CMM703_CW_Q2_InsuranceData_Analysis.R

1234

2022-08-11

```
##install.packages("readr")
##install.packages("caTools")

## Load packages ##
library(readr)
```

```
## Warning: package 'readr' was built under R version 4.1.3
```

```
library(ggplot2)
library(tidyr)
```

```
## Warning: package 'tidyr' was built under R version 4.1.3
```

```
library(psych)
```

```
## Warning: package 'psych' was built under R version 4.1.3
```

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

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

```
library(caTools)
```

```
## Warning: package 'caTools' was built under R version 4.1.3
```

```
library(knitr)
```

```
## Warning: package 'knitr' was built under R version 4.1.3
```

```
library(rmarkdown)
```

```
## Warning: package 'rmarkdown' was built under R version 4.1.3
```

```
library(tinytex)
```

```
## Warning: package 'tinytex' was built under R version 4.1.3
```

```
#library(magrittr)
#library(tidyverse)
#library(tidymodels)

options(knitr.duplicate.label = "allow")

## Get the current working directory / project path ##
getwd()
```

```
## [1] "D:/Academic/BDA/CMM703_DA/CW/CMM703_DA/CMM703_CW_Practicles_with_R/Script"
```

```
## Assign the source data path into a variable
dataSource_Path <-"D:/Academic/BDA/CMM703_DA/CW/CMM703_DA/CMM703_CW_Practicles_with_R/Data/For_Q2/insura

## Load data and assign it to a dataframe, insurance_dataFrame ##
data_tibble<-read_csv(dataSource_Path)
```

```
## New names:
## * `` -> `...1`
```

```
## Rows: 1471 Columns: 8
## -- Column specification --------------------------------------------------------
## Delimiter: ","
## chr (3): gender, smoking_status, district
## dbl (5): ...1, age, bmi, num_kids, premium
##
## i Use `spec()` to retrieve the full column specification for this data.
## i Specify the column types or set `show_col_types = FALSE` to quiet this message.
```

```
## Convert the tibble to a dataframe ##
insurance_dataFrame <- as.data.frame(data_tibble)

## Remove the index column ##
insurance_dataFrame <- insurance_dataFrame[,-1]

## Explore Data ##

## Get the first part of the DF ##
head(insurance_dataFrame)
```

```
##   age gender    bmi num_kids smoking_status district   premium
## 1  44 female 20.235        1            yes  badulla 19594.810
## 2  49 female 41.470        4             no   trinco 10977.206
## 3  29   male 35.500        2            yes  colombo 44585.456
## 4  57   male 34.010        0             no    galle 11356.661
## 5  36   male 28.880        3             no  badulla  6748.591
## 6  40 female 23.370        3             no  badulla  8252.284
```

```
## Get the last part of the DF ##
tail(insurance_dataFrame)
```

```
##      age gender    bmi num_kids smoking_status district   premium
## 1466  24   male 26.790        1             no    galle 12609.887
## 1467  46 female 28.900        2             no  colombo  8823.279
## 1468  60 female 30.500        0             no  colombo 12638.195
## 1469  58   male 35.700        0             no  colombo 11362.755
## 1470  39 female 34.100        3             no  colombo  7418.522
## 1471  62   male 30.875        3            yes    galle 46718.163
```

```
## Get the Structure of the DF ##
str(insurance_dataFrame)
```

```
## 'data.frame':    1471 obs. of  7 variables:
##  $ age           : num  44 49 29 57 36 40 55 20 53 58 ...
##  $ gender        : chr  "female" "female" "male" "male" ...
##  $ bmi           : num  20.2 41.5 35.5 34 28.9 ...
##  $ num_kids      : num  1 4 2 0 3 3 0 0 1 0 ...
##  $ smoking_status: chr  "yes" "no" "yes" "no" ...
##  $ district      : chr  "badulla" "trinco" "colombo" "galle" ...
##  $ premium       : num  19595 10977 44585 11357 6749 ...
```

```
## Check for null values ##
sapply(insurance_dataFrame,is.null)
```

```
##            age         gender            bmi       num_kids smoking_status
##          FALSE          FALSE          FALSE          FALSE          FALSE
##       district        premium
##          FALSE          FALSE
```

```
sapply(insurance_dataFrame,function(x) sum(is.null(x)))
```

```
##            age         gender            bmi       num_kids smoking_status
##              0              0              0              0              0
##       district        premium
##              0              0
```

```
## Check for missing values ##
sapply(insurance_dataFrame,function(x) sum(is.na(x)))
```

```
##            age         gender            bmi       num_kids smoking_status
##              0              0              0              0              0
##       district        premium
##              0              0
```

```
## Convert character variables into factors ##
insurance_dataFrame[sapply(insurance_dataFrame, is.character)] <- lapply(insurance_dataFrame[sapply(insu
                                                                         as.factor)

describe(insurance_dataFrame)
```

```
##                  vars    n     mean       sd  median  trimmed     mad     min
## age                 1 1471    39.19    14.09   39.00    39.00   19.27   18.00
## gender*             2 1471     1.49     0.50    1.00     1.49    0.00    1.00
## bmi                 3 1471    30.92     6.21   30.50    30.75    6.38   16.82
## num_kids            4 1471     1.06     1.17    1.00     0.90    1.48    0.00
## smoking_status*     5 1471     1.19     0.39    1.00     1.12    0.00    1.00
## district*           6 1471     2.55     1.12    3.00     2.56    1.48    1.00
## premium             7 1471 13118.74 12094.36 9447.25 10847.17 7625.58 1131.51
##                    max    range  skew kurtosis     se
## age              64.00    46.00  0.05    -1.28   0.37
## gender*           2.00     1.00  0.03    -2.00   0.01
## bmi              53.13    36.31  0.30    -0.02   0.16
## num_kids          5.00     5.00  0.92     0.07   0.03
## smoking_status*   2.00     1.00  1.56     0.43   0.01
## district*         4.00     3.00 -0.07    -1.36   0.03
## premium       62592.87 61461.37  1.55     1.71 315.34
```

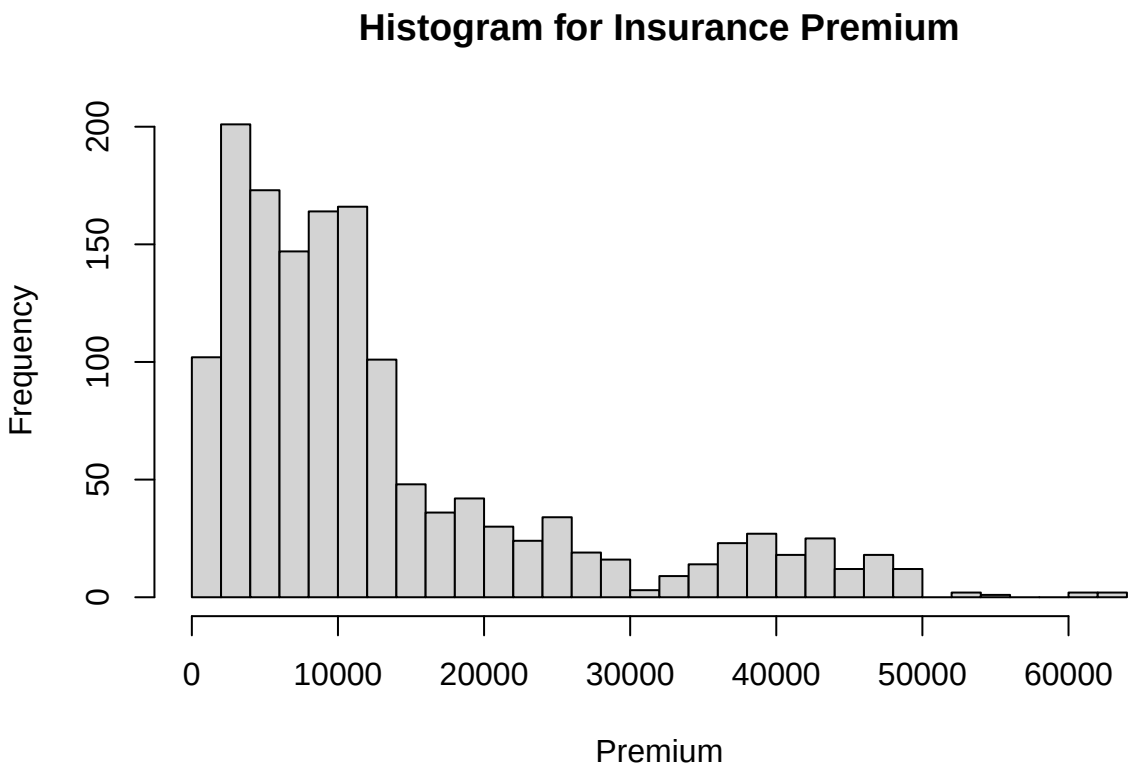
```r
## Levels of factors ##
#lapply(insurance_dataFrame[sapply(insurance_dataFrame,is.factor)],unique)

## select factor variables which should be converted as numeric ##
#must_convert<-sapply(insurance_dataFrame,is.factor)

## All factor variables transformed approximately its original numeric values using unclass function ##
#faclevels_dataFrame<-sapply(insurance_dataFrame[,must_convert],unclass)

## complete DF with all variables put together ##
#insurance_dataFrame<-cbind(insurance_dataFrame[,!must_convert],faclevels_dataFrame)

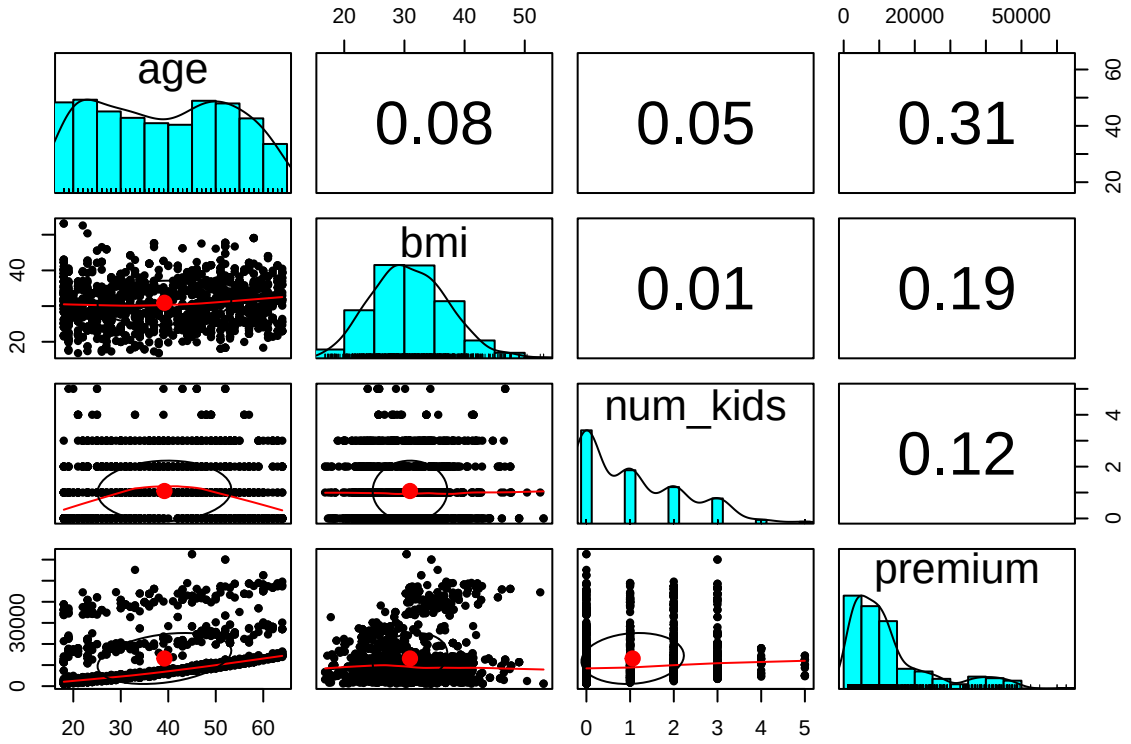
## Data distribution of predictor variable - premium ##
hist(insurance_dataFrame$premium, breaks = 30, main="Histogram for Insurance Premium",
     xlab="Premium")
```




```
## Discover the relationships between features ##
cor(insurance_dataFrame[c("age", "bmi", "num_kids", "premium")])
```

