      1      2      1      1
##  44.77  44.88  45.32  45.43  45.54   45.9  46.09   46.2  46.53   46.7  46.75
##      1      1      1      1      1      1      1      1      3      1      1
##  47.41  47.52   47.6  47.74  48.07  49.06  50.38  52.58  53.13
##      1      1      1      1      1      1      1      1      1
```

```
table(d$charges)
```

```
##
##   1121.8739   1131.5066   1135.9407   1136.3994    1137.011   1137.4697
##           1           1           1           1           1           1
##   1141.4451   1146.7966   1149.3959   1163.4627    1241.565     1242.26
##           1           1           1           1           1           1
##    1242.816    1252.407    1253.936    1256.299    1261.442    1261.859
##           1           1           1           1           1           1
##    1263.249   1391.5287   1515.3449    1526.312   1532.4697   1534.3045
##           1           1           1           1           1           1
##   1607.5101   1615.7667   1621.3402   1621.8827   1622.1885  1625.43375
##           1           1           1           1           1           1
##  1627.28245   1628.4709   1629.8335   1631.6683   1631.8212  1632.03625
##           1           1           1           1           1           1
##  1632.56445   1633.0444   1633.9618   1634.5734  1635.73365   1639.5631
##           1           1           1           1           1           2
##   1646.4297   1664.9996   1674.6323    1682.597   1694.7964   1702.4553
```

```
##          1          1          1          1          1          1
##  1704.5681  1704.70015  1705.6245  1708.0014  1708.92575  1711.0268
##          1          1          1          1          1          1
##   1712.227   1719.4363  1720.3537  1725.5523    1727.54   1727.785
##          1          1          1          1          1          1
##   1728.897    1731.677   1737.376   1743.214   1744.465   1748.774
##          1          1          1          1          1          1
##   1759.338  1769.53165  1815.8759  1824.2854   1826.843   1832.094
##          1          1          1          1          1          1
##   1837.237   1837.2819   1842.519   1875.344  1877.9294    1880.07
##          1          1          1          1          1          1
##   1880.487  1906.35825  1909.52745  1917.3184    1964.78   1967.0227
##          1          1          1          1          1          1
##   1969.614    1972.95   1977.815    1980.07  1981.5819  1984.4533
##          1          1          1          1          1          1
##  1986.9334   2007.945   2020.177  2020.5523  2026.9741  2045.68525
##          1          1          1          1          1          1
##  2055.3249  2102.2647    2103.08  2104.1134  2117.33885  2128.43105
##          1          1          1          1          1          1
##  2130.6759  2134.9015  2136.88225  2137.6536  2138.0707   2150.469
##          1          1          1          1          1          1
##   2154.361  2155.6815  2156.7518   2166.732  2196.4732  2198.18985
##          1          1          1          1          1          1
##  2200.83085  2201.0971  2203.47185  2203.73595  2205.9808  2207.69745
##          1          1          1          1          1          1
##  2211.13075  2217.46915  2217.6012  2219.4451  2221.56445  2250.8352
##          1          1          1          1          1          1
##   2254.7967  2257.47525  2261.5688     2302.3  2304.0022  2322.6218
##          1          1          1          1          1          1
##   2331.519  2352.96845  2362.22905  2395.17155  2396.0959  2404.7338
##          1          1          1          1          1          1
##   2416.955  2438.0552  2457.21115   2457.502  2459.7201  2464.6188
##          1          1          1          1          1          1
##  2473.3341  2480.9791   2483.736   2494.022  2497.0383  2498.4144
##          1          1          1          1          1          1
##  2523.1695  2527.81865  2534.39375  2566.4707   2585.269  2585.85065
```

```
##          1          1          1          1          1          1
##   2597.779   2632.992  2639.0429  2643.2685  2680.9493  2689.4954
##          1          1          1          1          1          1
##  2690.1138 2699.56835  2709.1119 2709.24395 2710.82855 2719.27975
##          1          1          1          1          1          1
##  2721.3208  2727.3951 2730.10785  2731.9122   2741.948 2755.02095
##          1          1          1          1          1          1
## 2775.19215  2789.0574  2801.2588 2803.69785 2842.76075 2850.68375
##          1          1          1          1          1          1
## 2855.43755   2866.091  2867.1196  2897.3235 2899.48935  2902.9065
##          1          1          1          1          1          1
##   2904.088   2913.569  2927.0647   2974.126 3021.80915  3044.2133
##          1          1          1          1          1          1
##   3046.062  3056.3881 3062.50825  3070.8087  3077.0955   3161.454
##          1          1          1          1          1          1
## 3167.45585  3171.6149   3172.018  3176.2877  3176.8159  3180.5101
##          1          1          1          1          1          1
## 3201.24515 3206.49135   3208.787 3213.62205  3227.1211  3238.4357
##          1          1          1          1          1          1
##   3260.199 3268.84665   3277.161 3279.86855 3292.52985  3309.7926
##          1          1          1          1          1          1
##   3353.284  3353.4703  3366.6697    3378.91 3385.39915  3392.3652
##          1          1          1          1          1          1
##  3392.9768 3393.35635   3410.324   3443.064  3471.4096   3481.868
##          1          1          1          1          1          1
##   3484.331  3490.5491  3500.6123   3537.703   3554.203  3556.9223
##          1          1          1          1          1          1
## 3558.62025  3561.8889   3577.999  3579.8287    3591.48 3594.17085
##          1          1          1          1          1          1
##   3597.596  3645.0894   3659.346   3693.428  3704.3545  3732.6251
##          1          1          1          1          1          1
##  3736.4647  3756.6216  3757.8448   3761.292  3766.8838   3847.674
##          1          1          1          1          1          1
## 3857.75925 3861.20965  3866.8552  3875.7341 3877.30425   3906.127
##          1          1          1          1          1          1
##  3925.7582  3935.1799  3943.5954  3947.4131 3956.07145  3972.9247
```

