Assignment_1

2024-08-28

```
library(readxl)
```

Data source: https://www.kaggle.com/datasets/danielkyrka/bmw-pricing-challenge/data Importing and reading the data

```
data <- read_xlsx("C:/Users/echit/Documents/School/Fundamentals of Machine Learning/Assignment_1/bmw_pri
```

Identify a few selected quantitative variables and print descriptive statistics

```
q_variables<-c("mileage","engine_power","price")
summary(data[q_variables])</pre>
```

```
##
      mileage
                   engine_power
                                   price
##
  Min. : -64 Min. : 0 Min. :
                                         100
  1st Qu.: 102914
                  1st Qu.:100 1st Qu.: 10800
## Median : 141080 Median :120
                               Median : 14200
   Mean : 140963
##
                   Mean :129
                               Mean : 15828
##
   3rd Qu.: 175196
                   3rd Qu.:135
                               3rd Qu.: 18600
  Max.
         :1000376
                   Max. :423
                               Max.
                                     :178500
```

Identify a few selected categorical variables and print descriptive statistics

```
c_variables<-c("fuel","paint_color","car_type")
table(data[c_variables])</pre>
```

```
## , , car_type = convertible
##
##
                 paint_color
## fuel
                  beige black blue brown green grey orange red silver white
##
    diesel
                      1
                            8
                      0
                            0
                                 0
                                       0
                                                 0
                                                        0 0
                                                                         0
##
    electro
                                             0
                                                                   0
    hybrid_petrol
                            0
                                 0
                                                                         0
                                      0
                            6
                                 1
                                            0 6
##
    petrol
##
## , , car_type = coupe
##
                 paint_color
##
```

```
## fuel
                     beige black blue brown green grey orange red silver white
##
     diesel
                               32
                                    17
                                            1
                                                       17
                                                                0
                                                                    1
                                                                            3
                         1
                                                  1
                         0
                                            0
                                                                0
                                                                    0
                                                                                  0
##
     electro
                               0
                                     0
                                                  0
                                                        0
##
                         0
                                0
                                     0
                                            0
                                                  0
                                                                0
                                                                    0
                                                                            0
                                                                                  0
     hybrid_petrol
                                                        1
     petrol
##
                         0
                                4
                                     1
                                            0
                                                  0
                                                        9
                                                                0
                                                                    0
                                                                            3
                                                                                  4
##
##
   , , car_type = estate
##
##
                   paint_color
## fuel
                     beige black blue brown green grey orange red silver white
##
     diesel
                         8
                             526
                                   234
                                          119
                                                  3
                                                     415
                                                                0
                                                                   13
                         0
                                     0
                                                                    0
                                                                                  0
##
     electro
                               0
                                           0
                                                  0
                                                        0
                                                                0
                                                                            0
                               0
                                     0
                                            0
                                                        0
                                                                0
                                                                    0
                                                                            0
                                                                                  0
##
     hybrid_petrol
                         0
                                                  0
                                                                                  2
                                            0
                                                  2
                                                       12
                                                                0
                                                                    0
##
                         0
                              11
                                     4
                                                                            1
     petrol
##
##
   , , car_type = hatchback
##
                   paint_color
##
                    beige black blue brown green grey orange red silver white
## fuel
##
     diesel
                        10
                             218
                                   116
                                          36
                                                  1 147
                                                                0
                                                                    5
##
     electro
                         0
                               0
                                     0
                                           0
                                                  0
                                                        2
                                                                0
                                                                    0
                                                                            0
                                                                                  1
##
     hybrid_petrol
                         0
                               2
                                     0
                                            0
                                                  0
                                                        0
                                                                0
                                                                    0
                                                                            0
                                                                                  0
                         0
                              19
                                     3
                                            2
                                                  0
                                                        6
                                                                0
                                                                    0
                                                                            2
                                                                                  3
##
     petrol
##
##
   , , car_type = sedan
##
##
                   paint_color
## fuel
                     beige black blue brown green grey orange red silver white
                             362
                                   167
                                         107
                                                  3 294
##
     diesel
                                                                0
                                                                   14
                                                                                 75
                         0
                               0
                                     0
                                            0
                                                                0
                                                                    0
                                                                            0
                                                                                  0
##
     electro
                                                  0
                                                        0
                               0
##
     hybrid_petrol
                         0
                                     0
                                            1
                                                  0
                                                        0
                                                                0
                                                                    0
                                                                            0
                                                                                  0
##
     petrol
                         1
                              19
                                    13
                                            1
                                                  2
                                                       15
                                                                0
                                                                    1
                                                                                   6
##
##
   , , car_type = subcompact
##
##
                   paint_color
## fuel
                     beige black blue brown green grey orange red silver white
##
     diesel
                         0
                              35
                                    25
                                            2
                                                  0
                                                       25
                                                                1
                                                                    0
##
     electro
                         0
                                0
                                     0
                                            0
                                                  0
                                                        0
                                                                0
                                                                    0
                                                                            0
                                                                                  0
                                     0
                                            0
                                                        0
                                                                0
                                                                    0
                                                                                  0
##
                         0
                               1
                                                  0
                                                                            0
     hybrid_petrol
##
                         0
                                3
                                     0
                                            1
                                                  0
                                                        2
                                                                0
                                                                                  0
     petrol
##
##
   , , car_type = suv
##
##
                   paint_color
## fuel
                     beige black blue brown green grey orange red silver white
                             362
                                  114
                                           70
                                                     208
                                                                3
                                                                  11
                                                                           96
##
     diesel
                         9
                                                  6
                                                                                163
##
                         0
                               0
                                     0
                                           0
                                                  0
                                                        0
                                                                0
                                                                    0
                                                                            0
                                                                                  0
     electro
                                                                                  0
##
     hybrid_petrol
                         0
                                1
                                     1
                                            0
                                                  0
                                                        1
                                                                0
                                                                    0
                                                                            0
                                9
                                     1
                                            0
                                                        0
                                                                0
##
     petrol
                         0
                                                  0
                                                                    1
                                                                            1
                                                                                  1
##
##
   , , car_type = van
##
##
                   paint_color
```

```
## fuel
                       beige black blue brown green grey orange red silver white
##
                                                                           2
      diesel
                            1
                                  15
                                         9
                                                1
                                                       0
                                                             7
                                                                      0
                                                                                   1
                                                                           0
##
      electro
                            0
                                   0
                                         0
                                                0
                                                       0
                                                             0
                                                                      0
                                                                                   0
                                                                                          0
                            0
                                   0
                                         0
                                                0
                                                             0
                                                                      0
                                                                           0
                                                                                   0
                                                                                          0
##
                                                       0
      hybrid_petrol
##
      petrol
                                   0
                                         0
                                                0
                                                       0
                                                             0
                                                                      0
                                                                           0
                                                                                   0
                                                                                           1
```