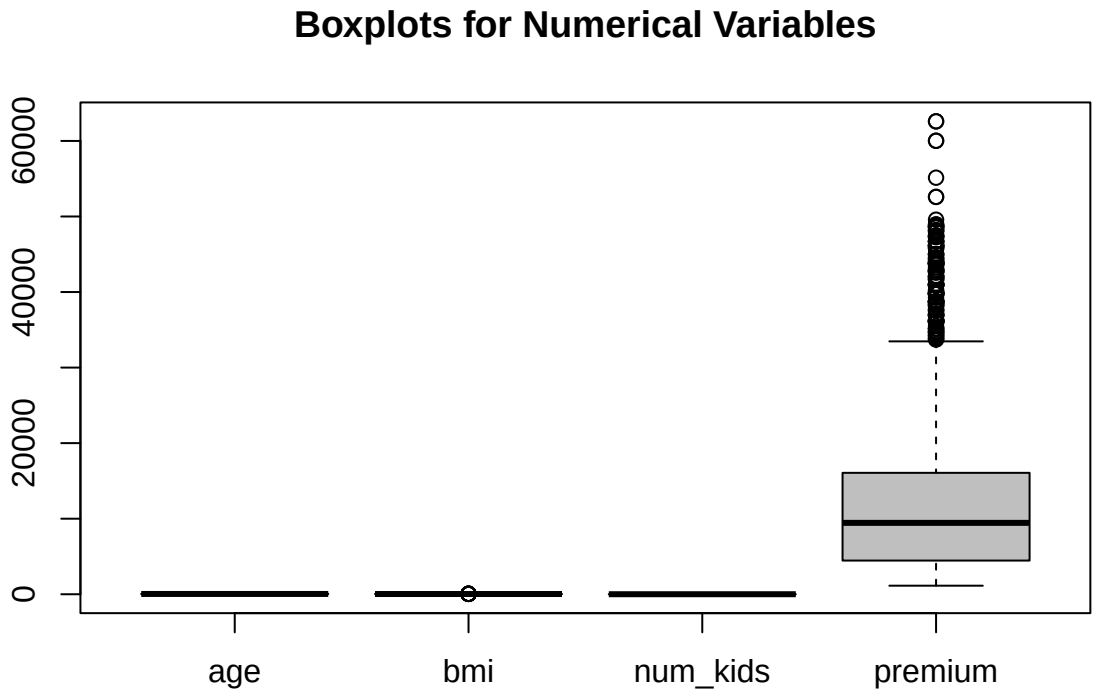
```
##                age         bmi    num_kids   premium
## age      1.00000000 0.083619579 0.052371107 0.3068623
## bmi      0.08361958 1.000000000 0.005854804 0.1912049
## num_kids 0.05237111 0.005854804 1.000000000 0.1164152
## premium  0.30686227 0.191204855 0.116415173 1.0000000
```

```
## Scatterplot matrix using psych package ##
pairs.panels(insurance_dataFrame[c("age", "bmi", "num_kids", "premium")])
```




```
## Box plots to numerical varibales ##
numdata_boxplot <- insurance_dataFrame[,c('age','bmi','num_kids','premium')]

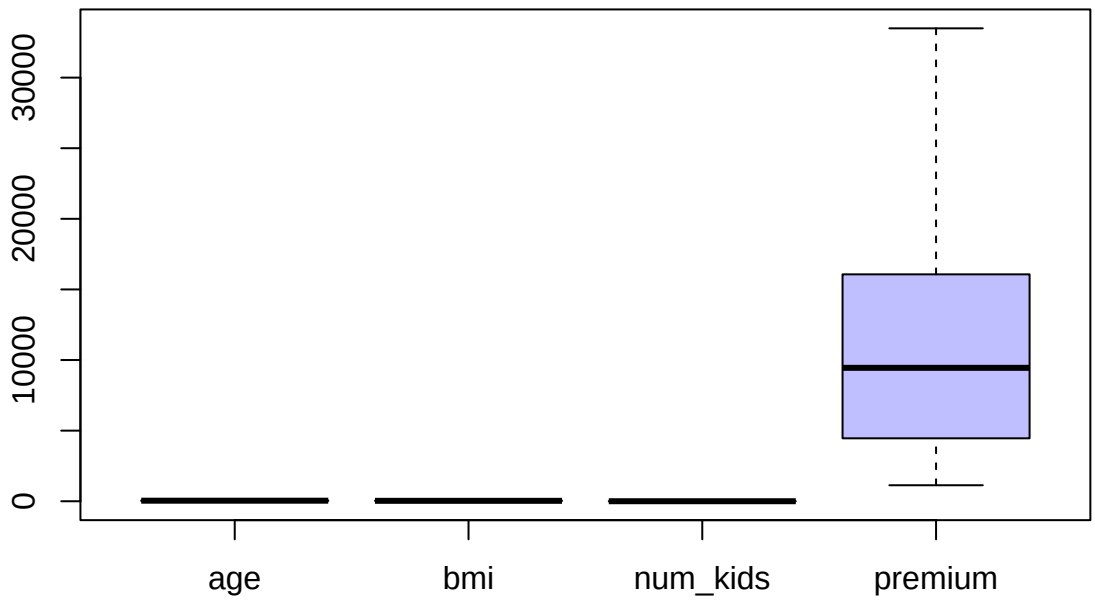
boxplot(numdata_boxplot, col = rgb(0, 0, 0, alpha = 0.25), main=("Boxplots for Numerical Variables") )
```




```
## Remove outliers using interqurtile range ##
rm_outliers <- function(x){
  qnt <- quantile(x, probs=c(.25, .75), na.rm = T)
  H <- 1.5 * IQR(x, na.rm = T)
  lb<-qnt[1] - H
  ub<-qnt[2] + H
  x[x < lb] <- lb
  x[x > ub] <- ub
  return(x)
}
insurance_dataFrame$bmi<-rm_outliers(insurance_dataFrame$bmi)
insurance_dataFrame$premium<-rm_outliers(insurance_dataFrame$premium)

numdata_boxplotintq <- insurance_dataFrame[,c("age","bmi","num_kids","premium")]

boxplot(numdata_boxplotintq, col = rgb(0, 0, 1, alpha = 0.25),
        main=("Boxplots for Numerical Variables without Outliers") )
```




```
##### Model Buildup #####

model_df <- insurance_dataFrame

# Splitting the DF into training and test data sets ##

set.seed(123)
## set the index on training data set to split the data on 0.8:0.2 ratio based on index##
traindt_index <- sample(seq_len(nrow(model_df)), size = floor(0.80 * nrow(model_df)))

##  the data ##
training_df <- model_df[traindt_index, ]
test_df <- model_df[-traindt_index, ]

training_df
```

```
##      age gender    bmi num_kids smoking_status district   premium
## 415   63 female 31.800        0             no  colombo 13880.949
## 463   26   male 29.150        1             no   trinco  2902.907
## 179   34 female 19.000        3             no  badulla  6753.038
## 526   25   male 45.540        2            yes   trinco 33488.574
## 195   51 female 37.050        3            yes  badulla 33488.574
## 938   45   male 30.360        0            yes   trinco 33488.574
## 1142  38   male 27.835        2             no    galle  6455.863
## 1323  32   male 30.800        3             no  colombo  5253.524
## 1253  63 female 36.850        0             no   trinco 13887.969
```

```
## 1268  43 female 35.720        2            no  badulla 19144.577
## 1038  47   male 38.940        2           yes   trinco 33488.574
## 1398  19   male 34.800        0           yes  colombo 33488.574
## 665   56   male 31.790        2           yes   trinco 33488.574
## 602   51   male 33.330        3            no   trinco 10560.492
## 709   32   male 35.200        2            no  colombo  4670.640
## 1011  23   male 32.560        0            no   trinco  1824.285
## 1115  53   male 30.495        0            no  badulla 10072.055
## 953   22   male 39.500        0            no  colombo  1682.597
## 348   47 female 27.645        2           yes    galle 24535.699
## 1017  24   male 40.150        0           yes   trinco 33488.574
## 1379  60 female 38.060        0            no   trinco 12648.703
## 840   24   male 33.630        4            no  badulla 17128.426
## 26    47   male 25.460        2            no  badulla  9225.256
## 519   36 female 22.600        2           yes  colombo 18608.262
## 211   49 female 36.630        3            no   trinco 10381.479
## 932   63 female 36.850        0            no   trinco 13887.969
## 593   44 female 29.810        2            no   trinco  8219.204
## 555   21   male 28.975        0            no    galle  1906.358
## 373   55 female 37.100        0            no  colombo 10713.644
## 844   56   male 25.935        0            no  badulla 11165.418
## 1167  38   male 19.950        1            no    galle  5855.903
## 544   40 female 27.400        1            no  colombo  6496.886
## 490   35   male 30.500        1            no  colombo  4751.070
## 905   49 female 29.925        0            no    galle  8988.159
## 937   21 female 26.400        1            no  colombo  2597.779
## 1047  47 female 27.645        2           yes    galle 24535.699
## 923   28 female 25.935        1            no    galle  4133.642
## 956   46   male 25.745        3            no    galle  9301.894
## 309   64 female 35.970        0            no   trinco 14313.846
## 1159  32   male 31.500        1            no  colombo  4076.497
## 1248  59 female 27.720        3            no   trinco 14001.134
## 166   27   male 23.100        0            no   trinco  2483.736
## 217   31 female 21.755        0            no    galle  4134.082
## 1314  30   male 24.130        1            no    galle  4032.241
## 581   63   male 31.445        0            no  badulla 13974.456
## 72    52 female 46.750        5            no   trinco 12592.534
## 588   42 female 37.900        0            no  colombo  6474.013
## 141   49   male 22.515        0            no  badulla  8688.859
## 722   24 female 25.270        0            no  badulla  3044.213
## 859   48   male 40.565        2           yes    galle 33488.574
## 153   36   male 41.895        3           yes  badulla 33488.574
## 294   61   male 23.655        0            no  badulla 13129.603
## 277   40 female 23.370        3            no  badulla  8252.284
## 41    18   male 43.010        0            no   trinco  1149.396
## 431   58 female 32.395        1            no  badulla 13019.161
## 90    34   male 21.375        0            no  badulla  4500.339
## 316   56   male 31.790        2           yes   trinco 33488.574
## 1247  18   male 47.850        0            no   trinco  1163.463
## 528   18   male 30.030        1            no   trinco  1720.354
## 1140  48 female 31.130        0            no   trinco  8280.623
## 774   28 female 25.800        0            no  colombo  3161.454
## 747   37 female 17.290        2            no  badulla  6877.980
## 456   33 female 35.530        0           yes    galle 33488.574
```

```
## 598   36 female 22.600        2            yes  colombo 18608.262
## 1063  42 female 40.370        2            yes   trinco 33488.574
## 1183  44 female 23.980        2             no   trinco  8211.100
## 752   53   male 30.495        0             no  badulla 10072.055
## 1233  52   male 26.400        3             no   trinco 25992.821
## 374   24   male 28.500        0            yes  badulla 33488.574
## 34    22 female 30.400        0             no  badulla  2741.948
## 516   19 female 27.900        0            yes  colombo 16884.924
## 13    23 female 28.310        0            yes    galle 18033.968
## 69    45   male 36.480        2            yes    galle 33488.574
## 755   60 female 35.100        0             no  colombo 12644.589
## 409   27   male 45.900        2             no  colombo  3693.428
## 1332  37 female 47.600        2            yes  colombo 33488.574
## 1302  28   male 22.515        2             no  badulla  4428.888
## 1113  24 female 23.210        0             no   trinco 25081.768
## 928   55 female 29.830        0             no  badulla 11286.539
## 1006  54   male 30.020        0             no    galle 24476.479
## 537   18 female 39.160        0             no   trinco  1633.044
## 983   57 female 34.295        2             no  badulla 13224.057
## 291   54   male 29.200        1             no  colombo 10436.096
## 1310  38   male 27.835        2             no    galle  6455.863
## 671   28   male 23.800        2             no  colombo  3847.674
## 121   57   male 42.130        1            yes   trinco 33488.574
## 1134  61 female 29.070        0            yes    galle 29141.360
## 1182  44 female 38.060        0            yes   trinco 33488.574
## 1088  42 female 25.300        1             no  colombo  7045.499
## 480   53   male 28.880        0             no    galle  9869.810
## 67    30   male 37.800        2            yes  colombo 33488.574
## 1014  31 female 36.630        2             no   trinco  4949.759
## 1109  50 female 30.115        1             no    galle  9910.360
## 165   37 female 23.370        2             no    galle  6686.431
## 1075  37   male 29.640        0             no    galle  5028.147
## 1098  37   male 36.190        0             no   trinco 19214.706
## 1202  30 female 27.930        0             no  badulla  4137.523
## 236   51 female 20.600        0             no  colombo  9264.797
## 610   64 female 39.330        0             no  badulla 14901.517
## 330   38 female 30.210        3             no    galle  7537.164
## 726   37   male 30.800        0             no  colombo  4646.759
## 127   23 female 33.400        0             no  colombo 10795.937
## 212   29   male 31.730        2             no    galle  4433.388
## 686   39 female 34.320        5             no   trinco  8596.828
## 814   18 female 36.850        0             no   trinco  1629.833
## 1334  54 female 31.240        0             no   trinco 10338.932
## 931   54 female 30.800        3             no  colombo 12105.320
## 878   64   male 24.700        1             no    galle 30166.618
## 243   22   male 39.500        0             no  colombo  1682.597
## 847   43   male 34.960        1            yes  badulla 33488.574
## 1137  21   male 36.860        0             no    galle  1917.318
## 1390  45 female 39.995        3             no  badulla  9704.668
## 619   32   male 37.180        2             no   trinco  4673.392
## 477   47   male 28.215        3            yes    galle 24915.221
## 151   45   male 21.375        0             no    galle  7222.786
## 666   53   male 31.160        1             no    galle 10461.979
## 767   57 female 28.700        0             no  colombo 11455.280
```

```
## 160   32   male 37.180        2            no   trinco  4673.392
## 155   33 female 42.940        3            no    galle  6360.994
## 426   64 female 22.990        0           yes   trinco 27037.914
## 1029  50 female 28.160        3            no   trinco 10702.642
## 326   52 female 44.700        3            no  colombo 11411.685
## 1304  23   male 35.200        1            no  colombo  2416.955
## 789   64 female 30.115        3            no    galle 16455.708
## 1262  34   male 34.210        0            no   trinco  3935.180
## 985   48 female 36.575        0            no    galle  8671.191
## 39    31   male 25.935        1            no    galle  4239.893
## 822   54   male 30.210        0            no    galle 10231.500
## 986   62   male 26.695        0           yes  badulla 28101.333
## 137   24   male 29.300        0            no  colombo  1977.815
## 455   42 female 23.370        0           yes  badulla 19964.746
## 589   41 female 33.155        3            no  badulla  8538.288
## 1107  46   male 22.300        0            no  colombo  7147.105
## 1345  54   male 31.600        0            no  colombo  9850.432
## 196   64   male 25.600        2            no  colombo 14988.432
## 680   24 female 33.345        0            no    galle  2855.438
## 1388  44   male 27.400        2            no  colombo  7726.854
## 500   21   male 25.700        4           yes  colombo 17942.106
## 1346  37   male 29.830        2            no  badulla  6406.411
## 344   60 female 27.550        0            no  badulla 13217.094
## 459   42 female 24.985        2            no    galle  8017.061
## 944   38 female 40.150        0            no   trinco  5400.980
## 1044  35 female 28.025        0           yes    galle 20234.855
## 872   50 female 31.600        2            no  colombo 10118.424
## 1467  46 female 28.900        2            no  colombo  8823.279
## 1188  48   male 30.200        2            no  colombo  8968.330
## 1076  63 female 35.200        1            no   trinco 14474.675
## 876   19 female 40.500        0            no  colombo  1759.338
## 534   55   male 29.900        0            no  colombo 10214.636
## 177   47 female 27.645        2           yes    galle 24535.699
## 554   18   male 28.310        1            no  badulla 11272.331
## 827   52 female 31.730        2            no    galle 11187.657
## 84    18   male 28.310        1            no  badulla 11272.331
## 633   21 female 21.890        2            no   trinco  3180.510
## 597   32   male 33.820        1            no    galle  4462.722
## 706   54 female 46.700        2            no  colombo 11538.421
## 1359  42 female 25.300        1            no  colombo  7045.499
## 710   58   male 47.850        0            no   trinco 11381.325
## 712   32   male 33.630        1           yes  badulla 33488.574
## 672   46   male 22.300        0            no  colombo  7147.105
## 1274  19   male 30.590        0            no    galle  1639.563
## 1021  43   male 35.310        2            no   trinco 18806.145
## 398   34   male 25.270        1            no    galle  4894.753
## 1013  51   male 30.030        1            no   trinco  9377.905
## 1413  22 female 30.400        0           yes    galle 33488.574
## 381   49   male 25.840        2           yes    galle 23807.241
## 40    24 female 33.345        0            no    galle  2855.438
## 522   34   male 21.375        0            no  badulla  4500.339
## 473   30 female 28.380        1           yes   trinco 19521.968
## 200   27 female 21.470        0            no    galle  3353.470
## 1149  31   male 20.400        0            no  colombo  3260.199
```

```
## 265   51   male 27.740        1            no  badulla  9957.722
## 775   24 female 27.600        0            no  colombo 18955.220
## 186   30 female 28.380        1           yes   trinco 19521.968
## 1276  33 female 32.900        2            no  colombo  5375.038
## 458   27 female 24.100        0            no  colombo  2974.126
## 1176  33 female 26.695        0            no    galle  4571.413
## 831   18 female 31.350        0            no   trinco  1622.188
## 1078  34   male 30.800        0           yes  colombo 33488.574
## 919   60 female 24.530        0            no   trinco 12629.897
## 235   64   male 40.480        0            no   trinco 13831.115
## 185   19   male 20.900        1            no  colombo  1832.094
## 413   44   male 22.135        2            no  badulla  8302.536
## 627   34   male 34.210        0            no   trinco  3935.180
## 1349  40   male 29.900        2            no  colombo  6600.361
## 1293  36   male 41.895        3           yes  badulla 33488.574
## 205   18 female 29.165        0            no  badulla  7323.735
## 779   18 female 33.155        0            no  badulla  2207.697
## 564   52 female 24.130        1           yes    galle 23887.663
## 794   25   male 30.590        0            no  badulla  2727.395
## 1397  30   male 35.530        0           yes   trinco 33488.574
## 1354  49 female 29.925        0            no    galle  8988.159
## 468   46 female 27.720        1            no   trinco  8232.639
## 920   45   male 36.480        2           yes    galle 33488.574
## 1081  43 female 24.700        2           yes    galle 21880.820
## 457   46 female 34.600        1           yes  colombo 33488.574
## 617   60   male 39.900        0           yes  colombo 33488.574
## 357   46   male 40.375        2            no    galle  8733.229
## 279   60 female 35.100        0            no  colombo 12644.589
## 270   39   male 29.925        1           yes  badulla 22462.044
## 1364  49   male 30.900        0           yes  colombo 33488.574
## 646   36   male 34.430        0           yes   trinco 33488.574
## 347   26   male 17.670        0            no    galle  2680.949
## 1153  60   male 28.900        0            no  colombo 12146.971
## 218   39 female 23.275        3            no  badulla  7986.475
## 618   25   male 35.625        0            no    galle  2534.394
## 698   30 female 28.380        1           yes   trinco 19521.968
## 337   40   male 32.300        2            no    galle  6986.697
## 797   18 female 36.850        0           yes   trinco 33488.574
## 1449  36   male 30.875        1            no    galle  5373.364
## 539   36 female 22.135        3            no  badulla  7228.216
## 981   48 female 36.575        0            no    galle  8671.191
## 1434  20 female 26.840        1           yes   trinco 17085.268
## 724   59 female 26.505        0            no  badulla 12815.445
## 1246  58   male 47.850        0            no   trinco 11381.325
## 1387  42 female 25.300        1            no  colombo  7045.499
## 861   34   male 34.675        0            no  badulla  4518.826
## 657   30   male 22.990        2           yes    galle 17361.766
## 960   30   male 38.830        1            no   trinco 18963.172
## 1277  30 female 27.930        0            no  badulla  4137.523
## 660   19 female 32.900        0            no  colombo  1748.774
## 163   61   male 33.915        0            no  badulla 13143.865
## 238   18   male 26.180        2            no   trinco  2304.002
## 578   29   male 29.735        2            no    galle 18157.876
## 1372  51   male 23.210        1           yes   trinco 22218.115
```