```
##          1          1          1          1          1          1
##  3981.9768   3987.926   3989.841  3994.1778  4005.4225  4032.2407
##          1          1          1          1          1          1
##  4040.5825  4058.1161  4058.7124  4074.4537   4076.497  4133.6416
##          1          1          1          1          1          1
##  4134.0824  4137.5227   4149.736  4151.0287  4185.0979  4189.1131
##          1          1          1          1          1          1
##   4234.927  4237.1265  4239.8926  4243.5900   4260.744  4266.1658
##          1          1          1          1          1          1
##  4296.2712  4320.4108  4337.7352  4340.4409  4347.0233   4349.462
##          1          1          1          1          1          1
##  4350.5144  4357.0436   4391.652   4399.731   4402.233  4415.1588
##          1          1          1          1          1          1
##  4428.8878  4433.3877  4433.9159  4435.0942  4438.2634  4441.2131
##          1          1          1          1          1          1
##   4449.462  4454.4026  4462.7218  4463.2051  4466.6214  4500.3392
##          1          1          1          1          1          1
##  4504.6624  4518.8262  4527.1829   4529.477   4536.259  4544.2348
##          1          1          1          1          1          1
##  4561.1885  4562.8421  4564.1914  4571.4130  4618.0799   4646.759
##          1          1          1          1          1          1
##  4661.2863  4667.6076   4670.64  4673.3922  4686.3887   4687.797
##          1          1          1          1          1          1
##  4718.2035  4719.5240  4719.7365  4738.2682   4746.344  4747.0529
##          1          1          1          1          1          1
##    4751.07  4753.6368   4762.329   4766.022  4779.6023  4795.6568
##          1          1          1          1          1          1
##  4827.9049    4830.63  4837.5823  4846.9201  4877.9810   4883.866
##          1          1          1          1          1          1
##  4889.0368  4889.9995  4894.7533  4906.4096  4915.0598  4922.9159
##          1          1          1          1          1          1
##   4931.647   4934.705  4949.7587  4992.3764  5002.7827   5003.853
##          1          1          1          1          1          1
##   5012.471  5028.1466  5031.2695   5080.096  5116.5004  5124.1887
##          1          1          1          1          1          1
##  5125.2157  5138.2567  5148.5526   5152.134  5209.5788  5227.9887
```

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##          1          1          1          1          1          1
##   5240.765  5245.2269   5246.047   5253.524 5257.50795 5261.46945
##          1          1          1          1          1          1
##  5266.3656 5267.81815  5272.1758 5312.16985   5325.651 5327.40025
##          1          1          1          1          1          1
## 5354.07465 5373.36425   5375.038  5377.4578   5383.536  5385.3379
##          1          1          1          1          1          1
##  5397.6167  5400.9805  5415.6612 5425.02335  5428.7277  5438.7491
##          1          1          1          1          1          1
## 5458.04645  5469.0066   5472.449  5478.0368  5484.4673   5488.262
##          1          1          1          1          1          1
##  5584.3057  5594.8455   5615.369 5630.45785   5649.715   5662.225
##          1          1          1          1          1          1
##  5693.4305  5699.8375   5708.867  5709.1644  5729.0053 5757.41345
##          1          1          1          1          1          1
##  5836.5204  5846.9176  5855.9025   5910.944  5920.1041   5926.846
##          1          1          1          1          1          1
##  5934.3798  5966.8874   5969.723   5972.378  5974.3847  5976.8311
##          1          1          1          1          1          1
##   5979.731 5989.52365   6059.173 6067.12675  6079.6715   6082.405
##          1          1          1          1          1          1
## 6112.35295 6113.23105  6117.4945  6123.5688 6128.79745  6184.2994
##          1          1          1          1          1          1
##  6185.3208   6186.127   6196.448  6198.7518 6203.90175   6238.298
##          1          1          1          1          1          1
##   6250.435  6272.4772   6282.235  6289.7549   6311.952   6313.759
##          1          1          1          1          1          1
## 6334.34355  6338.0756  6356.2707 6358.77645  6360.9936 6373.55735
##          1          1          1          1          1          1
## 6389.37785 6393.60345 6402.29135  6406.4107   6414.178  6435.6237
##          1          1          1          1          1          1
## 6455.86265  6457.8434   6474.013   6496.886  6500.2359 6548.19505
##          1          1          1          1          1          1
##  6551.7501 6555.07035 6571.02435   6571.544  6593.5083 6600.20595
##          1          1          1          1          1          1
##   6600.361  6610.1097 6640.54485  6652.5288  6653.7886 6664.68595
```

```
##          1          1          1          1          1          1
##   6666.243  6686.4313  6710.1919  6746.7425  6748.5912   6753.038
##          1          1          1          1          1          1
##  6770.1925   6775.961  6781.3542 6796.86325   6799.458  6837.3687
##          1          1          1          1          1          1
##   6849.026  6858.4796   6875.961  6877.9801 6933.24225 6940.90985
##          1          1          1          1          1          1
##  6948.7008 6985.50695   6986.697   7045.499  7046.7222  7050.0213
##          1          1          1          1          1          1
##   7050.642  7077.1894  7133.9025 7144.86265   7147.105  7147.4728
##          1          1          1          1          1          1
##   7151.092  7152.6714  7153.5539   7160.094  7160.3303  7162.0122
##          1          1          1          1          1          1
##  7173.35995   7196.867 7201.70085  7209.4918 7222.78625 7228.21565
##          1          1          1          1          1          1
##  7243.8136  7256.7231   7261.741  7265.7025  7281.5056 7323.734819
##          1          1          1          1          1          1
##  7325.0482   7337.748   7345.084  7345.7266   7348.142 7358.17565
##          1          1          1          1          1          1
##   7371.772   7418.522  7419.4779 7421.19455   7441.053   7441.501
##          1          1          1          1          1          1
##  7443.64305   7445.918 7448.40395   7512.267 7518.02535 7526.70645
##          1          1          1          1          1          1
##  7537.1639   7623.518    7624.63   7626.993  7633.7206 7639.41745
##          1          1          1          1          1          1
##  7640.3092 7650.77375    7682.67   7726.854  7727.2532 7729.64575
##          1          1          1          1          1          1
##  7731.4271 7731.85785   7740.337  7742.1098  7749.1564   7789.635
##          1          1          1          1          1          1
##  7804.1605 7935.29115   7954.517   7985.815 7986.47525 8017.06115
##          1          1          1          1          1          1
##  8023.13545  8026.6666   8027.968  8059.6791   8062.764   8068.185
##          1          1          1          1          1          1
##  8083.9198 8116.26885    8116.68  8124.4084  8125.7845 8162.71625
##          1          1          1          1          1          1
##  8211.1002  8219.2039  8232.6388  8233.0975  8240.5896  8252.2843
```

```
##          1          1          1          1          1          1
##   8269.044   8277.523  8280.6227  8283.6807  8302.53565  8310.83915
##          1          1          1          1          1          1
##  8334.45755  8334.5896 8342.90875  8347.1643 8410.04685 8413.46305
##          1          1          1          1          1          1
##   8428.0693   8442.667   8444.474   8457.818  8515.7587   8516.829
##          1          1          1          1          1          1
##   8520.026   8522.003   8527.532  8534.6718 8538.28845   8539.671
##          1          1          1          1          1          1
##   8547.6913   8551.347   8556.907  8569.8618  8582.3023  8596.8278
##          1          1          1          1          1          1
##   8601.3293  8603.8234 8604.48365  8605.3615  8606.2174     8615.3
##          1          1          1          1          1          1
##   8627.5411 8671.19125 8688.85885   8703.456 8733.22925   8765.249
##          1          1          1          1          1          1
##    8782.469   8798.593   8823.279 8823.98575   8825.086  8827.2099
##          1          1          1          1          1          1
##  8835.26495  8871.1517  8891.1395 8930.93455   8932.084  8944.1151
##          1          1          1          1          1          1
##  8964.06055 8965.79575    8968.33  8978.1851 8988.15875  9048.0273
##          1          1          1          1          1          1
##   9058.7303 9095.06825   9101.798   9140.951   9144.565 9174.13565
##          1          1          1          1          1          1
##     9182.17  9193.8385  9222.4026  9225.2564  9249.4952   9264.797
##          1          1          1          1          1          1
##   9282.4806   9283.562  9288.0267  9290.1395 9301.89355  9304.7019
##          1          1          1          1          1          1
##   9361.3268  9377.9047  9386.1613   9391.346   9411.005    9414.92
##          1          1          1          1          1          1
##   9432.9253 9447.25035  9447.3824  9487.6442 9500.57305  9504.3103
##          1          1          1          1          1          1
##  9541.69555  9549.5651   9563.029  9566.9909  9583.8933 9617.66245
##          1          1          1          1          1          1
##   9620.3307    9625.92   9630.397   9634.538  9644.2525 9704.66805
##          1          1          1          1          1          1
##    9715.841  9722.7695    9724.53  9748.9106  9778.3472  9788.8659
```

```
##           1           1           1           1           1           1
##   9800.8882    9850.432   9855.1314    9861.025   9863.4718  9866.30485
##           1           1           1           1           1           1
##   9869.8102    9872.701   9875.6804   9877.6077    9880.068  9910.35985
##           1           1           1           1           1           1
##   9957.7216     9964.06  9991.03765   10043.249   10065.413 10072.05505
##           1           1           1           1           1           1
##   10085.846    10096.97 10106.13425  10107.2206 10115.00885   10118.424
##           1           1           1           1           1           1
##  10141.1362  10156.7832  10197.7722   10214.636  10226.2842  10231.4999
##           1           1           1           1           1           1
##  10264.4421    10269.46   10325.206  10338.9316   10355.641 10370.91255
##           1           1           1           1           1           1
##  10381.4787 10407.08585 10422.91665 10435.06525   10436.096   10450.552
##           1           1           1           1           1           1
##  10461.9794  10493.9458  10560.4917  10564.8845   10577.087   10579.711
##           1           1           1           1           1           1
##  10594.2257 10594.50155  10600.5483   10601.412 10601.63225   10602.385
##           1           1           1           1           1           1
##  10702.6424    10704.47   10713.644 10736.87075    10791.96 10795.93733
##           1           1           1           1           1           1
## 10796.35025  10797.3362   10806.839  10807.4863  10825.2537  10848.1343
##           1           1           1           1           1           1
##  10923.9332   10928.849 10942.13205    10959.33  10959.6947   10965.446
##           1           1           1           1           1           1
## 10976.24575  10977.2063  10982.5013  11013.7119  11015.1747  11033.6617
##           1           1           1           1           1           1
##   11070.535   11073.176  11082.5772  11085.5868  11090.7178  11093.6229
##           1           1           1           1           1           1
##    11150.78   11163.568 11165.41765  11187.6567  11244.3769   11253.421
##           1           1           1           1           1           1
##   11264.541 11272.33139  11286.5387 11289.10925   11299.343 11305.93455
##           1           1           1           1           1           1
## 11326.71487   11345.519  11353.2276  11356.6609   11362.755  11363.2832
##           1           1           1           1           1           1
##   11365.952  11381.3254 11394.06555  11396.9002   11411.685 11436.73815
```

```
##           1           1           1           1           1           1
##  11454.0215    11455.28 11482.63485 11488.31695   11512.405 11520.09985
##           1           1           1           1           1           1
## 11534.87265   11538.421   11552.904  11554.2236 11566.30055    11576.13
##           1           1           1           1           1           1
##  11657.7189 11658.11505 11658.37915    11674.13  11729.6795 11735.87905
##           1           1           1           1           1           1
## 11737.84884   11741.726   11743.299  11743.9341  11763.0009  11830.6072
##           1           1           1           1           1           1
##  11833.7823    11837.16 11840.77505   11842.442 11842.62375   11848.141
##           1           1           1           1           1           1
##  11856.4115 11879.10405   11881.358  11881.9696 11884.04858 11931.12525
##           1           1           1           1           1           1
## 11938.25595 11944.59435  11945.1327  11946.6259  11987.1682  12029.2867
##           1           1           1           1           1           1
##   12032.326   12044.342   12094.478  12096.6512    12105.32  12124.9924
##           1           1           1           1           1           1
## 12129.61415  12142.5786   12146.971  12222.8983 12224.35085  12231.6136
##           1           1           1           1           1           1
##   12233.828  12235.8392   12244.531  12265.5069 12268.63225 12269.68865
##           1           1           1           1           1           1
##   12323.936   12333.828   12347.172   12363.547  12404.8791 12430.95335
##           1           1           1           1           1           1
##  12475.3513 12479.70895  12485.8009 12495.29085  12523.6048  12557.6053
##           1           1           1           1           1           1
##   12574.049  12592.5345 12609.88702  12622.1795  12629.1656  12629.8967
##           1           1           1           1           1           1
##   12638.195  12643.3778   12644.589   12646.207  12648.7034  12730.9996
##           1           1           1           1           1           1
## 12741.16745 12797.20962 12815.44495  12829.4551 12890.05765  12913.9924
##           1           1           1           1           1           1
##   12925.886  12928.7911  12949.1554  12950.0712   12957.118   12979.358
##           1           1           1           1           1           1
##  12981.3457  12982.8747 13012.20865 13019.16105   13041.921 13047.33235
##           1           1           1           1           1           1
##   13063.883  13112.6048 13126.67745 13129.60345 13143.33665 13143.86485
```