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## 117   38   male 16.815        2            no  badulla  6640.545
## 648   19   male 27.265        2            no    galle 22493.660
## 1079  22   male 39.500        0            no  colombo  1682.597
## 1241  26   male 33.915        1            no    galle  3292.530
## 1317  53   male 28.880        0            no    galle  9869.810
## 557   54   male 30.800        1           yes   trinco 33488.574
## 1471  62   male 30.875        3           yes    galle 33488.574
## 1158  41 female 28.050        1            no   trinco  6770.193
## 957   40   male 24.970        2            no   trinco  6593.508
## 873   50 female 25.600        0            no  colombo  8932.084
## 688   58   male 36.080        0            no   trinco 11363.283
## 757   37 female 34.800        2           yes  colombo 33488.574
## 988   19   male 35.400        0            no  colombo  1263.249
## 447   31   male 27.645        2            no  badulla  5031.270
## 1128  32 female 37.145        3            no  badulla  6334.344
## 821   58 female 36.480        0            no    galle 12235.839
## 1294  35 female 28.025        0           yes    galle 20234.855
## 711   56 female 25.650        0            no    galle 11454.022
## 349   56   male 33.660        4            no   trinco 12949.155
## 1322  61   male 33.535        0            no  badulla 13143.337
## 386   51 female 38.060        0           yes   trinco 33488.574
## 1165  19 female 24.700        0            no  colombo  1737.376
## 24    24   male 25.800        0            no  colombo  1972.950
## 945   25   male 29.700        3           yes  colombo 19933.458
## 1023  43 female 20.045        2           yes  badulla 19798.055
## 1154  56   male 39.600        0            no  colombo 10601.412
## 1378  20   male 27.300        0           yes  colombo 16232.847
## 170   20 female 31.920        0            no    galle  2261.569
## 1428  58 female 33.440        0            no    galle 12231.614
## 422   53   male 24.320        0            no    galle  9863.472
## 508   40 female 28.120        1           yes  badulla 22331.567
## 64    26 female 29.355        2            no  badulla  4564.191
## 80    20 female 28.975        0            no    galle  2257.475
## 548   53   male 21.400        1            no  colombo 10065.413
## 987   26 female 29.920        2            no   trinco  3981.977
## 475   63   male 31.445        0            no  badulla 13974.456
## 1389  46   male 24.795        3            no  badulla  9500.573
## 765   45   male 36.480        2           yes    galle 33488.574
## 479   39 female 31.920        2            no    galle  7209.492
## 1135  42 female 36.195        1            no    galle  7443.643
## 791   30 female 19.950        3            no    galle  5693.431
## 1438  50 female 28.160        3            no   trinco 10702.642
## 807   64 female 39.330        0            no  badulla 14901.517
## 292   46 female 35.530        0           yes  badulla 33488.574
## 297   57   male 28.975        0           yes  badulla 27218.437
## 860   21   male 27.360        0            no  badulla  2104.113
## 605   51 female 18.050        0            no    galle  9644.253
## 637   52   male 33.250        0            no  badulla  9722.770
## 1407  52   male 47.740        1            no   trinco  9748.911
## 1220  48 female 32.300        2            no  badulla 10043.249
## 1315  37   male 22.705        3            no  badulla  6985.507
## 1057  50   male 31.825        0           yes  badulla 33488.574
## 83    52   male 34.485        3           yes    galle 33488.574
## 866   23   male 41.910        0            no   trinco  1837.282
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## 1419  29   male 27.940        0            no   trinco  2867.120
## 1222  18 female 25.080        0            no  badulla  2196.473
## 76    42   male 35.970        2            no   trinco  7160.330
## 1118  32 female 29.735        0            no    galle  4357.044
## 1054  47   male 38.940        2           yes   trinco 33488.574
## 946   27   male 45.900        2            no  colombo  3693.428
## 1403  56   male 33.725        0            no    galle 10976.246
## 323   21 female 34.870        0            no   trinco  2020.552
## 115   21   male 23.210        0            no   trinco  1515.345
## 850   34   male 22.420        2            no  badulla 27375.905
## 608   30 female 39.050        3           yes   trinco 33488.574
## 682   46   male 33.345        1            no  badulla  8334.458
## 1466  24   male 26.790        1            no    galle 12609.887
## 1120  18 female 32.120        2            no   trinco  2801.259
## 397   36   male 41.895        3           yes  badulla 33488.574
## 1172  46   male 25.800        5            no  colombo 10096.970
## 989   43 female 35.640        1            no   trinco  7345.727
## 392   59 female 36.520        1            no   trinco 28287.898
## 1445  54   male 30.020        0            no    galle 24476.479
## 744   50   male 32.110        2            no  badulla 25333.333
## 1363  19   male 25.555        0            no    galle  1632.564
## 106   43 female 26.885        0           yes    galle 21774.322
## 11    36   male 31.500        0            no  colombo  4402.233
## 625   52   male 34.100        0            no   trinco  9140.951
## 1226  59   male 24.700        0            no  badulla 12323.936
## 403   18 female 31.350        0            no   trinco  1622.188
## 461   19   male 25.555        1            no    galle  2221.564
## 1424  58 female 29.000        0            no  colombo 11842.442
## 31    45 female 36.300        2            no   trinco  8527.532
## 1139  48 female 33.110        0           yes   trinco 33488.574
## 94    52 female 37.525        2            no    galle 33471.972
## 16    61 female 44.000        0            no  colombo 13063.883
## 178   43   male 30.100        1            no  colombo  6849.026
## 1227  60 female 36.005        0            no  badulla 13228.847
## 524   44   male 25.365        1            no    galle  7518.025
## 924   28 female 17.290        0            no  badulla  3732.625
## 204   53   male 28.600        3            no  colombo 11253.421
## 1443  46 female 23.655        1           yes    galle 21677.283
## 1270  52   male 41.800        2           yes   trinco 33488.574
## 384   53 female 38.060        3            no   trinco 20462.998
## 1146  51 female 39.500        1            no  colombo  9880.068
## 315   56 female 28.595        0            no  badulla 11658.115
## 259   64 female 31.825        2            no  badulla 16069.085
## 494   33 female 33.500        0           yes  colombo 33488.574
## 1072  21   male 25.700        4           yes  colombo 17942.106
## 1124  29 female 32.110        2            no    galle  4922.916
## 1016  34 female 37.335        2            no    galle  5989.524
## 1132  56   male 32.110        1            no  badulla 11763.001
## 10    58 female 41.910        0            no   trinco 24227.337
## 1219  48   male 29.700        0            no   trinco  7789.635
## 402   57 female 22.230        0            no  badulla 12029.287
## 108   53   male 29.480        0            no   trinco  9487.644
## 8     20   male 27.930        0            no  badulla  1967.023
## 626   37   male 24.320        2            no    galle  6198.752
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## 261   24   male 23.400        0            no  colombo  1969.614
## 541   45 female 35.300        0            no  colombo  7348.142
## 1350  21   male 20.235        3            no  badulla  3861.210
## 1376  34   male 21.375        0            no  badulla  4500.339
## 282   54   male 40.565        3           yes  badulla 33488.574
## 1156  60   male 24.320        1            no    galle 13112.605
## 696   28 female 26.315        3            no    galle  5312.170
## 667   60 female 35.100        0            no  colombo 12644.589
## 990   50   male 37.070        1            no   trinco  9048.027
## 452   24   male 23.655        0            no    galle  2352.968
## 856   37 female 34.105        1            no    galle  6112.353
## 622   54 female 23.000        3            no  colombo 12094.478
## 1221  49 female 23.180        2            no    galle 10156.783
## 1060  61   male 38.380        0            no    galle 12950.071
## 1244  53   male 21.400        1            no  colombo 10065.413
## 891   59   male 37.100        1            no  colombo 12347.172
## 1034  62   male 26.695        0           yes  badulla 28101.333
## 1459  34 female 27.500        1            no  colombo  5003.853
## 793   19 female 28.900        0            no  colombo  1743.214
## 1470  39 female 34.100        3            no  colombo  7418.522
## 278   41 female 31.635        1            no  badulla  7358.176
## 241   22 female 28.820        0            no   trinco  2156.752
## 1224  19 female 20.600        0            no  colombo  1731.677
## 679   57   male 34.010        0            no    galle 11356.661
## 37    33 female 22.135        1            no  badulla  5354.075
## 1368  40   male 41.230        1            no  badulla  6610.110
## 566   51 female 33.915        0            no  badulla  9866.305
## 19    63   male 41.325        3            no    galle 15555.189
## 378   50 female 27.360        0            no  badulla 25656.575
## 549   31   male 25.900        3           yes  colombo 19199.944
## 48    48 female 27.360        1            no  badulla  9447.382
## 464   52   male 34.485        3           yes    galle 33488.574
## 393   32 female 20.520        0            no  badulla  4544.235
## 670   29   male 37.290        2            no   trinco  4058.116
## 311   18 female 25.080        0            no  badulla  2196.473
## 189   64   male 25.600        2            no  colombo 14988.432
## 38    23 female 32.780        2           yes   trinco 33488.574
## 319   53   male 34.105        0           yes  badulla 33488.574
## 1394  59 female 34.800        2            no  colombo 33488.574
## 846   62   male 26.695        0           yes  badulla 28101.333
## 120   23 female 42.750        1           yes  badulla 33488.574
## 1313  22 female 30.400        0            no  badulla  2741.948
## 441   57 female 31.160        0           yes    galle 33488.574
## 599   47 female 33.915        3            no    galle 10115.009
## 1426  57   male 40.945        0            no  badulla 11566.301
## 714   61 female 28.200        0            no  colombo 13041.921
## 677   62 female 26.290        0           yes   trinco 27808.725
## 81    20 female 33.000        0            no   trinco  1880.070
## 1147  32   male 30.030        1            no   trinco  4074.454
## 134   43   male 38.060        2           yes   trinco 33488.574
## 424   25 female 42.130        1            no   trinco  3238.436
## 756   23   male 34.400        0            no  colombo  1826.843
## 6     40 female 23.370        3            no  badulla  8252.284
## 879   25   male 26.220        0            no  badulla  2721.321
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## 668   43 female 46.200        0           yes   trinco 33488.574
## 49    22 female 24.300        0            no  colombo  2150.469
## 193   50   male 34.200        2           yes  colombo 33488.574
## 1457  29 female 31.160        0            no  badulla  3943.595
## 1331  43 female 34.400        3            no  colombo  8522.003
## 303   43   male 25.520        5            no   trinco 14478.330
## 898   19   male 20.425        0            no    galle  1625.434
## 190   46   male 38.170        2            no   trinco  8347.164
## 191   23 female 24.225        2            no  badulla 22395.744
## 446   48   male 37.290        2            no   trinco  8978.185
## 119   45   male 30.200        1            no  colombo  7441.053
## 817   39   male 42.655        0            no  badulla  5757.413
## 61    30   male 31.400        1            no  colombo  3659.346
## 1184  49   male 30.300        0            no  colombo  8116.680
## 930   30 female 19.950        3            no    galle  5693.431
## 950   49 female 41.470        4            no   trinco 10977.206
## 1265  56 female 28.595        0            no  badulla 11658.115
## 1360  26   male 27.265        3            no  badulla  4661.286
## 758   26   male 32.900        2           yes  colombo 33488.574
## 993   21   male 27.360        0            no  badulla  2104.113
## 947   53 female 22.880        1           yes   trinco 23244.790
## 690   49   male 36.850        0            no   trinco  8125.784
## 251   31   male 20.400        0            no  colombo  3260.199
## 560   42   male 28.310        3           yes    galle 32787.459
## 643   52   male 47.740        1            no   trinco  9748.911
## 545   60   male 32.800        0           yes  colombo 33488.574
## 1130  31 female 21.755        0            no    galle  4134.082
## 162   22 female 34.580        2            no  badulla  3925.758
## 576   51   male 39.700        1            no  colombo  9391.346
## 168   25   male 29.700        3           yes  colombo 19933.458
## 788   34 female 37.335        2            no    galle  5989.524
## 78    22   male 37.070        2           yes   trinco 33488.574
## 1121  18 female 36.850        0            no   trinco  1629.833
## 445   53   male 24.320        0            no    galle  9863.472
## 995   44   male 22.135        2            no  badulla  8302.536
## 95    18   male 21.470        0            no  badulla  1702.455
## 379   46   male 27.600        0            no  colombo 24603.048
## 221   22 female 34.580        2            no  badulla  3925.758
## 1145  26   male 33.915        1            no    galle  3292.530
## 620   51 female 20.600        0            no  colombo  9264.797
## 448   47 female 33.345        0            no  badulla 20878.784
## 242   43   male 34.960        1           yes  badulla 33488.574
## 927   59 female 35.200        0            no   trinco 12244.531
## 1367  37 female 47.600        2           yes  colombo 33488.574
## 926   22 female 34.580        2            no  badulla  3925.758
## 407   39 female 32.500        1            no  colombo  6238.298
## 229   20   male 27.930        0            no  badulla  1967.023
## 785   46   male 38.170        2            no   trinco  8347.164
## 699   45 female 33.100        0            no  colombo  7345.084
## 1267  25 female 24.300        3            no  colombo  4391.652
## 1245  23   male 32.560        0            no   trinco  1824.285
## 79    55   male 32.670        1            no   trinco 10807.486
## 237   57 female 28.700        0            no  colombo 11455.280
## 579   57   male 28.100        0            no  colombo 10965.446
```

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## 929   47 female 29.545        1            no    galle  8930.935
## 1217  22 female 28.820        0            no   trinco  2156.752
## 493   45   male 28.700        2            no  colombo  8027.968
## 730   43 female 26.885        0           yes    galle 21774.322
## 209   54 female 30.800        3            no  colombo 12105.320
## 1095  19   male 33.100        0            no  colombo 23082.955
## 693   33 female 24.310        0            no   trinco  4185.098
## 358   44 female 27.645        0            no    galle  7421.195
## 650   19   male 33.100        0            no  colombo 23082.955
## 877   23 female 23.180        2            no    galle 14426.074
## 1191  56   male 40.300        0            no  colombo 10602.385
## 1418  49 female 30.780        1            no  badulla  9778.347
## 904   36 female 19.855        0            no  badulla  5458.046
## 129   23   male 31.730        3           yes  badulla 33488.574
## 848   43 female 46.200        0           yes   trinco 33488.574
## 886   53 female 28.100        3            no  colombo 11741.726
## 450   34   male 25.270        1            no    galle  4894.753
## 232   21   male 25.700        4           yes  colombo 17942.106
## 334   51 female 40.660        0            no  badulla  9875.680
## 396   33 female 18.500        1            no  colombo  4766.022
## 1027  26   male 32.900        2           yes  colombo 33488.574
## 1450  46   male 38.170        2            no   trinco  8347.164
## 639   22   male 47.850        1           yes   trinco 33488.574
## 1019  22   male 34.800        3            no  colombo  3443.064
## 264   59   male 41.140        1           yes   trinco 33488.574
## 697   56   male 34.430        0            no   trinco 10594.226
## 201   21   male 25.700        4           yes  colombo 17942.106
## 52    46   male 42.350        3           yes   trinco 33488.574
## 225   48 female 32.300        2            no  badulla 10043.249
## 1381  39 female 31.920        2            no    galle  7209.492
## 1336  23 female 31.400        0           yes  colombo 33488.574
## 770   42 female 26.180        1            no   trinco  7046.722
## 577   38 female 27.835        2            no  badulla  7144.863
## 1297  31 female 25.740        0            no   trinco  3756.622
## 903   19 female 27.900        0           yes  colombo 16884.924
## 973   58 female 29.000        0            no  colombo 11842.442
## 1361  37 female 25.555        1           yes  badulla 20296.863
## 20    34   male 35.815        0            no    galle  4320.411
## 206   29   male 32.110        2            no    galle  4433.916
## 124   30   male 24.400        3           yes  colombo 18259.216
## 592   54   male 32.775        0            no  badulla 10435.065
## 1299  30 female 32.400        1            no  colombo  4149.736
## 740   45   male 30.360        0           yes   trinco 33488.574
## 45    19 female 36.575        0            no    galle  2136.882
## 332   19 female 17.800        0            no  colombo  1727.785
## 281   55 female 30.140        2            no   trinco 11881.970
## 91    52 female 33.300        2            no  colombo 10806.839
## 653   18   male 31.730        0           yes  badulla 33488.574
## 980   18   male 41.140        0            no   trinco  1146.797
## 138   58 female 31.825        2            no  badulla 13607.369
## 606   50   male 25.300        0            no   trinco  8442.667
## 1370  19   male 28.700        0            no  colombo  1253.936
## 425   20 female 28.975        0            no    galle  2257.475
## 780   28   male 23.800        2            no  colombo  3847.674
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## 1412  27   male 26.030        0            no  badulla  3070.809
## 839   39   male 24.510        2            no    galle  6710.192
## 271   19   male 25.555        1            no    galle  2221.564
## 595   44   male 34.320        1            no   trinco  7147.473
## 1223  52   male 32.205        3            no  badulla 11488.317
## 1410  48 female 41.230        4            no    galle 11033.662
## 167   19   male 20.425        0            no    galle  1625.434
## 499   57 female 25.740        2            no   trinco 12629.166
## 255   34   male 32.800        1            no  colombo 14358.364
## 1025  62   male 26.695        0           yes  badulla 28101.333
## 634   29   male 28.975        1            no  badulla  4040.558
## 1365  59   male 27.500        1            no  colombo 12333.828
## 902   24 female 30.210        3            no    galle  4618.080
## 71    32 female 28.930        0            no   trinco  3972.925
## 772   18 female 24.090        1            no   trinco  2201.097
## 1091  42   male 35.970        2            no   trinco  7160.330
## 1330  40   male 22.705        2            no  badulla  7173.360
## 776   23 female 42.750        1           yes  badulla 33488.574
## 437   62 female 30.495        2            no    galle 15019.760
## 1031  22   male 32.110        0            no    galle  2055.325
## 1324  49   male 31.350        1            no  badulla  9290.139
## 896   18   male 33.535        0           yes  badulla 33488.574
## 958   62   male 31.460        1            no   trinco 27000.985
## 750   56 female 35.800        1            no  colombo 11674.130
## 1272  47   male 28.215        3           yes    galle 24915.221
## 412   20 female 29.600        0            no  colombo  1875.344
## 1126  50 female 27.600        1           yes  colombo 24520.264
## 1342  27 female 30.400        3            no    galle 18804.752
## 673   37   male 30.875        3            no    galle  6796.863
## 628   33   male 35.750        1           yes   trinco 33488.574
## 46    27   male 33.155        2            no    galle  4058.712
## 1215  59 female 32.395        3            no  badulla 14590.632
## 531   44 female 27.500        1            no  colombo  7626.993
## 1461  34   male 35.815        0            no    galle  4320.411
## 1373  33 female 19.095        2           yes  badulla 16776.304
## 1452  60   male 39.900        0           yes  colombo 33488.574
## 220   60 female 24.530        0            no   trinco 12629.897
## 692   23 female 24.225        2            no  badulla 22395.744
## 222   34 female 30.210        1           yes    galle 33488.574
## 836   64 female 22.990        0           yes   trinco 27037.914
## 507   61   male 38.380        0            no    galle 12950.071
## 1458  53 female 23.750        2            no  badulla 11729.680
## 122   18 female 33.880        0            no   trinco 11482.635
## 331   33   male 35.245        0            no  badulla 12404.879
## 901   19   male 20.425        0            no    galle  1625.434
## 502   27 female 20.045        3           yes    galle 16420.495
## 484   54   male 33.630        1            no    galle 10825.254
## 787   44   male 39.520        0            no    galle  6948.701
## 1210  18   male 21.780        2            no   trinco 11884.049
## 743   58   male 30.305        0            no  badulla 11938.256
## 1252  24   male 29.300        0            no  colombo  1977.815
## 829   38 female 34.800        2            no  colombo  6571.544
## 1292  44 female 25.000        1            no  colombo  7623.518
## 169   54 female 35.815        3            no    galle 12495.291
```

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## 729   20 female 31.460        0            no   trinco  1877.929
## 1404  52   male 47.740        1            no   trinco  9748.911
## 561   57   male 40.370        0            no   trinco 10982.501
## 341   44 female 25.800        1            no  colombo  7624.630
## 1399  64 female 39.700        0            no  colombo 14319.031
## 320   54   male 31.600        0            no  colombo  9850.432
## 504   46 female 28.050        1            no   trinco  8233.097
## 1190  26   male 20.800        0            no  colombo  2302.300
## 2     49 female 41.470        4            no   trinco 10977.206
## 1015  44   male 25.365        1            no    galle  7518.025
## 786   18 female 40.280        0            no  badulla  2217.601
## 962   46   male 27.600        0            no  colombo 24603.048
## 1171  41   male 28.800        1            no  colombo  6282.235
## 111   30 female 19.950        3            no    galle  5693.431
## 855   40 female 28.690        3            no    galle  8059.679
## 1186  40 female 25.460        1            no  badulla  7077.189
## 1094  18 female 36.850        0           yes   trinco 33488.574
## 449   23   male 27.360        1            no    galle  2789.057
## 888   23   male 18.715        0            no    galle 21595.382
## 943   19   male 27.700        0           yes  colombo 16297.846
## 523   36 female 30.020        0            no    galle  5272.176
## 719   32   male 28.880        0            no    galle  3866.855
## 335   45   male 36.480        2           yes    galle 33488.574
## 56    46 female 27.720        1            no   trinco  8232.639
## 1266  50 female 25.600        0            no  colombo  8932.084
## 974   51   male 27.740        1            no  badulla  9957.722
## 207   37   male 37.070        1           yes   trinco 33488.574
## 436   62   male 30.875        3           yes    galle 33488.574
## 1259  56 female 35.800        1            no  colombo 11674.130
## 601   41   male 21.780        1            no   trinco  6272.477
## 1203  32 female 31.540        1            no  badulla  5148.553
## 387   46   male 39.425        1            no  badulla  8342.909
## 263   53 female 38.060        3            no   trinco 20462.998
## 68    46 female 33.725        1            no  badulla  8823.986
## 1207  55   male 35.245        1            no  badulla 11394.066
## 1173  21   male 31.020        0            no   trinco 16586.498
## 565   38 female 30.210        3            no    galle  7537.164
## 1311  18 female 40.280        0            no  badulla  2217.601
## 792   21   male 35.530        0            no   trinco  1532.470
## 742   22 female 21.280        3            no    galle  4296.271
## 1437  35 female 23.465        2            no  badulla  6402.291
## 835   31   male 36.300        2           yes  colombo 33488.574
## 964   34   male 35.815        0            no    galle  4320.411
## 586   58 female 32.395        1            no  badulla 13019.161
## 256   52 female 18.335        0            no    galle  9991.038
## 1228  18   male 34.430        0            no   trinco  1137.470
## 471   23 female 28.310        0           yes    galle 18033.968
## 88    61 female 31.160        0            no    galle 13429.035
## 416   44   male 34.320        1            no   trinco  7147.473
## 857   27 female 20.045        3           yes    galle 16420.495
## 1170  35   male 38.600        1            no  colombo  4762.329
## 1085  41   male 34.210        1            no   trinco  6289.755
## 1119  46   male 40.375        2            no    galle  8733.229
## 1460  18 female 33.880        0            no   trinco 11482.635
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## 700   53 female 36.860        3            yes    galle 33488.574
## 287   63 female 36.850        0             no   trinco 13887.969
## 842   49 female 23.845        3            yes  badulla 24106.913
## 685   43   male 30.100        1             no  colombo  6849.026
## 1320  38 female 27.600        0             no  colombo  5383.536
## 280   50 female 25.600        0             no  colombo  8932.084
## 512   43   male 26.030        0             no  badulla  6837.369
## 803   21 female 21.850        1            yes  badulla 15359.104
## 1043  31   male 39.490        1             no   trinco  3875.734
## 778   25   male 23.900        5             no  colombo  5080.096
## 972   19   male 29.070        0            yes    galle 17352.680
## 328   21   male 27.360        0             no  badulla  2104.113
## 172   35 female 34.105        3            yes    galle 33488.574
## 298   19 female 24.605        1             no    galle  2709.244
## 1280  34   male 34.210        0             no   trinco  3935.180
## 1455  45 female 28.600        2             no   trinco  8516.829
## 678   50   male 36.200        0             no  colombo  8457.818
## 529   55   male 28.975        0             no  badulla 10796.350
## 1279  52 female 46.750        5             no   trinco 12592.534
## 1462  51   male 35.970        1             no   trinco  9386.161
## 741   56   male 39.600        0             no  colombo 10601.412
## 365   49 female 34.770        1             no    galle  9583.893
## 591   18 female 24.090        1             no   trinco  2201.097
## 894   48   male 30.780        3             no  badulla 10141.136
## 227   18 female 30.115        0             no  badulla 21344.847
## 834   34   male 27.835        1            yes    galle 20009.634
## 838   34   male 27.000        2             no  colombo 11737.849
## 1127  19   male 30.590        0             no    galle  1639.563
## 1151  46 female 34.600        1            yes  colombo 33488.574
## 1177  57   male 27.940        1             no   trinco 11554.224
## 1300  26 female 29.920        2             no   trinco  3981.977
## 535   63 female 32.200        2            yes  colombo 33488.574
## 1179  46 female 30.800        3             no  colombo  9414.920
## 112   63   male 33.660        3             no   trinco 15161.534
## 1409  35   male 34.770        2             no    galle  5729.005
## 93    23   male 32.560        0             no   trinco  1824.285
## 489   23   male 47.850        1             no   trinco  2438.055
## 1348  37   male 37.070        1            yes   trinco 33488.574
## 631   56   male 31.790        2            yes   trinco 33488.574
## 1108  18 female 36.850        0             no   trinco  1629.833
## 482   59 female 23.655        0            yes    galle 25678.778
## 248   40 female 28.690        3             no    galle  8059.679
## 105   27   male 26.030        0             no  badulla  3070.809
## 171   33 female 28.270        1             no   trinco  4779.602
## 1046  25 female 22.515        1             no    galle  3594.171
## 1080  38 female 27.265        1             no  badulla  6555.070
## 1401  62 female 39.160        0             no   trinco 13470.804
## 312   22 female 27.100        0             no  colombo  2154.361
## 562   57 female 23.180        0             no    galle 11830.607
## 139   55 female 37.100        0             no  colombo 10713.644
## 1066  22 female 34.580        2             no  badulla  3925.758
## 481   32   male 37.335        1             no  badulla  4667.608
## 250   20   male 33.330        0             no   trinco  1391.529
## 883   33 female 18.500        1             no  colombo  4766.022
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## 1242  37 female 47.600        2            yes  colombo 33488.574
## 1414  45 female 35.815        0             no    galle  7731.858
## 1318  38   male 28.270        1             no   trinco  5484.467
## 1163  46 female 28.050        1             no   trinco  8233.097
## 1327  22   male 32.110        0             no    galle  2055.325
## 99    24 female 26.600        0             no  badulla  3046.062
## 98    32 female 33.155        3             no    galle  6128.797
## 58    30 female 33.330        1             no   trinco  4151.029
## 1383  34   male 25.270        1             no    galle  4894.753
## 525   53 female 37.430        1             no    galle 10959.695
## 976   21 female 25.800        0             no  colombo  2007.945
## 258   54   male 29.200        1             no  colombo 10436.096
## 635   33 female 33.500        0            yes  colombo 33488.574
## 262   39   male 34.100        2             no   trinco 23563.016
## 967   64 female 39.330        0             no  badulla 14901.517
## 851   43 female 34.580        1             no    galle  7727.253
## 992   45   male 28.700        2             no  colombo  8027.968
## 199   42 female 26.600        0            yes    galle 21348.706
## 1340  18 female 38.170        0             no   trinco  1631.668
## 823   22 female 34.580        2             no  badulla  3925.758
## 234   63   male 33.100        0             no  colombo 13393.756
## 799   63   male 41.470        0             no   trinco 13405.390
## 55    19   male 27.600        0             no  colombo  1252.407
## 1463  28 female 26.315        3             no    galle  5312.170
## 753   19 female 22.515        0             no    galle  2117.339
## 488   25 female 34.485        0             no    galle  3021.809
## 897   21 female 21.850        1            yes  badulla 15359.104
## 1309  24 female 27.600        0             no  colombo 18955.220
## 1035  21 female 35.720        0             no    galle  2404.734
## 1353  56   male 33.660        4             no   trinco 12949.155
## 1026  21   male 36.850        0             no   trinco  1534.304
## 1059  19   male 27.265        2             no    galle 22493.660
## 1251  19 female 28.300        0            yes  colombo 17081.080
## 1269  55   male 35.245        1             no  badulla 11394.066
## 74    46   male 25.745        3             no    galle  9301.894
## 913   47 female 36.000        1             no  colombo  8556.907
## 329   36   male 29.700        0             no   trinco  4399.731
## 1256  21 female 34.600        0             no  colombo  2020.177
## 339   21   male 31.255        0             no    galle  1909.527
## 884   46   male 25.800        5             no  colombo 10096.970
## 247   25   male 26.695        4             no    galle  4877.981
## 370   36 female 25.900        1             no  colombo  5472.449
## 530   31   male 36.300        2            yes  colombo 33488.574
## 44    49 female 29.925        0             no    galle  8988.159
## 533   18   male 21.780        2             no   trinco 11884.049
## 994   23   male 18.715        0             no    galle 21595.382
## 376   47 female 26.600        2             no  badulla  9715.841
## 1319  43 female 34.400        3             no  colombo  8522.003
## 837   38 female 30.690        1             no   trinco  5976.831
## 1321  21   male 22.300        1             no  colombo  2103.080
## 1040  41 female 33.060        2             no    galle  7749.156
## 194   44   male 34.320        1             no   trinco  7147.473
## 594   36 female 26.885        0             no    galle  5267.818
## 460   19 female 29.800        0             no  colombo  1744.465
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## 1056  54   male 40.565        3           yes  badulla 33488.574
## 77    60   male 32.800        0           yes  colombo 33488.574
## 1196  64 female 22.990        0           yes   trinco 27037.914
## 691   52 female 18.335        0            no    galle  9991.038
## 658   51   male 27.740        1            no  badulla  9957.722
## 266   38 female 30.210        3            no    galle  7537.164
## 713   58   male 30.305        0            no  badulla 11938.256
## 355   54   male 25.100        3           yes  colombo 25382.297
## 470   18 female 31.350        0            no   trinco  1622.188
## 959   18 female 33.155        0            no  badulla  2207.697
## 1395  57   male 42.130        1           yes   trinco 33488.574
## 1032  27   male 29.150        0           yes   trinco 18246.496
## 1255  60   male 24.320        1            no    galle 13112.605
## 380   50 female 46.090        1            no   trinco  9549.565
## 881   57   male 40.945        0            no  badulla 11566.301
## 5     36   male 28.880        3            no  badulla  6748.591
## 469   61 female 25.080        0            no   trinco 24513.091
## 1208  53 female 23.750        2            no  badulla 11729.680
## 612   48   male 31.445        1            no  badulla  8964.061
## 411   28 female 28.880        1            no  badulla  4337.735
## 1039  43 female 30.685        2            no    galle  8310.839
## 655   27 female 31.255        1            no    galle  3956.071
## 615   40   male 29.900        2            no  colombo  6600.361
## 1204  18 female 33.880        0            no   trinco 11482.635
## 391   60   male 29.640        0            no  badulla 12731.000
## 290   31   male 28.595        1            no    galle  4243.590
## 867   36 female 29.920        1            no   trinco  5478.037
## 466   52 female 24.860        0            no   trinco 27117.994
## 911   55   male 32.775        0            no    galle 10601.632
## 1230  30 female 39.050        3           yes   trinco 33488.574
## 1193  18 female 33.880        0            no   trinco 11482.635
## 1099  58 female 25.200        0            no  colombo 11837.160
## 647   40   male 22.705        2            no  badulla  7173.360
## 478   19 female 36.575        0            no    galle  2136.882
## 321   34 female 38.000        3            no  colombo  6196.448
## 9     53   male 21.400        1            no  colombo 10065.413
## 1333  48   male 37.290        2            no   trinco  8978.185
## 642   23 female 28.000        0            no  colombo 13126.677
## 708   36 female 30.020        0            no    galle  5272.176
## 1305  32   male 30.030        1            no   trinco  4074.454
## 148   53 female 22.880        1           yes   trinco 23244.790
## 651   52   male 38.600        2            no  colombo 10325.206
## 18    21   male 36.850        0            no   trinco  1534.304
## 1030  21 female 34.870        0            no   trinco  2020.552
## 1453  53 female 38.060        3            no   trinco 20462.998
## 1001  38   male 19.300        0           yes  colombo 15820.699
## 1200  35   male 36.670        1           yes  badulla 33488.574
## 383   33 female 38.900        3            no  colombo  5972.378
## 551   19   male 20.615        2            no    galle  2803.698
## 1357  48 female 27.360        1            no  badulla  9447.382
## 922   48 female 32.300        2            no  badulla 10043.249
## 845   60   male 29.640        0            no  badulla 12731.000
## 1396  24   male 25.800        0            no  colombo  1972.950
## 1055  61 female 44.000        0            no  colombo 13063.883
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## 161   47   male 36.190        0           yes   trinco 33488.574
## 421   31 female 21.755        0            no    galle  4134.082
## 444   51   male 25.400        0            no  colombo  8782.469
## 29    59 female 32.100        3            no  colombo 14007.222
## 812   23 female 28.120        0            no    galle  2690.114
## 1117  41 female 28.050        1            no   trinco  6770.193
## 1052  60 female 24.035        0            no    galle 13012.209
## 42    23 female 23.180        2            no    galle 14426.074
## 771   57   male 40.280        0            no  badulla 20709.020
## 224   43   male 25.520        5            no   trinco 14478.330
## 804   21   male 27.360        0            no  badulla  2104.113
## 1097  39   male 29.925        1           yes  badulla 22462.044
## 352   41 female 31.635        1            no  badulla  7358.176
## 1429  47 female 23.600        1            no  colombo  8539.671
## 683   23   male 34.400        0            no  colombo  1826.843
## 451   18 female 38.280        0            no   trinco 14133.038
## 899   44   male 21.850        3            no  badulla  8891.139
## 1189  54   male 25.460        1            no  badulla 25517.114
## 401   33 female 18.500        1            no  colombo  4766.022
## 1406  55 female 30.500        0            no  colombo 10704.470
## 611   50 female 28.120        3            no    galle 11085.587
## 654   45 female 27.645        1            no    galle 28340.189
## 996   23   male 32.700        3            no  colombo  3591.480
## 375   19   male 30.400        0            no  colombo  1256.299
## 760   22   male 28.880        0            no  badulla  2250.835
## 1201  25 female 20.800        1            no  colombo  3208.787
## 863   48 female 31.130        0            no   trinco  8280.623
## 520   19 female 25.745        1            no    galle  2710.829
## 782   18 female 38.280        0            no   trinco  1631.821
## 977   23 female 39.270        2            no   trinco  3500.612
## 86    19 female 28.880        0           yes    galle 17748.506
## 434   27   male 23.100        0            no   trinco  2483.736
## 17    50   male 27.455        1            no  badulla  9617.662
## 649   51   male 33.330        3            no   trinco 10560.492
## 1250  19 female 21.700        0           yes  colombo 13844.506
## 485   28   male 23.980        3           yes   trinco 17663.144
## 887   35 female 34.800        1            no  colombo  5246.047
## 921   32 female 29.735        0            no    galle  4357.044
## 1290  27 female 17.955        2           yes  badulla 15006.579
## 656   58 female 29.000        0            no  colombo 11842.442
## 474   26   male 32.900        2           yes  colombo 33488.574
## 790   31   male 29.810        0           yes   trinco 19350.369
## 35    26   male 46.530        1            no   trinco  2927.065
## 538   18 female 42.240        0           yes   trinco 33488.574
## 36    31 female 32.775        2            no    galle  5327.400
## 503   32   male 30.030        1            no   trinco  4074.454
## 1281  58   male 34.865        0            no  badulla 11944.594
## 28    42 female 41.325        1            no  badulla  7650.774
## 310   24   male 31.065        0           yes  badulla 33488.574
## 1421  18   male 35.200        1            no   trinco  1727.540
## 285   64   male 37.905        0            no    galle 14210.536
## 720   57 female 31.825        0            no    galle 11842.624
## 833   21   male 31.100        0            no  colombo  1526.312
## 269   38 female 30.210        3            no    galle  7537.164
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## 372   35   male 34.320        3            no   trinco  5934.380
## 517   26   male 32.490        1            no  badulla  3490.549
## 1198  55 female 25.365        3            no  badulla 13047.332
## 759   36   male 28.880        3            no  badulla  6748.591
## 764   50   male 25.365        2            no    galle 30284.643
## 716   23   male 34.400        0            no  colombo  1826.843
## 584   18   male 31.730        0           yes  badulla 33488.574
## 126   35   male 36.670        1           yes  badulla 33488.574
## 1351  36 female 26.885        0            no    galle  5267.818
## 152   25 female 42.130        1            no   trinco  3238.436
## 75    32   male 28.930        1           yes   trinco 19719.695
## 800   38 female 27.600        0            no  colombo  5383.536
## 982   41 female 32.600        3            no  colombo  7954.517
## 1382  18 female 33.155        0            no  badulla  2207.697
## 304   64 female 31.825        2            no  badulla 16069.085
## 676   30   male 35.530        0           yes   trinco 33488.574
## 1036  20   male 33.330        0            no   trinco  1391.529
## 100   30 female 27.930        0            no  badulla  4137.523
## 25    27   male 30.500        0            no  colombo  2494.022
## 640   19 female 28.310        0           yes    galle 17468.984
## 180   46 female 30.800        3            no  colombo  9414.920
## 293   18   male 43.010        0            no   trinco  1149.396
## 1261  24   male 31.065        0           yes  badulla 33488.574
## 1447  45 female 30.495        1           yes    galle 33488.574
## 547   22   male 31.730        0            no  badulla  2254.797
## 343   51   male 33.330        3            no   trinco 10560.492
## 915   54 female 31.240        0            no   trinco 10338.932
## 955   34   male 32.800        1            no  colombo 14358.364
## 433   61   male 43.400        0            no  colombo 12574.049
## 1393  36   male 31.500        0            no  colombo  4402.233
## 366   44 female 27.500        1            no  colombo  7626.993
## 1402  18   male 29.370        1            no   trinco  1719.436
## 1306  63 female 25.080        0            no    galle 14254.608
## 1004  19   male 25.555        1            no    galle  2221.564
## 869   64 female 35.970        0            no   trinco 14313.846
## 978   18 female 36.850        0            no   trinco  1629.833
## 1338  61 female 21.090        0            no    galle 13415.038
## 681   47 female 24.320        0            no  badulla  8534.672
## 916   28   male 30.875        0            no    galle  3062.508
## 215   24   male 28.500        0           yes  badulla 33488.574
## 103   40 female 28.690        3            no    galle  8059.679
## 1058  39   male 26.410        0           yes  badulla 20149.323
## 400   21   male 31.020        0            no   trinco 16586.498
## 914   39   male 35.300        2           yes  colombo 33488.574
## 1053  38 female 28.000        3            no  colombo  7151.092
## 158   27 female 21.470        0            no    galle  3353.470
## 156   55 female 29.830        0            no  badulla 11286.539
## 613   23   male 31.730        3           yes  badulla 33488.574
## 286   32 female 24.600        0           yes  colombo 17496.306
## 423   24   male 25.800        0            no  colombo  1972.950
## 1136  48 female 27.265        1            no  badulla  9447.250
## 430   29   male 29.640        1            no  badulla 20277.808
## 1071  28   male 35.435        0            no  badulla  3268.847
## 1061  34 female 26.410        1            no    galle  5385.338
```

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## 540   19 female 32.490        0           yes    galle 33488.574
## 385   54 female 32.300        1            no  badulla 11512.405
## 1068  62 female 29.920        0            no   trinco 13457.961
## 624   38 female 28.930        1            no   trinco  5974.385
## 1316  19 female 28.300        0           yes  colombo 17081.080
## 164   41 female 37.100        2            no  colombo  7371.772
## 600   22 female 24.300        0            no  colombo  2150.469
## 900   51 female 33.915        0            no  badulla  9866.305
## 948   26   male 35.420        0            no   trinco  2322.622
## 174   58   male 36.080        0            no   trinco 11363.283
## 675   27 female 23.210        1            no   trinco  3561.889
## 1385  32 female 17.765        2           yes    galle 32734.186
## 420   61   male 38.380        0            no    galle 12950.071
## 1022  19 female 39.615        1            no    galle  2730.108
## 515   28 female 26.510        2            no   trinco  4340.441
## 1024  21   male 25.700        4           yes  colombo 17942.106
## 880   51 female 36.385        3            no    galle 11436.738
## 51    18   male 43.010        0            no   trinco  1149.396
## 1328  31 female 32.680        1            no    galle  4738.268
## 230   21   male 31.020        0            no   trinco 16586.498
## 694   18   male 34.430        0            no   trinco  1137.470
## 223   18 female 42.240        0           yes   trinco 33488.574
## 145   32 female 29.800        2            no  colombo  5152.134
## 1218  19 female 28.600        5            no  colombo  4687.797
## 975   49 female 41.470        4            no   trinco 10977.206
## 318   64   male 26.410        0            no  badulla 14394.558
## 419   57 female 29.810        0           yes   trinco 27533.913
## 669   61 female 44.000        0            no  colombo 13063.883
## 143   25   male 25.740        0            no   trinco  2137.654
## 623   30   male 27.645        1            no  badulla  4237.127
## 542   38 female 28.000        3            no  colombo  7151.092
## 1195  19   male 29.070        0           yes    galle 17352.680
## 130   19   male 34.100        0            no  colombo  1261.442
## 208   23   male 37.100        3            no  colombo  3597.596
## 731   57 female 23.980        1            no   trinco 22192.437
## 766   29   male 22.515        3            no  badulla  5209.579
## 1122  45 female 30.495        1           yes    galle 33488.574
## 275   60 female 35.100        0            no  colombo 12644.589
## 629   19   male 33.100        0            no  colombo 23082.955
## 197   50 female 27.830        3            no   trinco 19749.383
## 487   53 female 28.100        3            no  colombo 11741.726
## 1440  25   male 25.840        1            no  badulla  3309.793
## 925   58   male 36.955        2           yes    galle 33488.574
## 664   38   male 16.815        2            no  badulla  6640.545
## 1240  35   male 24.130        1            no    galle  5125.216
## 1125  56 female 28.785        0            no  badulla 11658.379
## 882   51   male 32.300        1            no  badulla  9964.060
## 327   49   male 29.830        1            no  badulla  9288.027
## 1096  30 female 27.930        0            no  badulla  4137.523
## 572   52   male 34.100        0            no   trinco  9140.951
## 1298  48   male 30.200        2            no  colombo  8968.330
## 1391  58   male 47.850        0            no   trinco 11381.325
## 703   36   male 33.400        2           yes  colombo 33488.574
## 1307  61 female 22.040        0            no  badulla 13616.359
```