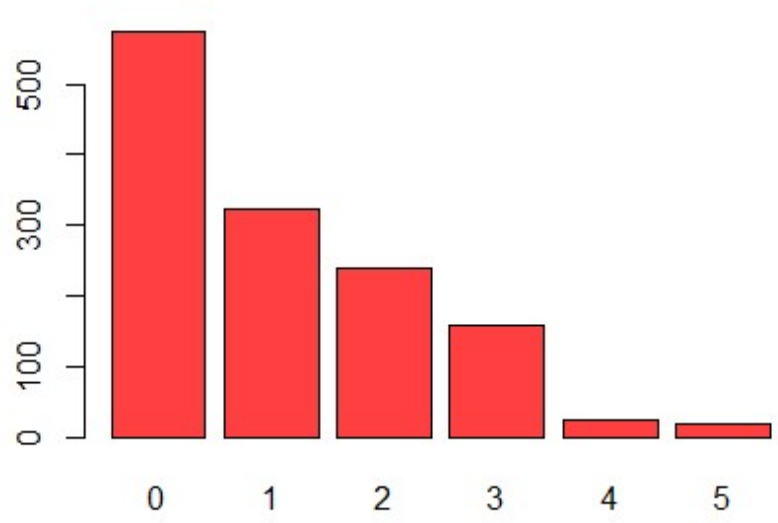
```
##           1           1           1           1           1           1
## 13204.28565  13217.0945 13224.05705   13224.693 13228.84695  13352.0998
##           1           1           1           1           1           1
##   13390.559   13393.756  13405.3903  13415.0381  13429.0354   13430.265
##           1           1           1           1           1           1
##   13451.122  13457.9608    13462.52  13470.8044    13470.86  13555.0049
##           1           1           1           1           1           1
## 13607.36875  13616.3586  13635.6379 13725.47184 13747.87235  13770.0979
##           1           1           1           1           1           1
##   13822.803  13831.1152   13844.506  13844.7972   13880.949   13887.204
##           1           1           1           1           1           1
##  13887.9685  13919.8229  13937.6665 13974.45555 13981.85035  14001.1338
##           1           1           1           1           1           1
##  14001.2867   14007.222  14043.4767    14119.62 14133.03775 14210.53595
##           1           1           1           1           1           1
##   14235.072  14254.6082  14256.1928  14283.4594  14313.8463   14319.031
##           1           1           1           1           1           1
##  14349.8544 14358.36437 14382.70905 14394.39815  14394.5579  14410.9321
##           1           1           1           1           1           1
##  14418.2804 14426.07385  14449.8544 14451.83515 14455.64405   14474.675
##           1           1           1           1           1           1
## 14478.33015  14571.8908 14590.63205 14692.66935  14711.7438  14901.5167
##           1           1           1           1           1           1
##   14988.432 15006.57945 15019.76005  15161.5344   15170.069 15230.32405
##           1           1           1           1           1           1
##  15359.1045 15518.18025 15555.18875 15612.19335  15817.9857   15820.699
##           1           1           1           1           1           1
## 15828.82173 16069.08475  16085.1275  16115.3045 16138.76205   16232.847
##           1           1           1           1           1           1
##   16297.846 16420.49455  16450.8947 16455.70785  16577.7795 16586.49771
##           1           1           1           1           1           1
## 16657.71745 16776.30405 16796.41194   16884.924  17043.3414    17081.08
##           1           1           1           1           1           1
##  17085.2676 17128.42608  17178.6824   17179.522  17352.6803  17361.7661
##           1           1           1           1           1           1
##  17468.9839   17496.306 17560.37975 17626.23951  17663.1442  17748.5062
```

```
##           1           1           1           1           1           1
## 17878.90068 17904.52705 17929.30337   17942.106  18033.9679   18157.876
##           1           1           1           1           1           1
## 18218.16139  18223.4512  18246.4955   18259.216   18310.742  18328.2381
##           1           1           1           1           1           1
##   18608.262  18648.4217 18765.87545  18767.7377  18804.7524 18806.14547
##           1           1           1           1           1           1
## 18838.70366 18903.49141 18955.22017 18963.17192   18972.495    19023.26
##           1           1           1           1           1           1
##   19040.876  19107.7796 19144.57652   19199.944 19214.70553  19350.3689
##           1           1           1           1           1           1
##  19361.9988  19442.3535  19444.2658 19496.71917  19515.5416  19521.9682
##           1           1           1           1           1           1
##   19539.243 19594.80965 19673.33573  19719.6947 19749.38338 19798.05455
##           1           1           1           1           1           1
##   19933.458  19964.7463 20009.63365  20149.3229 20167.33603 20177.67113
##           1           1           1           1           1           1
## 20234.85475 20277.80751 20296.86345 20420.60465 20462.99766 20630.28351
##           1           1           1           1           1           1
## 20709.02034  20745.9891 20773.62775 20781.48892 20878.78443  20984.0936
##           1           1           1           1           1           1
##    21082.16 21098.55405   21195.818  21223.6758 21232.18226 21259.37795
##           1           1           1           1           1           1
##  21344.8467   21348.706  21472.4788 21595.38229  21659.9301 21677.28345
##           1           1           1           1           1           1
##  21771.3423 21774.32215  21797.0004    21880.82  21978.6769 21984.47061
##           1           1           1           1           1           1
##   22144.032 22192.43711  22218.1149  22331.5668 22395.74424  22412.6485
##           1           1           1           1           1           1
## 22462.04375     22478.6 22493.65964 23045.56616  23065.4207 23082.95533
##           1           1           1           1           1           1
## 23241.47453  23244.7902  23288.9284   23306.547 23401.30575 23563.01618
##           1           1           1           1           1           1
##   23568.272  23807.2406  23887.6627 23967.38305 24059.68019 24106.91255
##           1           1           1           1           1           1
##  24180.9335 24227.33724  24393.6224 24476.47851 24513.09126   24520.264
```

```
##           1           1           1           1           1           1
## 24535.69855 24603.04837   24667.419 24671.66334  24869.8368  24873.3849
##           1           1           1           1           1           1
## 24915.04626 24915.22085 25081.76784   25309.489 25333.33284   25382.297
##           1           1           1           1           1           1
## 25517.11363 25656.57526 25678.77845 25992.82104 26018.95052 26109.32905
##           1           1           1           1           1           1
## 26125.67477  26140.3603 26236.57997 26392.26029 26467.09737  26926.5144
##           1           1           1           1           1           1
## 27000.98473  27037.9141 27117.99378 27218.43725 27322.73386 27346.04207
##           1           1           1           1           1           1
## 27375.90478  27533.9129 27724.28875  27808.7251 27941.28758 28101.33305
##           1           1           1           1           1           1
## 28287.89766 28340.18885 28468.91901 28476.73499  28868.6639 28923.13692
##           1           1           1           1           1           1
##  28950.4692  29141.3603 29186.48236 29330.98315  29523.1656 30063.58055
##           1           1           1           1           1           1
## 30166.61817  30184.9367 30259.99556 30284.64294  30942.1918 31620.00106
##           1           1           1           1           1           1
## 32108.66282  32548.3405  32734.1863 32787.45859  33307.5508 33471.97189
##           1           1           1           1           1           1
## 33475.81715  33732.6867  33750.2918   33900.653   33907.548   34166.273
##           1           1           1           1           1           1
## 34254.05335  34303.1672  34439.8559   34472.841 34617.84065  34672.1472
##           1           1           1           1           1           1
##   34779.615  34806.4677   34828.654   34838.873 35069.37452 35147.52848
##           1           1           1           1           1           1
## 35160.13457    35491.64   35585.576  35595.5898  36021.0112   36085.219
##           1           1           1           1           1           1
##  36124.5737  36149.4835  36189.1017   36197.699 36219.40545  36307.7983
##           1           1           1           1           1           1
##   36397.576 36580.28216   36837.467 36898.73308 36910.60803  36950.2567
##           1           1           1           1           1           1
##   37079.372  37133.8982  37165.1638  37270.1512 37465.34375  37484.4493
##           1           1           1           1           1           1
##  37607.5277  37701.8768  37742.5757  37829.7242  38126.2465 38245.59327
```

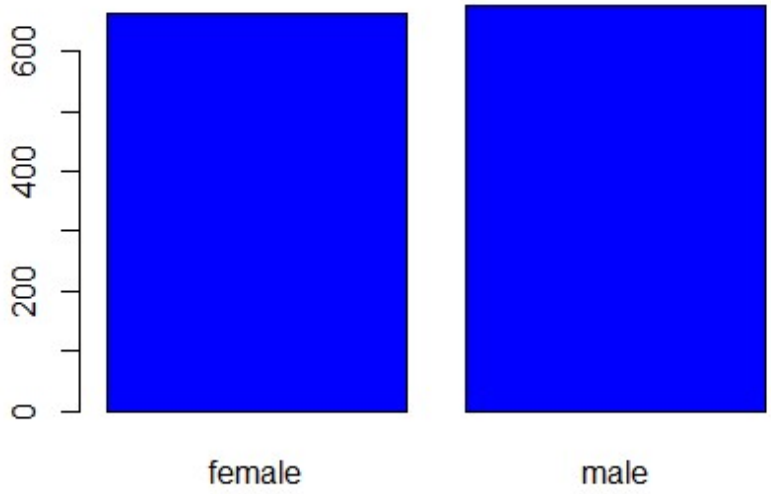
```
##           1           1           1           1           1           1
##  38282.7495   38344.566   38415.474  38511.6283   38709.176       38711
##           1           1           1           1           1           1
##  38746.3551  38792.6856   38998.546   39047.285 39125.33225   39241.442
##           1           1           1           1           1           1
##  39556.4945  39597.4072  39611.7577  39722.7462 39725.51805   39727.614
##           1           1           1           1           1           1
##  39774.2763   39836.519  39871.7043 39983.42595 40003.33225    40103.89
##           1           1           1           1           1           1
##   40182.246  40273.6455  40419.0191 40720.55105  40904.1995  40932.4295
##           1           1           1           1           1           1
##  40941.2854  40974.1649  41034.2214 41097.16175   41661.602  41676.0811
##           1           1           1           1           1           1
##   41919.097  41949.2441    41999.52  42111.6647  42112.2356  42124.5153
##           1           1           1           1           1           1
##  42211.1382 42303.69215  42560.4304  42760.5022   42856.838  42969.8527
##           1           1           1           1           1           1
##  42983.4585 43254.41795  43578.9394 43753.33705  43813.8661  43896.3763
##           1           1           1           1           1           1
##  43921.1837  43943.8761  44202.6536  44260.7499  44400.4064   44423.803
##           1           1           1           1           1           1
##  44501.3982 44585.45587  44641.1974  45008.9555 45702.02235 45710.20785
##           1           1           1           1           1           1
##   45863.205   46113.511  46130.5265  46151.1245  46200.9851  46255.1125
##           1           1           1           1           1           1
##  46599.1084  46661.4424 46718.16325  46889.2612  47055.5321   47269.854
##           1           1           1           1           1           1
##   47291.055   47305.305    47403.88   47462.894 47496.49445 47896.79135
##           1           1           1           1           1           1
##    47928.03   48173.361 48517.56315 48549.17835  48673.5588  48675.5177
##           1           1           1           1           1           1
##    48824.45 48885.13561  48970.2476  49577.6624 51194.55914 52590.82939
##           1           1           1           1           1           1
## 55135.40209 58571.07448 60021.39897 62592.87309 63770.42801
##           1           1           1           1           1
```

```r
# Barplot of Categorical data

barplot(table(d$children),col="brown1")
```