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## 240   61   male 38.380        0            no    galle 12950.071
## 725   47 female 32.000        1            no  colombo  8551.347
## 830   59   male 37.100        1            no  colombo 12347.172
## 1087  21   male 28.975        0            no    galle  1906.358
## 1405  33 female 39.820        1            no   trinco  4795.657
## 536   52 female 37.400        0            no  colombo  9634.538
## 607   49 female 41.470        4            no   trinco 10977.206
## 367   47   male 47.520        1            no   trinco  8083.920
## 998   31   male 36.300        2           yes  colombo 33488.574
## 684   23 female 24.225        2            no  badulla 22395.744
## 906   48 female 22.800        0            no  colombo  8269.044
## 239   55 female 30.500        0            no  colombo 10704.470
## 432   50 female 27.830        3            no   trinco 19749.383
## 1371  57 female 22.230        0            no  badulla 12029.287
## 1229  47 female 29.545        1            no    galle  8930.935
## 1347  64 female 31.300        2           yes  colombo 33488.574
## 1187  28   male 33.000        3            no   trinco  4449.462
## 630   44 female 26.410        0            no    galle  7419.478
## 1264  29   male 28.975        1            no  badulla  4040.558
## 1271  22   male 34.800        3            no  colombo  3443.064
## 616   62 female 31.730        0            no  badulla 14043.477
## 695   27 female 34.800        1            no  colombo  3577.999
## 1212  55 female 37.100        0            no  colombo 10713.644
## 1090  44 female 38.950        0           yes    galle 33488.574
## 1343  60 female 25.840        0            no    galle 28923.137
## 96    32 female 44.220        0            no   trinco  3994.178
## 467   58   male 32.010        1            no   trinco 11946.626
## 1194  32 female 41.100        0            no  colombo  3989.841
## 1236  54   male 24.035        0            no  badulla 10422.917
## 382   46   male 27.600        0            no  colombo 24603.048
## 159   59 female 27.720        3            no   trinco 14001.134
## 289   26 female 29.920        1            no   trinco  3392.977
## 336   51   male 23.210        1           yes   trinco 22218.115
## 1415  20   male 30.115        5            no  badulla  4915.060
## 1464  25   male 23.900        5            no  colombo  5080.096
## 133   45 female 27.645        1            no    galle 28340.189
## 1101  19   male 30.590        0            no    galle  1639.563
## 202   25 female 26.790        2            no    galle  4189.113
## 1275  29   male 37.290        2            no   trinco  4058.116
## 728   30 female 23.655        3           yes    galle 18765.875
## 1114  57   male 40.370        0            no   trinco 10982.501
## 893   53 female 26.600        0            no    galle 10355.641
## 1446  41 female 21.755        1            no  badulla 13725.472
## 1073  36 female 26.885        0            no    galle  5267.818
## 144   18   male 39.140        0            no  badulla 12890.058
## 1086  27 female 23.210        1            no   trinco  3561.889
## 252   25 female 26.790        2            no    galle  4189.113
## 632   49   male 36.850        0            no   trinco  8125.784
## 1454  36   male 41.895        3           yes  badulla 33488.574
## 89    64 female 32.965        0            no    galle 14692.669
## 462   52 female 33.300        2            no  colombo 10806.839
## 1049  41 female 28.050        1            no   trinco  6770.193
## 302   44   male 21.850        3            no  badulla  8891.139
## 345   30   male 31.400        1            no  colombo  3659.346
```

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## 1392  32   male 33.630        1           yes  badulla 33488.574
## 825   19   male 19.800        0            no  colombo  1241.565
## 939   29 female 35.530        0            no   trinco  3366.670
## 244   62   male 39.930        0            no   trinco 12982.875
## 1000  48 female 25.850        3           yes   trinco 24180.933
## 745   46 female 23.655        1           yes    galle 21677.283
## 142   58   male 47.850        0            no   trinco 11381.325
## 501   25   male 26.800        3            no  colombo  3906.127
## 1205  34   male 22.420        2            no  badulla 27375.905
## 885   48 female 33.330        0            no   trinco  8283.681
## 868   50   male 25.300        0            no   trinco  8442.667
## 4     57   male 34.010        0            no    galle 11356.661
## 1444  49 female 22.610        1            no    galle  9566.991
## 1249  52 female 37.525        2            no    galle 33471.972
## 210   18 female 32.120        2            no   trinco  2801.259
## 1286  18 female 40.280        0            no  badulla  2217.601
## 12    42 female 41.325        1            no  badulla  7650.774
## 128   47 female 27.645        2           yes    galle 24535.699
## 532   38   male 38.390        3           yes   trinco 33488.574
## 1150  22 female 39.805        0            no  badulla  2755.021
## 587   37 female 29.500        2            no  colombo  6311.952
## 1133  28   male 38.060        0            no   trinco  2689.495
## 704   60   male 39.900        0           yes  colombo 33488.574
## 563   36 female 30.020        0            no    galle  5272.176
## 1287  39 female 34.100        3            no  colombo  7418.522
## 1439  43 female 34.580        1            no    galle  7727.253
## 1344  29   male 37.290        2            no   trinco  4058.116
## 389   19 female 25.745        1            no    galle  2710.829
## 751   35   male 36.670        1           yes  badulla 33488.574
## 1020  35   male 17.860        1            no    galle  5116.500
## 32    22 female 21.280        3            no    galle  4296.271
## 748   61 female 22.040        0            no  badulla 13616.359
## 1181  60 female 28.700        1            no  colombo 13224.693
## 1283  53 female 38.060        3            no   trinco 20462.998
## 305   57 female 28.785        4            no  badulla 14394.398
## 496   51   male 33.330        3            no   trinco 10560.492
## 307   26 female 42.400        1            no  colombo  3410.324
## 1465  46   male 25.800        5            no  colombo 10096.970
## 410   42   male 26.070        1           yes   trinco 33488.574
## 604   32 female 33.155        3            no    galle  6128.797
## 641   53 female 37.430        1            no    galle 10959.695
## 918   19 female 24.510        1            no    galle  2709.112
## 1335  49 female 23.845        3           yes  badulla 24106.913
## 783   29   male 37.290        2            no   trinco  4058.116
## 1356  41   male 32.200        2            no  colombo  6875.961
## 1231  21   male 26.030        0            no  badulla  2102.265
## 1     44 female 20.235        1           yes  badulla 19594.810
## 472   50 female 27.360        0            no  badulla 25656.575
## 350   29   male 31.730        2            no    galle  4433.388
## 645   18 female 42.240        0           yes   trinco 33488.574
## 1003  36   male 33.820        1            no    galle  5377.458
## 7     55   male 28.975        0            no  badulla 10796.350
## 559   31 female 25.740        0            no   trinco  3756.622
## 394   57 female 28.700        0            no  colombo 11455.280
```