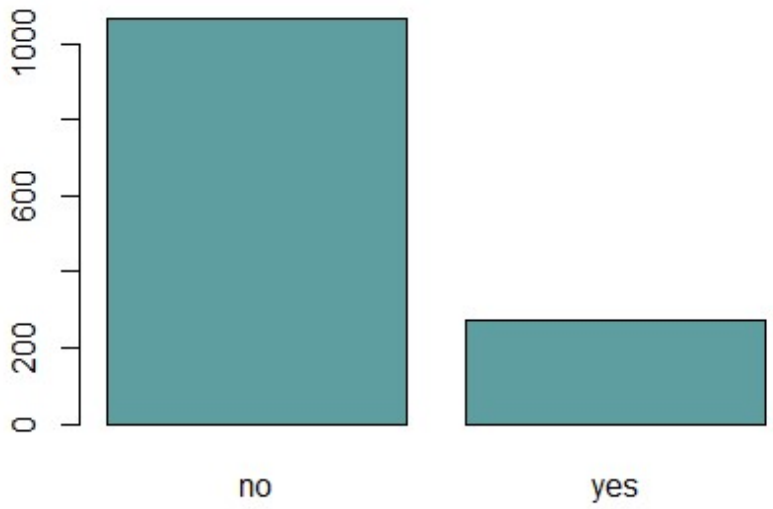

```r
# majority of them having no children.
```

```r
barplot(table(d$sex),col="blue1")
```




```r
#  Here the graph shows,number of males are more than females.
```

```r
barplot(table(d$smoker),col="cadetblue")
```

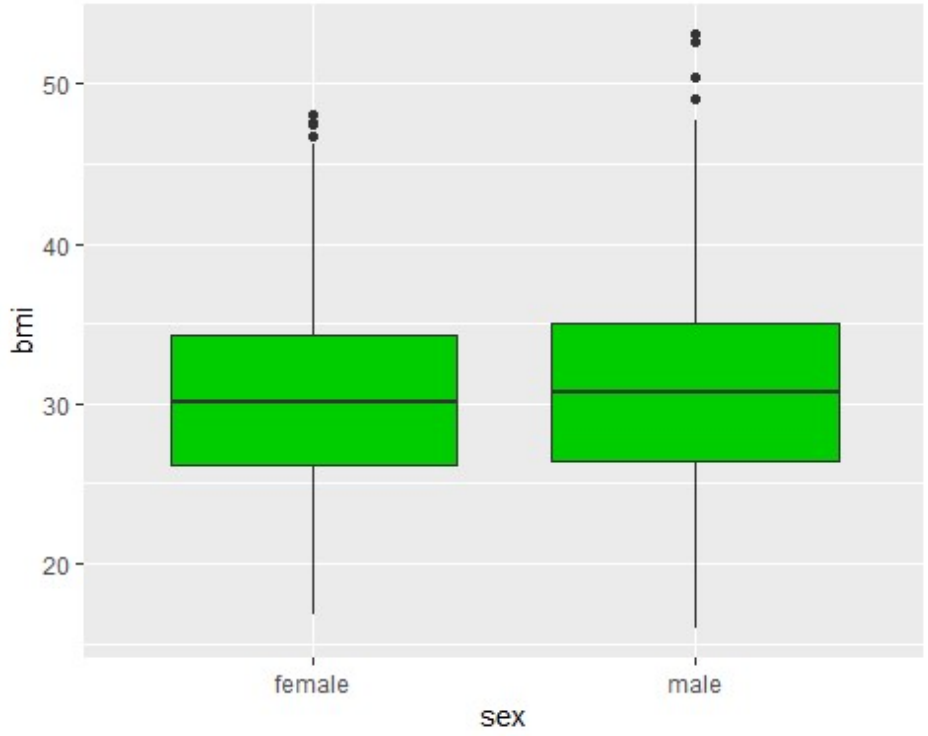



```r
#  The number of  persons without smoke  are more than others.
```

```r
barplot(table(d$region),col="aquamarine")
```

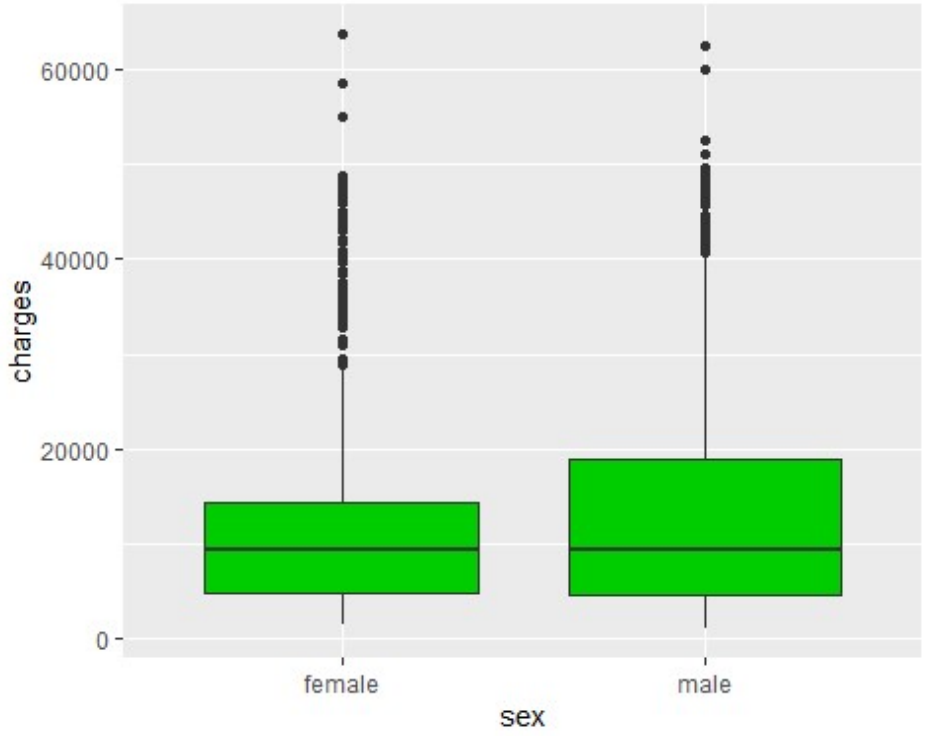

```r
#  Shows,more number of persons are from southeast.
```

```r
# Boxplot male and female with BMI values
sex_bmi<-ggplot(d,aes(x=sex,y=bmi))+geom_boxplot(fill="green3")
print(sex_bmi)
```



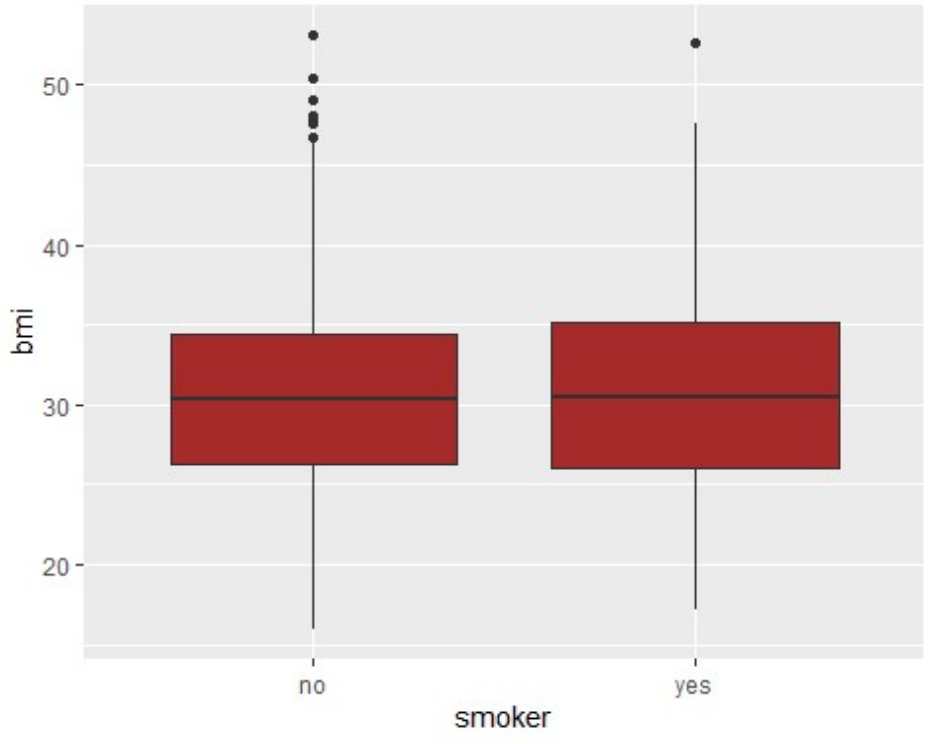

```r
# BMI value is more for male than female
```

```r
## Boxplot of male and female with charges
sex_chr<-ggplot(d,aes(x=sex,y=charges))+geom_boxplot(fill="green3")
print(sex_chr)
```



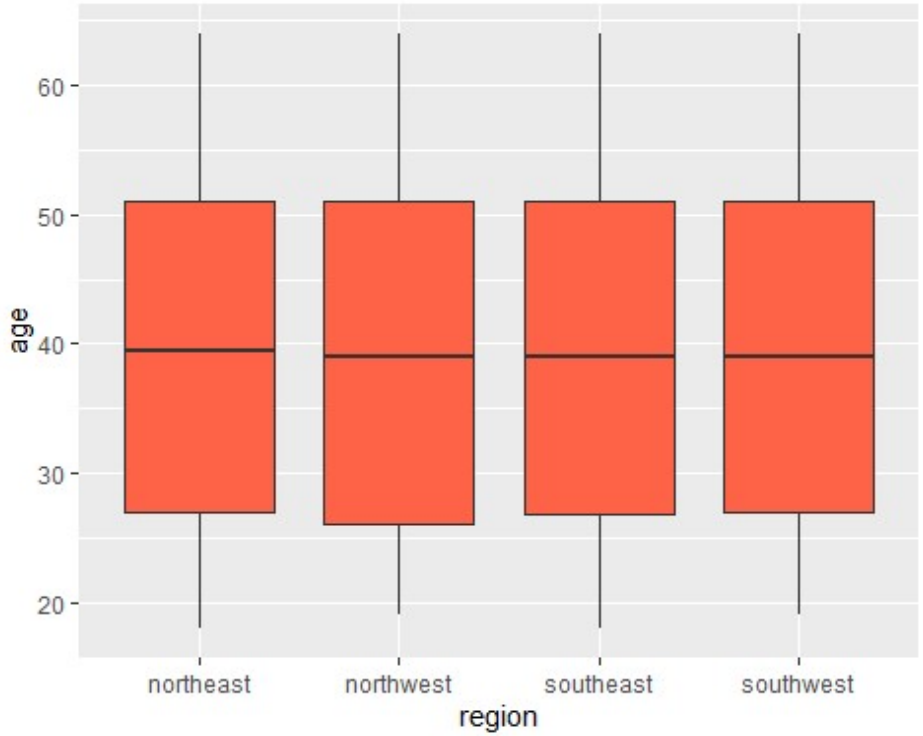

```r
# More charges are paid by male
```

```r
# Boxplot of smoker and nonsmoker with BMI values
smok_bmi<-ggplot(d,aes(x=smoker,y=bmi))+geom_boxplot(fill="brown")
print(smok_bmi)
```




```r
# BMI value of smokers are more than without smokers
```

```r
# Boxplot of age with region
age_reg<-ggplot(d,aes(x=region,y=age))+geom_boxplot(fill="tomato")
print(age_reg)
```

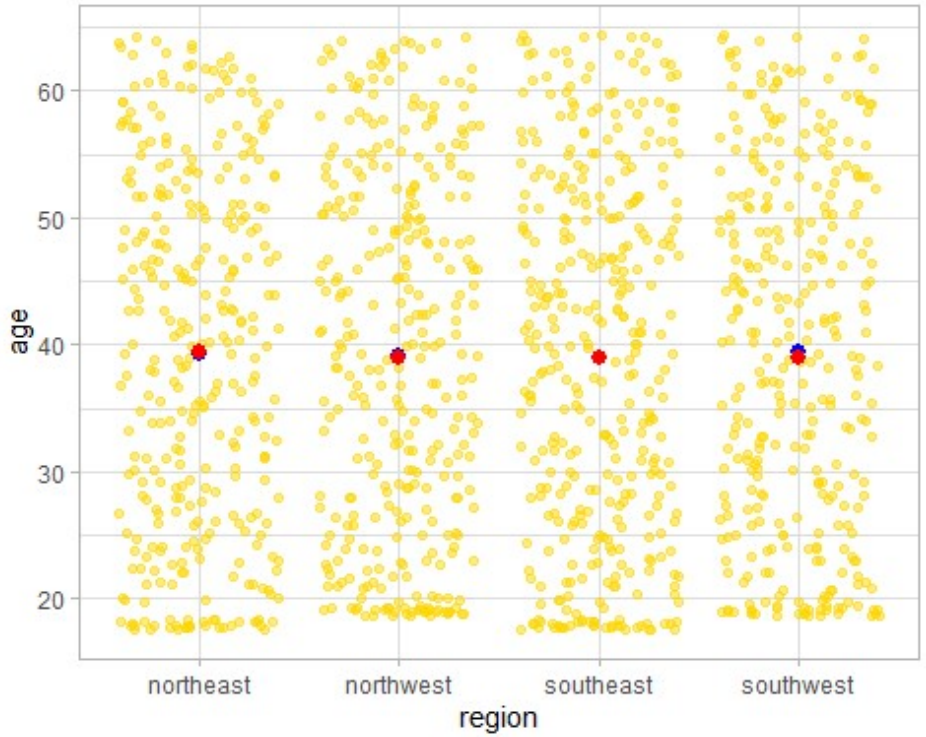



```r
# Here Maximum age from all regions are almost same
```

```r
# geom_jitter with region and age
g1 <- ggplot(d, aes(region, age)) +
  geom_jitter(color = "gold", alpha = 0.5) +
  theme_light()+
  stat_summary(aes(x=region,y=age),fun=mean,color="blue")+
  stat_summary(aes(x=region,y=age),fun=median,color="red")
print(g1)
```

```
## Warning: Removed 4 rows containing missing values (geom_segment).
```

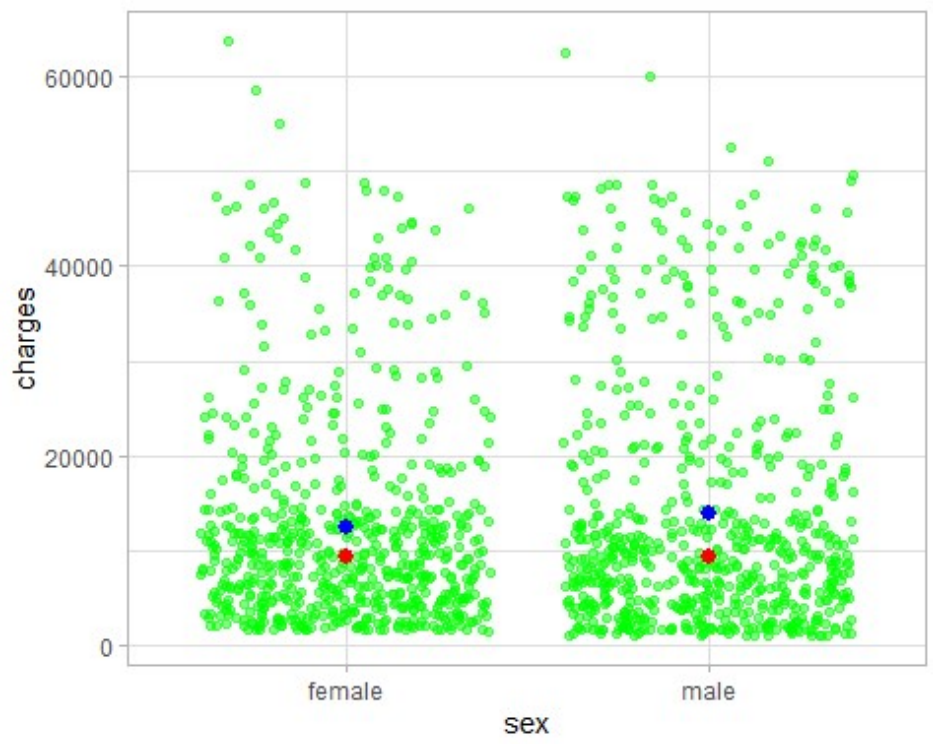
```
## Warning: Removed 4 rows containing missing values (geom_segment).
```



```r
# Here all the region shows almost same mean and median value for age




#  geom_jitter with sex and charges
g2 <- ggplot(d, aes(sex, charges)) +
  geom_jitter(color = "green", alpha = 0.5) +
  theme_light()+
  stat_summary(aes(x=sex,y=charges),fun=mean,color="blue")+
  stat_summary(aes(x=sex,y=charges),fun=median,color="red")
print(g2)
```

```
## Warning: Removed 2 rows containing missing values (geom_segment).
```

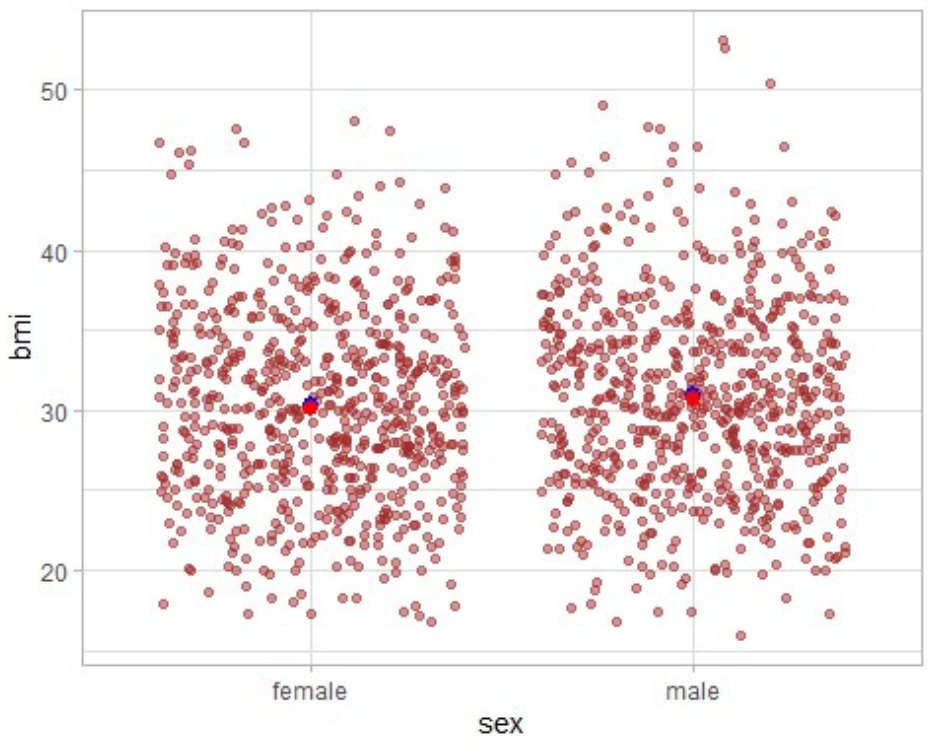
```
## Warning: Removed 2 rows containing missing values (geom_segment).
```




```
#  Here, there is a small differnce in mean value of male and female w.r.t
#  charges
```

```r
#  geom_jitter of sex and bmi
g3 <- ggplot(d, aes(sex, bmi)) +
  geom_jitter(color = "brown", alpha = 0.5) +
  theme_light()+
  stat_summary(aes(x=sex,y=bmi),fun=mean,color="blue")+
  stat_summary(aes(x=sex,y=bmi),fun=median,color="red")
print(g3)
```

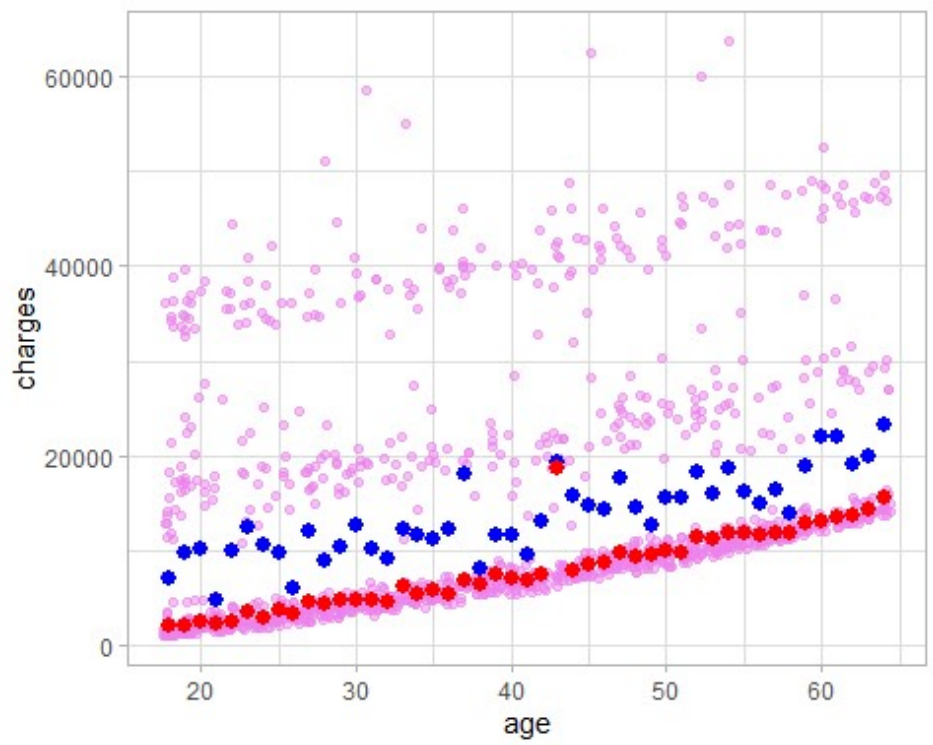
```
## Warning: Removed 2 rows containing missing values (geom_segment).

## Warning: Removed 2 rows containing missing values (geom_segment).
```