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## 892   50 female 31.600        2            no  colombo 10118.424
## 805   58 female 28.215        0            no    galle 12224.351
## 1175  40 female 29.810        1            no   trinco  6500.236
## 968   63   male 33.660        3            no   trinco 15161.534
## 1083  27 female 31.400        0           yes  colombo 33488.574
## 828   19   male 25.175        0            no    galle  1632.036
## 970   54 female 24.605        3            no    galle 12479.709
## 406   53 female 32.300        2            no  badulla 29186.482
## 853   42 female 33.155        1            no  badulla  7639.417
## 954   30   male 38.830        1            no   trinco 18963.172
## 1077  58 female 36.480        0            no    galle 12235.839
## 1436  29   male 37.290        2            no   trinco  4058.116
## 971   25 female 24.300        3            no  colombo  4391.652
## 1082  21 female 22.135        0            no  badulla  2585.851
## 521   50 female 27.600        1           yes  colombo 24520.264
## 1070  59 female 32.395        3            no  badulla 14590.632
## 963   30   male 38.830        1            no   trinco 18963.172
## 1325  53 female 32.300        2            no  badulla 29186.482
## 567   23 female 23.180        2            no    galle 14426.074
## 1155  18 female 40.185        0            no  badulla  2217.469
## 1169  31   male 34.390        3           yes    galle 33488.574
## 253   32 female 44.220        0            no   trinco  3994.178
## 1441  42 female 32.870        0            no  badulla  7050.021
## 110   49 female 22.610        1            no    galle  9566.991
## 435   19   male 34.800        0           yes  colombo 33488.574
## 429   36   male 35.200        1           yes   trinco 33488.574
## 274   42 female 23.370        0           yes  badulla 19964.746
## 1069  45 female 25.700        3            no  colombo  9101.798
## 1185  57   male 23.700        0            no  colombo 10959.330
## 363   51   male 24.795        2           yes    galle 23967.383
## 440   50   male 37.070        1            no   trinco  9048.027
## 1451  19 female 22.515        0            no    galle  2117.339
## 1197  24 female 25.270        0            no  badulla  3044.213
## 841   20 female 31.460        0            no   trinco  1877.929
## 718   23 female 34.960        3            no    galle  4466.621
## 1435  62   male 32.110        0            no  badulla 13555.005
## 1206  24   male 28.500        0           yes  badulla 33488.574
## 295   52 female 38.380        2            no  badulla 11396.900
## 1326  43   male 23.200        0            no  colombo  6250.435
## 1432  62   male 30.875        3           yes    galle 33488.574
## 353   48 female 33.110        0           yes   trinco 33488.574
## 1166  29   male 29.640        1            no  badulla 20277.808
## 511   31   male 28.595        1            no    galle  4243.590
## 346   55   male 33.880        3            no   trinco 11987.168
## 453   45 female 27.645        1            no    galle 28340.189
## 727   38   male 29.260        2            no    galle  6457.843
## 198   21   male 22.300        1            no  colombo  2103.080
## 54    42 female 24.985        2            no    galle  8017.061
## 832   41   male 34.200        2            no    galle  7261.741
## 498   31 female 25.740        0            no   trinco  3756.622
## 73    47   male 32.300        1            no  colombo  8062.764
## 689   51 female 18.050        0            no    galle  9644.253
## 1065  38   male 34.700        2            no  colombo  6082.405
## 175   57   male 27.940        1            no   trinco 11554.224
```