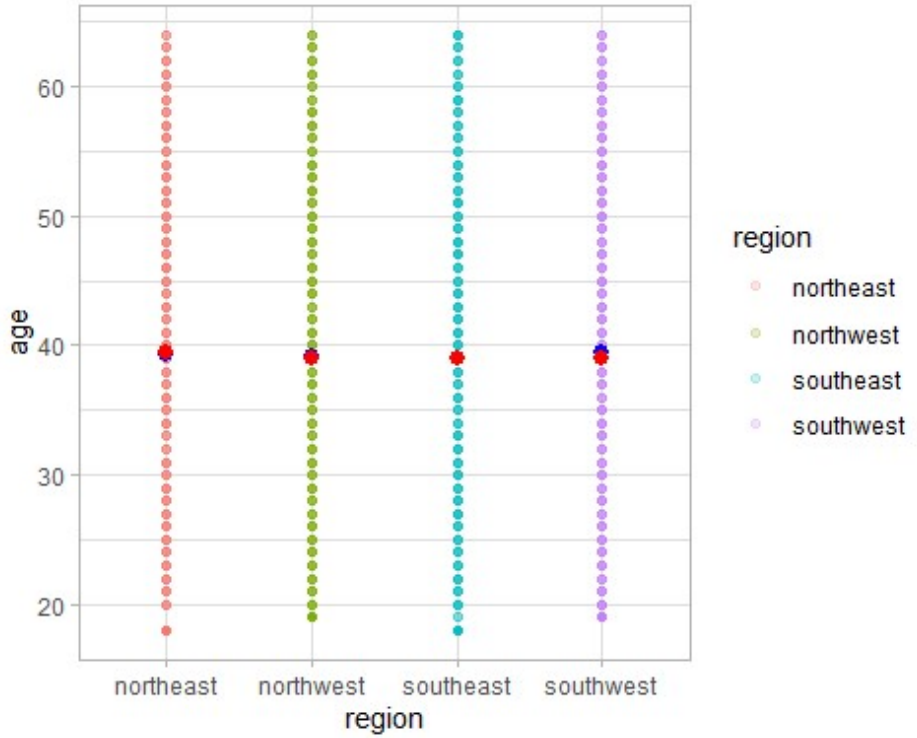
```r
# There is a small difference in mean and median value of male and female
# w.r.t bmi values




#  geom_jitter of age and charges
g4<-ggplot(d, aes(age, charges)) +
  geom_jitter(color = "violet", alpha = 0.5) +
  theme_light()+
  stat_summary(aes(x=age,y=charges),fun=mean,color="blue")+
  stat_summary(aes(x=age,y=charges),fun=median,color="red")
print(g4)
```

```
## Warning: Removed 47 rows containing missing values (geom_segment).
```

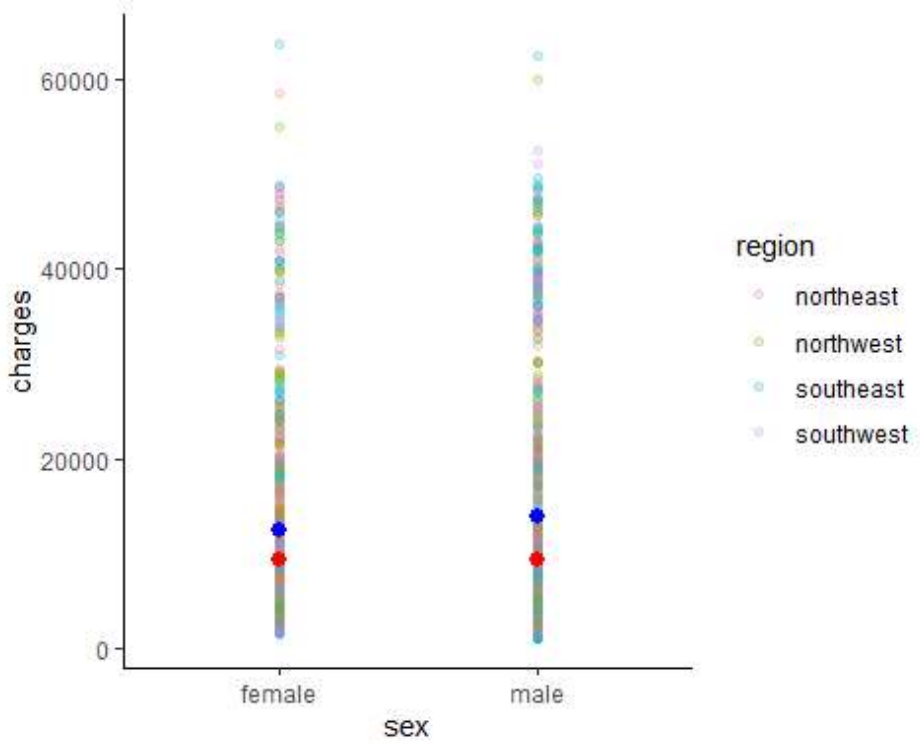
```
## Warning: Removed 47 rows containing missing values (geom_segment).
```




```
# Here,mean and median values are different w.r.t age and charges


#  geom_point with region and age
p1<-ggplot(data=d)+geom_point(aes(x=region,y=age,color=region),alpha=.2)+
  theme_light()+
  stat_summary(aes(x=region,y=age),fun=mean,color="blue")+
  stat_summary(aes(x=region,y=age),fun=median,color="red")
print(p1)

## Warning: Removed 4 rows containing missing values (geom_segment).

## Warning: Removed 4 rows containing missing values (geom_segment).
```

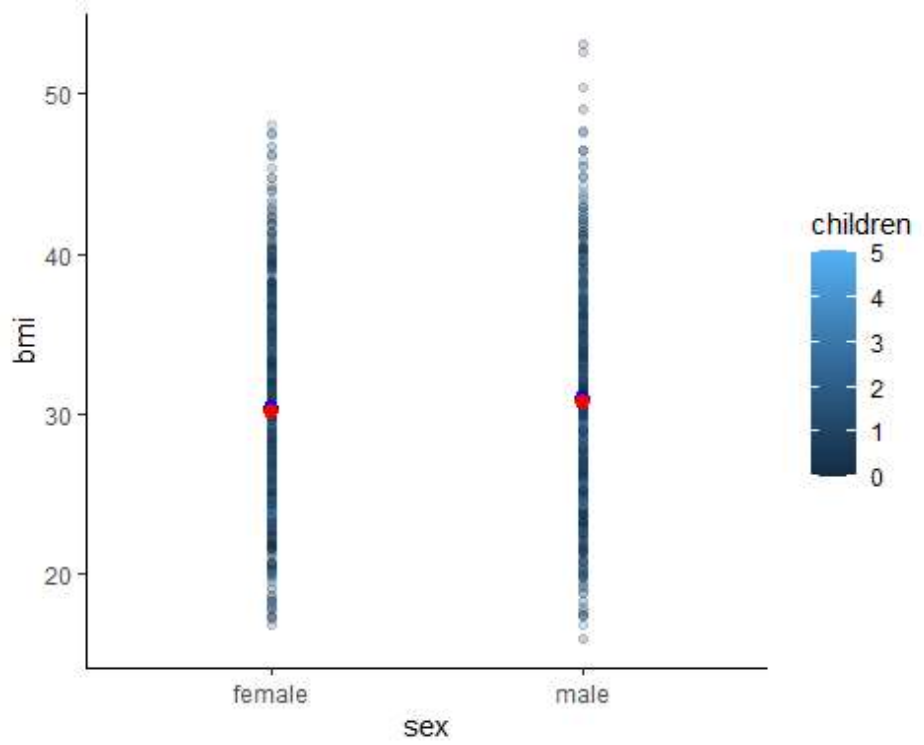



```
#  geom_point with sex and charges
p2<-ggplot(data=d)+geom_point(aes(x=sex,y=charges,color=region),alpha=.2)+
  theme_classic()+
  stat_summary(aes(x=sex,y=charges),fun=mean,color="blue")+
  stat_summary(aes(x=sex,y=charges),fun=median,color="red")
print(p2)

## Warning: Removed 2 rows containing missing values (geom_segment).

## Warning: Removed 2 rows containing missing values (geom_segment).
```




```
#  geom_point with sex and bmi
p3<-ggplot(data=d)+geom_point(aes(x=sex,y=bmi,color=children),alpha=.2)+
  theme_classic()+
  stat_summary(aes(x=sex,y=bmi),fun=mean,color="blue")+
  stat_summary(aes(x=sex,y=bmi),fun=median,color="red")
print(p3)
```