```
## 114   32   male 37.335        1            no  badulla  4667.608
## 1339  62 female 30.495        2            no    galle 15019.760
## 546   52 female 18.335        0            no    galle  9991.038
## 267   29 female 20.235        2            no    galle  4906.410
## 849   33   male 27.100        1           yes  colombo 19040.876
## 1374  53 female 38.060        3            no   trinco 20462.998
## 1469  58   male 35.700        0            no  colombo 11362.755
## 491   50   male 30.970        3            no    galle 10600.548
## 1067  30 female 30.900        3            no  colombo  5325.651
## 811   48 female 27.930        4            no    galle 11015.175
## 408   28   male 33.820        0            no    galle 19673.336
## 92    40 female 28.120        1           yes  badulla 22331.567
## 1048  31   male 29.810        0           yes   trinco 19350.369
## 1111  62   male 21.400        0            no  colombo 12957.118
## 580   18 female 32.120        2            no   trinco  2801.259
## 63    47 female 24.320        0            no  badulla  8534.672
## 356   29   male 28.975        1            no  badulla  4040.558
## 1037  45   male 30.495        2            no    galle  8413.463
## 795   63 female 37.700        0           yes  colombo 33488.574
## 1123  47   male 28.215        3           yes    galle 24915.221
## 231   26   male 23.700        2            no  colombo  3484.331
## 228   28 female 37.620        1            no   trinco  3766.884
## 1104  54 female 31.900        1            no   trinco 10928.849
## 556   18   male 39.140        0            no  badulla 12890.058
## 1050  28   male 38.060        0            no   trinco  2689.495
## 702   41   male 34.210        1            no   trinco  6289.755
## 1131  19   male 30.590        0            no    galle  1639.563
## 1337  26   male 27.265        3            no  badulla  4661.286
## 1045  39   male 24.510        2            no    galle  6710.192
## 746   45 female 35.815        0            no    galle  7731.858
## 1028  46   male 19.855        0            no    galle  7526.706
## 1062  42   male 26.315        1            no    galle  6940.910
## 107   19 female 25.745        1            no    galle  2710.829
## 949   51 female 20.600        0            no  colombo  9264.797
## 1301  48 female 27.930        4            no    galle 11015.175
## 483   52 female 44.700        3            no  colombo 11411.685
## 717   46   male 24.795        3            no  badulla  9500.573
## 60    30   male 27.645        1            no  badulla  4237.127
## 203   50   male 25.300        0            no   trinco  8442.667
## 506   38 female 30.690        1            no   trinco  5976.831
## 674   18   male 33.535        0           yes  badulla 33488.574
## 1007  19   male 20.425        0            no    galle  1625.434
## 966   26   male 31.065        0            no    galle  2699.568
## 999   40   male 34.105        1            no  badulla  6600.206
## 428   57 female 25.740        2            no   trinco 12629.166
## 1278  58   male 32.010        1            no   trinco 11946.626
## 1152  64 female 39.330        0            no  badulla 14901.517
## 1263  52 female 33.300        2            no  colombo 10806.839
## 773   25   male 30.590        0            no  badulla  2727.395
## 570   61   male 36.300        1           yes  colombo 33488.574
## 818   49 female 36.630        3            no   trinco 10381.479
## 819   26   male 35.420        0            no   trinco  2322.622
## 33    60 female 28.700        1            no  colombo 13224.693
## 826   52 female 18.335        0            no    galle  9991.038
```

```
## 1273  59 female 35.200        0             no   trinco 12244.531
## 864   36 female 25.900        1             no  colombo  5472.449
## 342   34 female 30.210        1            yes    galle 33488.574
## 1260  56   male 19.950        0            yes  badulla 22412.648
## 1425  28 female 25.800        0             no  colombo  3161.454
## 102   32 female 44.220        0             no   trinco  3994.178
## 871   48   male 36.670        1             no    galle 28468.919
## 1214  26   male 27.265        3             no  badulla  4661.286
## 131   44 female 27.645        0             no    galle  7421.195
## 1442  20 female 30.590        0             no  badulla  2459.720
## 21    49 female 22.610        1             no    galle  9566.991
## 1358  49 female 21.300        1             no  colombo  9182.170
## 418   42   male 35.800        2             no  colombo  7160.094
## 659   46 female 33.725        1             no  badulla  8823.986
## 154   28   male 38.060        0             no   trinco  2689.495
## 941   40   male 25.080        0             no   trinco  5415.661
## 1416  63   male 21.660        1             no    galle 14349.854
## 1192  33 female 24.310        0             no   trinco  4185.098
## 1386  60   male 31.350        3            yes    galle 33488.574
## 1312  60 female 32.450        0            yes   trinco 33488.574
## 1162  52 female 31.730        2             no    galle 11187.657
## 1377  33   male 35.750        1            yes   trinco 33488.574
## 249   45 female 38.285        0             no  badulla  7935.291
## 1225  18 female 26.315        0             no  badulla  2198.190
## 813   31   male 36.300        2            yes  colombo 33488.574
## 553   18   male 25.460        0             no  badulla  1708.001
## 543   23 female 28.120        0             no    galle  2690.114
## 514   39   male 26.220        1             no    galle  6123.569
## 763   41   male 35.750        1            yes   trinco 33488.574
## 734   57   male 33.630        1             no    galle 11945.133
## 997   37 female 27.740        3             no    galle  7281.506
## 984   42 female 33.155        1             no  badulla  7639.417
## 809   46   male 22.300        0             no  colombo  7147.105
```

```
test_df
```

```
##      age gender    bmi num_kids smoking_status district   premium
## 3     29   male 35.500        2            yes  colombo 33488.574
## 14    37   male 36.190        0             no   trinco 19214.706
## 15    51   male 37.000        0             no  colombo  8798.593
## 22    51   male 42.900        2            yes   trinco 33488.574
## 23    51 female 40.660        0             no  badulla  9875.680
## 27    46 female 23.655        1            yes    galle 21677.283
## 30    57 female 22.230        0             no  badulla 12029.287
## 43    35 female 28.025        0            yes    galle 20234.855
## 47    55   male 35.245        1             no  badulla 11394.066
## 50    19   male 17.480        0             no    galle  1621.340
## 53    52   male 33.250        0             no  badulla  9722.770
## 57    47   male 28.215        4             no  badulla 10407.086
## 59    33   male 24.795        0            yes  badulla 17904.527
## 62    40   male 29.900        2             no  colombo  6600.361
## 65    46 female 33.725        1             no  badulla  8823.986
## 66    21   male 36.850        0             no   trinco  1534.304
## 70    41   male 34.210        1             no   trinco  6289.755
```

```
## 82    64 female 35.970        0            no   trinco 14313.846
## 85    18 female 35.625        0            no  badulla  2211.131
## 87    34   male 21.375        0            no  badulla  4500.339
## 97    20   male 32.395        1            no    galle  2362.229
## 101   52 female 46.750        5            no   trinco 12592.534
## 104   51 female 39.500        1            no  colombo  9880.068
## 109   19   male 24.600        1            no  colombo  1837.237
## 113   29   male 27.940        0            no   trinco  2867.120
## 116   18 female 35.625        0            no  badulla  2211.131
## 118   34 female 23.560        0            no  badulla  4992.376
## 123   29 female 35.530        0            no   trinco  3366.670
## 125   18 female 30.115        0            no  badulla  2203.472
## 132   18 female 30.305        0            no  badulla  2203.736
## 135   51   male 33.330        3            no   trinco 10560.492
## 136   30 female 32.400        1            no  colombo  4149.736
## 140   23 female 32.780        2           yes   trinco 33488.574
## 146   29   male 22.895        0           yes  badulla 16138.762
## 147   25 female 34.485        0            no    galle  3021.809
## 149   63 female 23.085        0            no  badulla 14451.835
## 150   40   male 19.800        1           yes   trinco 17179.522
## 157   34   male 32.800        1            no  colombo 14358.364
## 173   50 female 27.600        1           yes  colombo 24520.264
## 176   22   male 31.730        0            no  badulla  2254.797
## 181   58 female 39.050        0            no   trinco 11856.412
## 182   19 female 39.615        1            no    galle  2730.108
## 183   26   male 31.065        0            no    galle  2699.568
## 184   49   male 36.850        0            no   trinco  8125.784
## 187   47   male 28.215        4            no  badulla 10407.086
## 188   30   male 28.690        3           yes    galle 20745.989
## 192   19   male 20.700        0            no  colombo  1242.816
## 213   25   male 45.540        2           yes   trinco 33488.574
## 214   48   male 35.625        4            no  badulla 10736.871
## 216   60 female 32.450        0           yes   trinco 33488.574
## 219   38 female 34.800        2            no  colombo  6571.544
## 226   23   male 27.360        1            no    galle  2789.057
## 233   27   male 45.900        2            no  colombo  3693.428
## 245   20   male 33.330        0            no   trinco  1391.529
## 246   30 female 28.405        1            no    galle  4527.183
## 254   45   male 28.700        2            no  colombo  8027.968
## 257   18 female 29.165        0            no  badulla  7323.735
## 260   24 female 39.490        0            no   trinco  2480.979
## 268   60   male 28.595        0            no  badulla 30259.996
## 272   39 female 34.100        3            no  colombo  7418.522
## 273   61 female 35.910        0            no  badulla 13635.638
## 276   45 female 39.995        3            no  badulla  9704.668
## 283   30 female 32.400        1            no  colombo  4149.736
## 284   38 female 28.930        1            no   trinco  5974.385
## 288   25 female 34.485        0            no    galle  3021.809
## 296   28 female 37.620        1            no   trinco  3766.884
## 299   45   male 24.035        2            no  badulla  8604.484
## 300   53   male 36.600        3            no  colombo 11264.541
## 301   44 female 25.000        1            no  colombo  7623.518
## 306   24 female 27.720        0            no   trinco  2464.619
## 308   49 female 27.100        1            no  colombo 26140.360
```

```
## 313   28   male 26.980        2            no  badulla  4435.094
## 314   64 female 22.990        0           yes   trinco 27037.914
## 317   18   male 30.140        0            no   trinco  1131.507
## 322   53   male 24.320        0            no    galle  9863.472
## 324   23 female 24.225        2            no  badulla 22395.744
## 325   57 female 34.295        2            no  badulla 13224.057
## 333   38   male 28.025        1            no  badulla  6067.127
## 338   51 female 21.560        1            no   trinco  9855.131
## 340   49 female 23.845        3           yes  badulla 24106.913
## 351   55 female 32.775        2            no    galle 12268.632
## 354   34 female 33.700        1            no  colombo  5012.471
## 359   18   male 47.850        0            no   trinco  1163.463
## 360   23   male 17.385        1            no    galle  2775.192
## 361   29   male 29.735        2            no    galle 18157.876
## 362   45   male 36.480        2           yes    galle 33488.574
## 364   37 female 30.800        2            no   trinco  6313.759
## 368   50 female 27.360        0            no  badulla 25656.575
## 369   54   male 25.460        1            no  badulla 25517.114
## 371   26 female 34.200        2            no  colombo  3987.926
## 377   36   male 41.895        3           yes  badulla 33488.574
## 388   42 female 29.000        1            no  colombo  7050.642
## 390   25 female 24.300        3            no  colombo  4391.652
## 395   31   male 27.645        2            no  badulla  5031.270
## 399   19 female 39.615        1            no    galle  2730.108
## 404   33 female 28.270        1            no   trinco  4779.602
## 405   60 female 18.335        0            no  badulla 13204.286
## 414   22 female 21.280        3            no    galle  4296.271
## 417   18   male 33.770        1            no   trinco  1725.552
## 427   53 female 38.060        3            no   trinco 20462.998
## 438   57   male 23.700        0            no  colombo 10959.330
## 439   38   male 28.025        1            no  badulla  6067.127
## 442   31   male 20.400        0            no  colombo  3260.199
## 443   26 female 42.400        1            no  colombo  3410.324
## 454   28 female 25.800        0            no  colombo  3161.454
## 465   27   male 33.660        0            no   trinco  2498.414
## 476   23 female 33.400        0            no  colombo 10795.937
## 486   37   male 46.530        3            no   trinco  6435.624
## 492   63   male 41.325        3            no    galle 15555.189
## 495   22 female 36.000        0            no  colombo  2166.732
## 497   45 female 33.100        0            no  colombo  7345.084
## 505   19 female 30.590        2            no    galle 24059.680
## 509   30   male 22.990        2           yes    galle 17361.766
## 510   50 female 27.600        1           yes  colombo 24520.264
## 513   62 female 32.965        3            no    galle 15612.193
## 518   61 female 35.910        0            no  badulla 13635.638
## 527   28 female 23.845        2            no    galle  4719.737
## 550   21   male 26.030        0            no  badulla  2102.265
## 552   40 female 27.400        1            no  colombo  6496.886
## 558   52   male 33.250        0            no  badulla  9722.770
## 568   47 female 24.100        1            no  colombo 26236.580
## 569   38 female 27.835        2            no  badulla  7144.863
## 571   33   male 27.100        1           yes  colombo 19040.876
## 573   27 female 20.045        3           yes    galle 16420.495
## 574   56 female 25.300        0            no  colombo 11070.535
```

```
## 575   51   male 39.700        1            no  colombo  9391.346
## 582   64 female 31.825        2            no  badulla 16069.085
## 583   56 female 28.785        0            no  badulla 11658.379
## 585   30 female 28.380        1           yes   trinco 19521.968
## 590   62   male 30.875        3           yes    galle 33488.574
## 596   33   male 29.400        4            no  colombo  6059.173
## 603   59   male 26.400        0            no   trinco 11743.299
## 609   61   male 23.655        0            no  badulla 13129.603
## 614   32   male 35.200        2            no  colombo  4670.640
## 621   47 female 32.000        1            no  colombo  8551.347
## 636   54   male 39.600        1            no  colombo 10450.552
## 638   18 female 39.820        0            no   trinco  1633.962
## 644   19   male 36.955        0           yes    galle 33488.574
## 652   64 female 22.990        0           yes   trinco 27037.914
## 661   20   male 28.025        1           yes    galle 17560.380
## 662   25   male 27.550        0            no    galle  2523.169
## 663   23 female 28.490        1           yes   trinco 18328.238
## 687   31   male 39.490        1            no   trinco  3875.734
## 701   34 female 33.250        1            no  badulla  5594.846
## 705   24   male 29.300        0            no  colombo  1977.815
## 707   39   male 29.600        4            no  colombo  7512.267
## 715   19   male 30.400        0            no  colombo  1256.299
## 721   26   male 30.875        2            no    galle  3877.304
## 723   61 female 29.070        0           yes    galle 29141.360
## 732   18   male 30.400        3            no  badulla  3481.868
## 733   32   male 28.880        0            no    galle  3866.855
## 735   48 female 27.265        1            no  badulla  9447.250
## 736   30 female 22.895        1            no  badulla  4719.524
## 737   26 female 17.195        2           yes  badulla 14455.644
## 738   37   male 24.320        2            no    galle  6198.752
## 739   33 female 39.820        1            no   trinco  4795.657
## 749   50   male 26.600        0            no  colombo  8444.474
## 754   51 female 34.100        0            no   trinco  9283.562
## 761   19 female 32.900        0            no  colombo  1748.774
## 762   35   male 17.860        1            no    galle  5116.500
## 768   19   male 22.610        0            no    galle  1628.471
## 769   44   male 39.520        0            no    galle  6948.701
## 777   29   male 31.730        2            no    galle  4433.388
## 781   31   male 28.595        1            no    galle  4243.590
## 784   48 female 32.230        1            no   trinco  8871.152
## 796   28 female 34.770        0            no    galle  3556.922
## 798   18   male 38.170        0           yes   trinco 33488.574
## 801   19   male 25.555        0            no    galle  1632.564
## 802   30 female 33.330        1            no   trinco  4151.029
## 806   34 female 37.335        2            no    galle  5989.524
## 808   28   male 33.820        0            no    galle 19673.336
## 810   58   male 36.080        0            no   trinco 11363.283
## 815   45 female 28.600        2            no   trinco  8516.829
## 816   54   male 33.630        1            no    galle 10825.254
## 820   55 female 30.140        2            no   trinco 11881.970
## 824   59 female 34.800        2            no  colombo 33488.574
## 843   57   male 27.940        1            no   trinco 11554.224
## 852   56   male 33.660        4            no   trinco 12949.155
## 854   55 female 37.100        0            no  colombo 10713.644
```