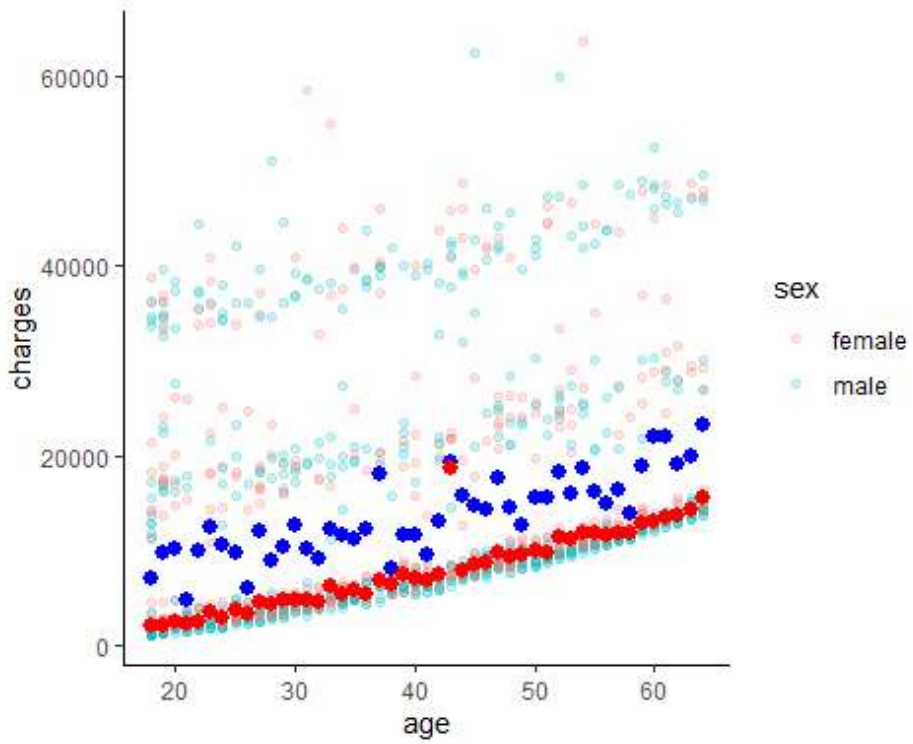
```
## Warning: Removed 2 rows containing missing values (geom_segment).

## Warning: Removed 2 rows containing missing values (geom_segment).
```




```
#  geom_point with age and charges
p4<-ggplot(data=d)+geom_point(aes(x=age,y=charges,color=sex),alpha=.2)+
  theme_classic()+
  stat_summary(aes(x=age,y=charges),fun=mean,color="blue")+
  stat_summary(aes(x=age,y=charges),fun=median,color="red")
print(p4)
```

```
## Warning: Removed 47 rows containing missing values (geom_segment).
```

```
## Warning: Removed 47 rows containing missing values (geom_segment).
```



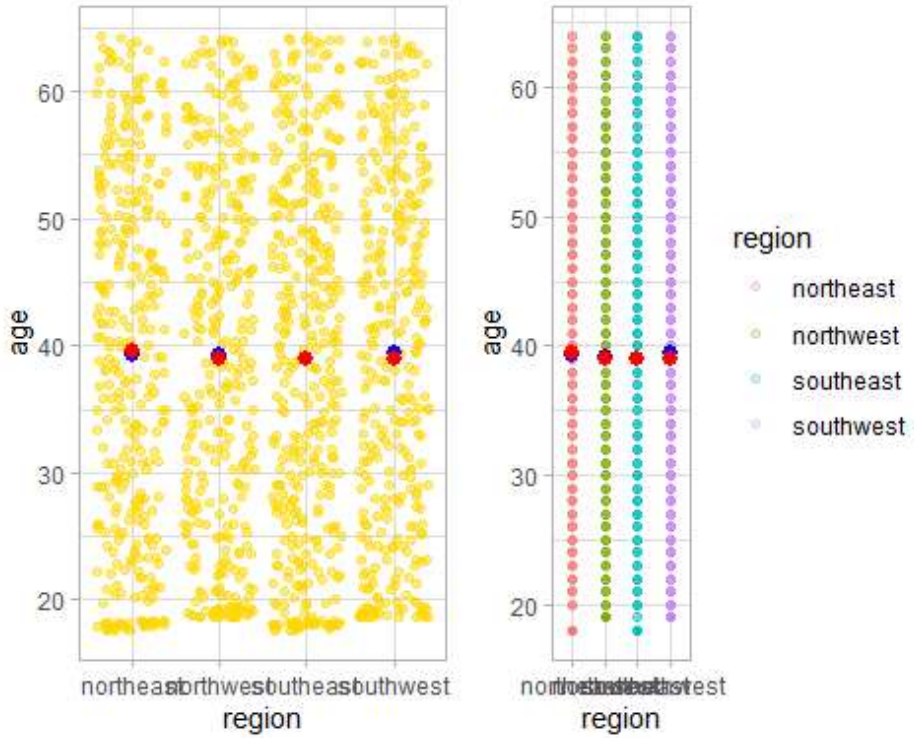

```
#  Combination of geom_jitter and geom_point
print(grid.arrange(g1,p1,nrow=1))
```

```
## Warning: Removed 4 rows containing missing values (geom_segment).
```

```
## Warning: Removed 4 rows containing missing values (geom_segment).
```

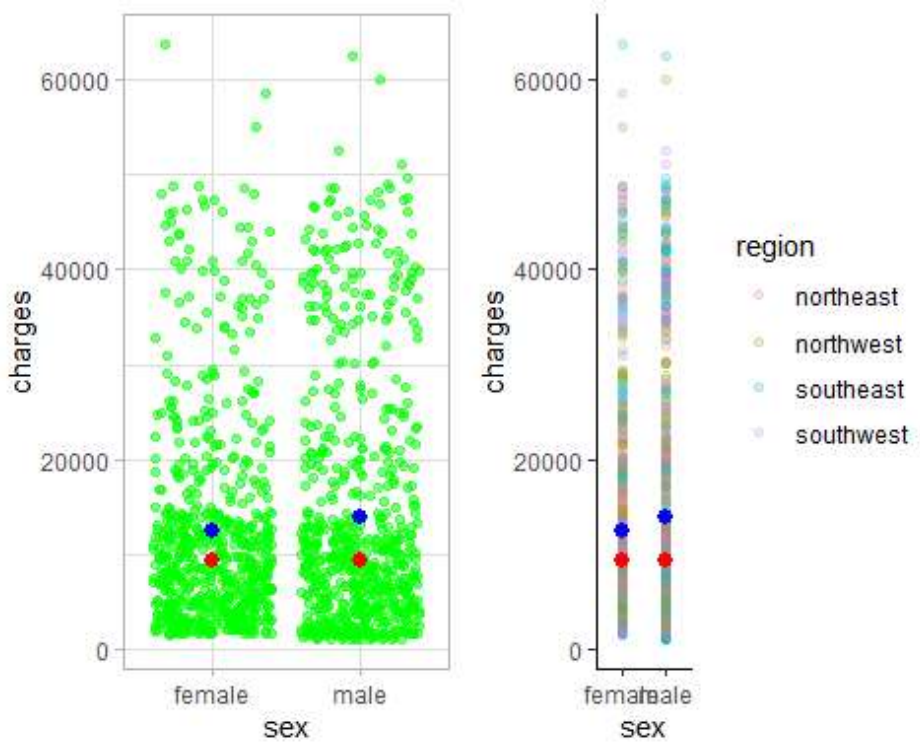
```
## Warning: Removed 4 rows containing missing values (geom_segment).
```

```
## Warning: Removed 4 rows containing missing values (geom_segment).
```



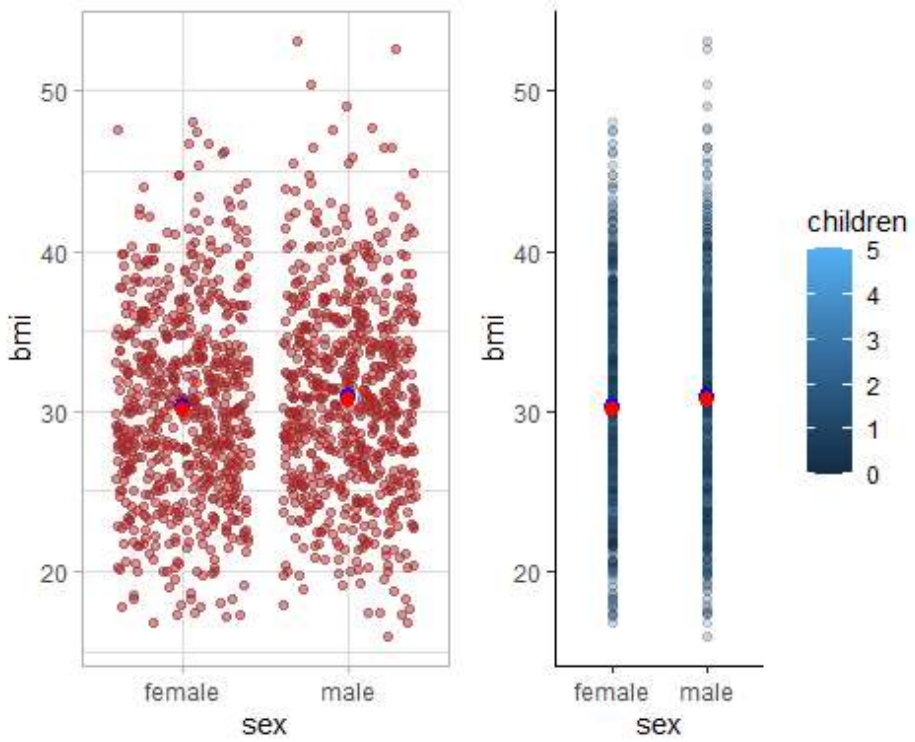

```
## TableGrob (1 x 2) "arrange": 2 grobs
##   z     cells    name           grob
## 1 1 (1-1,1-1) arrange gtable[layout]
## 2 2 (1-1,2-2) arrange gtable[layout]

print(grid.arrange(g2,p2,nrow=1))

## Warning: Removed 2 rows containing missing values (geom_segment).

## Warning: Removed 2 rows containing missing values (geom_segment).

## Warning: Removed 2 rows containing missing values (geom_segment).
```

```
## Warning: Removed 2 rows containing missing values (geom_segment).
```



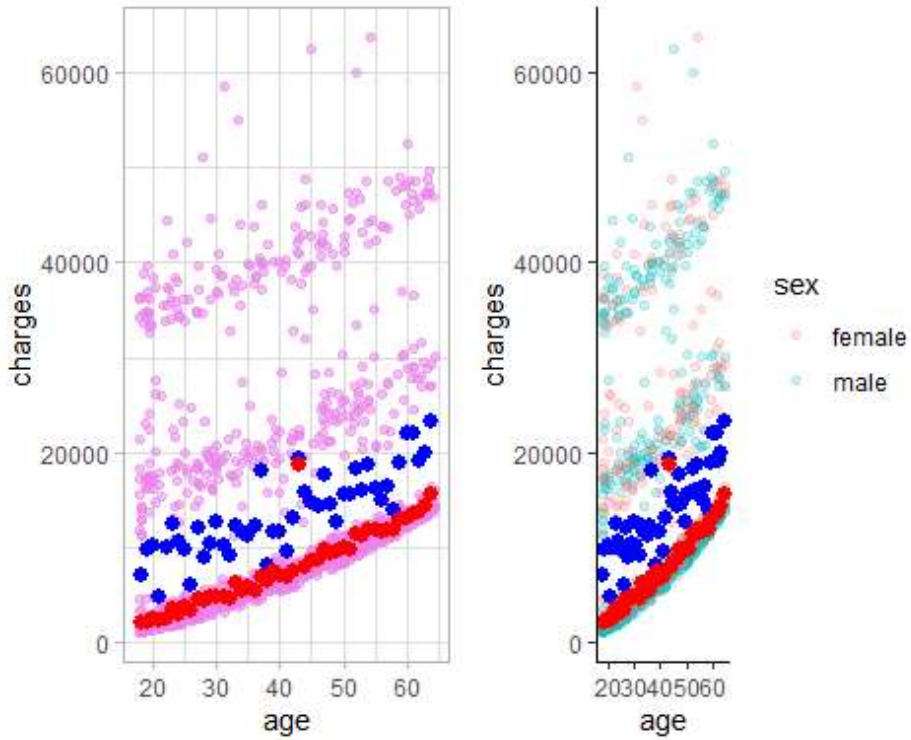

```
## TableGrob (1 x 2) "arrange": 2 grobs
##   z     cells    name           grob
## 1 1 (1-1,1-1) arrange gtable[layout]
## 2 2 (1-1,2-2) arrange gtable[layout]

print(grid.arrange(g3,p3,nrow=1))

## Warning: Removed 2 rows containing missing values (geom_segment).

## Warning: Removed 2 rows containing missing values (geom_segment).
```

```
## Warning: Removed 2 rows containing missing values (geom_segment).

## Warning: Removed 2 rows containing missing values (geom_segment).
```



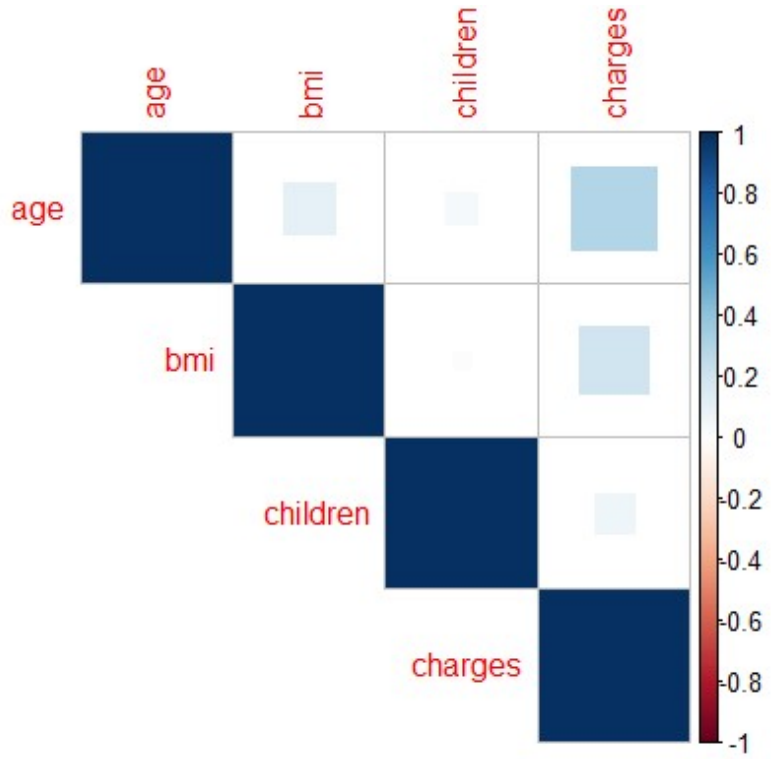

```
## TableGrob (1 x 2) "arrange": 2 grobs
##   z     cells    name           grob
## 1 1 (1-1,1-1) arrange gtable[layout]
## 2 2 (1-1,2-2) arrange gtable[layout]

print(grid.arrange(g4,p4,nrow=1))

## Warning: Removed 47 rows containing missing values (geom_segment).
```

```
## Warning: Removed 47 rows containing missing values (geom_segment).

## Warning: Removed 47 rows containing missing values (geom_segment).

## Warning: Removed 47 rows containing missing values (geom_segment).
```

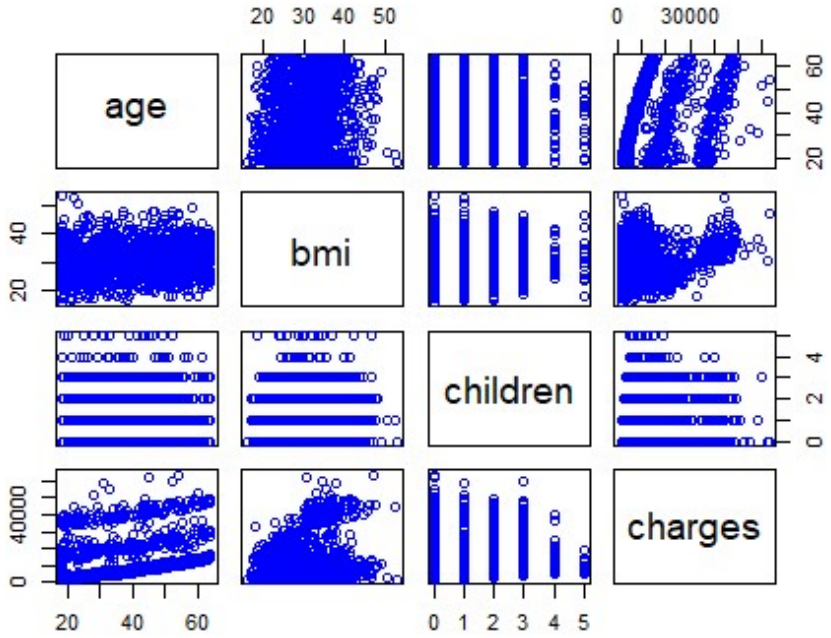



```
## TableGrob (1 x 2) "arrange": 2 grobs
##   z     cells    name           grob
## 1 1 (1-1,1-1) arrange gtable[layout]
## 2 2 (1-1,2-2) arrange gtable[layout]
```

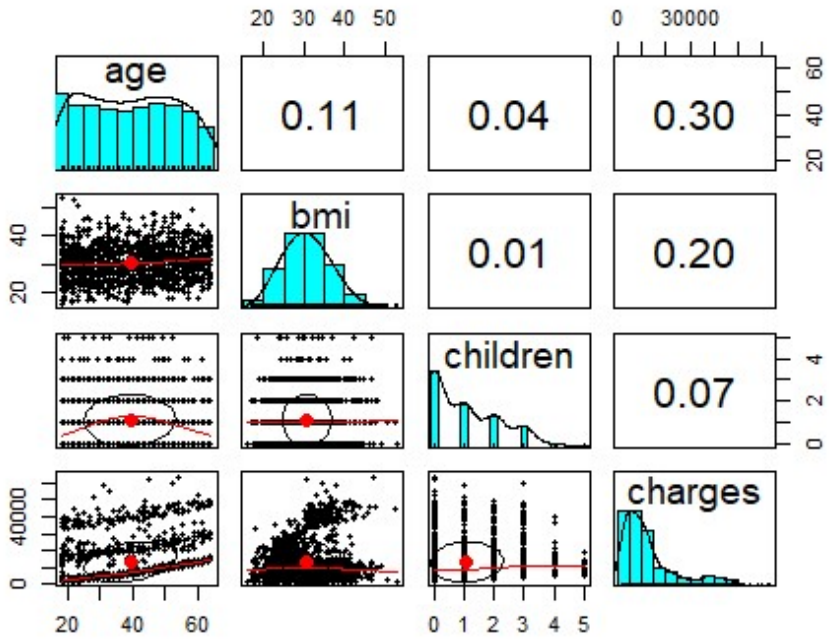
```
#  To check the summary of charges
summary(d$charges)

##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
##    1122    4740    9382   13270   16640   63770

#  To find the relation among variables.So we will use correlation matrix
corr<-cor(d[c("age","bmi","children","charges")])
corrplot(corr,method="square",type="upper")
```



```r
#  Scatterplot matrix
pairs(d[c("age","bmi","children","charges")],col="blue")
```




```r
#  To add more information to scatterplot.
#  To enhance the plot,already load the package "psych"
pairs.panels(d[c("age","bmi","children","charges")])
```




```
#  To train a model on to the data
#  To fit the linear regression model to the data with R,we will use
#  the function lm()
model<-lm(charges~age+children+bmi+sex+region,data=d)
model<-lm(charges~.,data=d)


#  To build the model
model

##
## Call:
## lm(formula = charges ~ ., data = d)
```

```
##
## Coefficients:
##     (Intercept)              age          sexmale              bmi
##        -11938.5            256.9           -131.3            339.2
##        children        smokeryes  regionnorthwest  regionsoutheast
##           475.5          23848.5           -353.0          -1035.0
## regionsouthwest
##          -960.1
```

```
#  To view more information about the model
summary(model)
```

```
##
## Call:
## lm(formula = charges ~ ., data = d)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -11304.9  -2848.1   -982.1   1393.9  29992.8
##
## Coefficients:
##                 Estimate Std. Error t value Pr(>|t|)
## (Intercept)     -11938.5      987.8 -12.086  < 2e-16 ***
## age                256.9       11.9  21.587  < 2e-16 ***
## sexmale           -131.3      332.9  -0.394 0.693348
## bmi                339.2       28.6  11.860  < 2e-16 ***
## children           475.5      137.8   3.451 0.000577 ***
## smokeryes        23848.5      413.1  57.723  < 2e-16 ***
## regionnorthwest   -353.0      476.3  -0.741 0.458769
## regionsoutheast  -1035.0      478.7  -2.162 0.030782 *
## regionsouthwest   -960.0      477.9  -2.009 0.044765 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 6062 on 1329 degrees of freedom
```

```
## Multiple R-squared:  0.7509, Adjusted R-squared:  0.7494
## F-statistic: 500.8 on 8 and 1329 DF,  p-value: < 2.2e-16

# In this analysis,applied linear regression.
# As we can see, summary of a model showed us the significance of variable.
```