```
## 858   55   male 38.280        0            no   trinco 10226.284
## 862   23   male 41.910        0            no   trinco  1837.282
## 865   55   male 29.900        0            no  colombo 10214.636
## 870   45   male 22.895        2           yes    galle 21098.554
## 874   36 female 27.740        0            no  badulla  5469.007
## 875   47 female 32.000        1            no  colombo  8551.347
## 889   43 female 32.560        3           yes   trinco 33488.574
## 890   19 female 40.500        0            no  colombo  1759.338
## 895   25 female 28.595        0            no  badulla  3213.622
## 907   47 female 24.100        1            no  colombo 26236.580
## 908   39   male 21.850        1            no    galle  6117.494
## 909   59   male 29.700        2            no   trinco 12925.886
## 910   22   male 26.840        0            no   trinco  1665.000
## 912   42   male 28.310        3           yes    galle 32787.459
## 917   23   male 23.845        0            no  badulla  2395.172
## 933   30   male 24.130        1            no    galle  4032.241
## 934   63   male 33.100        0            no  colombo 13393.756
## 935   19 female 39.615        1            no    galle  2730.108
## 936   26   male 33.915        1            no    galle  3292.530
## 940   39   male 42.655        0            no  badulla  5757.413
## 942   61   male 33.535        0            no  badulla 13143.337
## 951   33 female 26.695        0            no    galle  4571.413
## 952   23 female 23.180        2            no    galle 14426.074
## 961   47   male 36.200        1            no  colombo  8068.185
## 965   27   male 28.500        0           yes    galle 18310.742
## 969   52   male 34.100        0            no   trinco  9140.951
## 979   46 female 28.050        1            no   trinco  8233.097
## 991   53 female 22.880        1           yes   trinco 23244.790
## 1002  19   male 28.400        1            no  colombo  1842.519
## 1005  53   male 31.160        1            no    galle 10461.979
## 1008  26 female 42.400        1            no  colombo  3410.324
## 1009  30 female 22.895        1            no  badulla  4719.524
## 1010  25 female 26.790        2            no    galle  4189.113
## 1012  23 female 36.670        2           yes  badulla 33488.574
## 1018  21   male 35.530        0            no   trinco  1532.470
## 1033  55 female 26.800        1            no  colombo 33488.574
## 1041  60 female 32.450        0           yes   trinco 33488.574
## 1042  51 female 40.660        0            no  badulla  9875.680
## 1051  19 female 32.110        0            no    galle  2130.676
## 1064  47 female 29.545        1            no    galle  8930.935
## 1074  48   male 29.700        0            no   trinco  7789.635
## 1084  64 female 33.800        1           yes  colombo 33488.574
## 1089  36 female 25.840        0            no    galle  5266.366
## 1092  61 female 29.070        0           yes    galle 29141.360
## 1093  26 female 34.200        2            no  colombo  3987.926
## 1100  18   male 28.310        1            no  badulla 11272.331
## 1102  18   male 21.780        2            no   trinco 11884.049
## 1103  53   male 29.480        0            no   trinco  9487.644
## 1105  18   male 35.200        1            no   trinco  1727.540
## 1106  47 female 36.630        1           yes   trinco 33488.574
## 1110  48 female 35.910        1            no  badulla 26392.260
## 1112  49 female 41.470        4            no   trinco 10977.206
## 1116  44   male 34.320        1            no   trinco  7147.473
## 1129  54 female 35.815        3            no    galle 12495.291
```

```
## 1138  64   male 36.960        2           yes   trinco 33488.574
## 1141  46 female 27.720        1            no   trinco  8232.639
## 1143  51   male 31.635        0            no    galle  9174.136
## 1144  55   male 27.645        0            no    galle 10594.502
## 1148  18 female 25.080        0            no  badulla  2196.473
## 1157  33   male 29.400        4            no  colombo  6059.173
## 1160  39 female 22.800        3            no  badulla  7985.815
## 1161  34   male 35.815        0            no    galle  4320.411
## 1164  52 female 30.780        1            no  badulla 10797.336
## 1168  50 female 27.075        1            no  badulla 10106.134
## 1174  57   male 42.130        1           yes   trinco 33488.574
## 1178  47   male 28.215        3           yes    galle 24915.221
## 1180  24 female 30.210        3            no    galle  4618.080
## 1199  57 female 25.740        2            no   trinco 12629.166
## 1209  48 female 28.900        0            no  colombo  8277.523
## 1211  55 female 26.980        0            no    galle 11082.577
## 1213  52   male 36.765        2            no    galle 26467.097
## 1216  34   male 34.210        0            no   trinco  3935.180
## 1232  19 female 36.575        0            no    galle  2136.882
## 1234  58   male 34.390        0            no    galle 11743.934
## 1235  58 female 39.050        0            no   trinco 11856.412
## 1237  26 female 34.200        2            no  colombo  3987.926
## 1238  32   male 30.030        1            no   trinco  4074.454
## 1239  61   male 36.100        3            no  colombo 27941.288
## 1243  58 female 27.170        0            no    galle 12222.898
## 1254  27 female 17.955        2           yes  badulla 15006.579
## 1257  49   male 22.515        0            no  badulla  8688.859
## 1258  57   male 40.280        0            no  badulla 20709.020
## 1282  27   male 18.905        3            no  badulla  4827.905
## 1284  40   male 22.705        2            no  badulla  7173.360
## 1285  44   male 37.100        2            no  colombo  7740.337
## 1288  30   male 37.430        3            no  badulla  5428.728
## 1289  18 female 31.350        0            no   trinco  1622.188
## 1291  26 female 40.185        0            no    galle  3201.245
## 1295  47 female 24.100        1            no  colombo 26236.580
## 1296  38   male 27.835        2            no    galle  6455.863
## 1303  25   male 33.660        4            no   trinco  4504.662
## 1308  21   male 36.860        0            no    galle  1917.318
## 1329  21 female 16.815        1            no  badulla  3167.456
## 1341  38 female 34.800        2            no  colombo  6571.544
## 1352  59 female 35.200        0            no   trinco 12244.531
## 1355  18   male 38.170        0           yes   trinco 33488.574
## 1362  41   male 28.405        1            no    galle  6664.686
## 1366  60 female 32.450        0           yes   trinco 33488.574
## 1369  18   male 33.660        0            no   trinco  1136.399
## 1375  19 female 33.110        0           yes   trinco 33488.574
## 1380  40   male 34.105        1            no  badulla  6600.206
## 1384  50   male 32.300        1           yes  badulla 33488.574
## 1400  53   male 20.900        0           yes   trinco 21195.818
## 1408  49 female 34.770        1            no    galle  9583.893
## 1411  25 female 30.200        0           yes  colombo 33488.574
## 1417  51   male 32.300        1            no  badulla  9964.060
## 1420  35   male 36.670        1           yes  badulla 33488.574
## 1422  29   male 37.290        2            no   trinco  4058.116
```

```
## 1423  58 female 31.825        2             no  badulla 13607.369
## 1427  64   male 37.905        0             no    galle 14210.536
## 1430  45 female 33.100        0             no  colombo  7345.084
## 1431  40 female 41.420        1             no    galle 28476.735
## 1433  23 female 28.490        1            yes   trinco 18328.238
## 1448  55 female 26.980        0             no    galle 11082.577
## 1456  28 female 33.110        0             no   trinco  3171.615
## 1468  60 female 30.500        0             no  colombo 12638.195
```

```
##Training the data for model using training df ##
## Fit Multiple Linear Regression to the training df with all independent variables##
insu_model <- lm(premium ~ ., data = training_df)

## Check for the model accuracy ##
summary(insu_model)
```

```
##
## Call:
## lm(formula = premium ~ ., data = training_df)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -9463.7 -2371.9 -1133.8   364.6 21822.6
##
## Coefficients:
##                   Estimate Std. Error t value Pr(>|t|)
## (Intercept)       -4824.46     866.59  -5.567 3.21e-08 ***
## age                 216.80      10.33  20.987  < 2e-16 ***
## gendermale          195.54     289.48   0.675  0.49950
## bmi                 161.56      24.59   6.570 7.55e-11 ***
## num_kids            398.12     121.73   3.270  0.00111 **
## smoking_statusyes 19743.96     362.84  54.415  < 2e-16 ***
## districtcolombo   -1312.72     415.08  -3.163  0.00160 **
## districtgalle      -699.66     412.01  -1.698  0.08974 .
## districttrinco     -869.47     420.32  -2.069  0.03881 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 4921 on 1167 degrees of freedom
## Multiple R-squared:  0.7544, Adjusted R-squared:  0.7527
## F-statistic: 448.1 on 8 and 1167 DF,  p-value: < 2.2e-16
```

```
#### Improve the Model ####

### Transforming, Recoding variables where it's needed ###

## Considering client's age Vs premium & couldn't defined a linear relationship##
model_df$age_ <- model_df$age^2

## Decide a health factor according to continuous variable BMI ##
model_df$bmi_30 <- ifelse(model_df$bmi >= 30, 1, 0)

## Split the data again with additional columns ##
```

```r
training_impdf <- model_df[traindt_index, ]
test_impdf <- model_df[-traindt_index, ]

## Fit the model again with interaction features ##
insu_impmodel <- lm(premium ~ age + age_ + num_kids + bmi + gender +
                    bmi_30*smoking_status , data = training_impdf)

## Check for the model accuracy ##
summary(insu_impmodel)
```

```
##
## Call:
## lm(formula = premium ~ age + age_ + num_kids + bmi + gender +
##     bmi_30 * smoking_status, data = training_impdf)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -7276.6 -1881.2 -1118.9  -419.7 21904.0
##
## Coefficients:
##                              Estimate Std. Error t value Pr(>|t|)
## (Intercept)                 4036.7004  1440.6106   2.802  0.00516 **
## age                          -70.7860    63.0870  -1.122  0.26208
## age_                           3.6577     0.7892   4.635 3.98e-06 ***
## num_kids                     516.0789   111.8355   4.615 4.37e-06 ***
## bmi                           16.5465    34.1702   0.484  0.62831
## gendermale                  -160.5096   254.5363  -0.631  0.52843
## bmi_30                      -331.2661   438.1408  -0.756  0.44976
## smoking_statusyes         13447.0020   474.7409  28.325  < 2e-16 ***
## bmi_30:smoking_statusyes  11611.2136   640.3055  18.134  < 2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 4321 on 1167 degrees of freedom
## Multiple R-squared:  0.8107, Adjusted R-squared:  0.8094
## F-statistic: 624.6 on 8 and 1167 DF,  p-value: < 2.2e-16
```

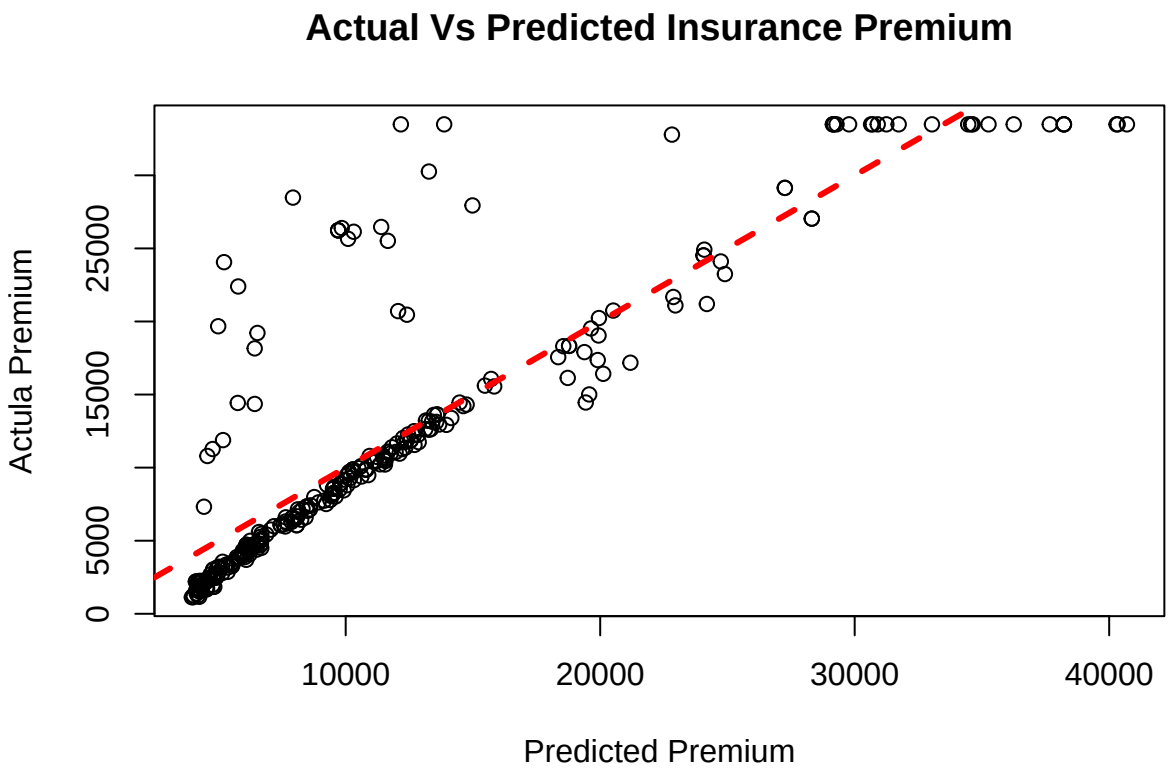
```r
####### Validate the model ########

##### Model prediction of premium with test data set ######
mdl_premiumPredicted = predict(insu_impmodel, newdata = test_impdf)

### Correlation between actual vs predicted of premium ###
cor(mdl_premiumPredicted, test_impdf$premium)
```

```
## [1] 0.8718554
```

```r
## Plot actual vs predicted of premium ###
plot(mdl_premiumPredicted, test_impdf$premium,
     main = 'Actual Vs Predicted Insurance Premium', xlab = 'Predicted Premium',
     ylab = 'Actula Premium')
abline(a = 0, b = 1, col = "red", lwd = 3, lty = 2)
```


Actual Vs Predicted Insurance Premium
Actula Premium
0
5000
15000
25000
10000
20000
30000
40000
Predicted Premium