Transform at least one variable. It doesn't matter what the transformation is. Log transformation on the price variable

```
print(data$price)
##
                                                    17100
                                                                      6100
                                                                              6200
                                                                                    17300
       [1]
            11300
                    69700
                            10200
                                    25100
                                            33400
                                                            12400
##
      [11]
            19300
                    13300
                            21700
                                    36300
                                            10500
                                                      8300
                                                            21900
                                                                      9200
                                                                             11000
                                                                                      7700
##
     [21]
            16800
                    31000
                            26300
                                    23300
                                            20800
                                                      1800
                                                            30100
                                                                    28700
                                                                              6500
                                                                                     11100
##
     [31]
             9900
                     9500
                            31000
                                    27500
                                             5500
                                                      6300
                                                              2400
                                                                      6800
                                                                             24200
                                                                                     11800
                    12100
                                                    24300
##
     [41]
            34300
                            15800
                                     8000
                                             9000
                                                              2600
                                                                    21400
                                                                             26200
                                                                                      8400
##
     [51]
            17100
                     7500
                            23800
                                    26500
                                            27700
                                                    18300
                                                              2300
                                                                    30200
                                                                              1000
                                                                                    19000
##
     [61]
            30500
                    28600
                            38900
                                    36300
                                            27700
                                                    32100
                                                            11900
                                                                    47000
                                                                            55200
                                                                                    16100
            26200
                    19500
                            53600
                                    28000
                                                    32000
                                                            26400
##
     [71]
                                            22400
                                                                      8600
                                                                             31500
                                                                                    39900
##
     [81]
             8900
                    23800
                            18400
                                    16900
                                            30000
                                                      8200
                                                            36900
                                                                      7500
                                                                             23400
                                                                                    23000
            95200
                    23200
                            25300
                                                     9200
##
     [91]
                                    28600
                                            27000
                                                            22500
                                                                      3100
                                                                             14600
                                                                                    26100
    [101]
             8200
                     8700
                            27700
                                    23800
                                            23500
                                                    28000
                                                            26800
                                                                    10500
                                                                             32100
                                                                                     22000
##
                    21800
                                    17800
                                                    45800
##
    [111]
            28600
                            36500
                                            30700
                                                            28700
                                                                    22400
                                                                             23300
                                                                                     27600
##
    [121]
            12900
                    26800
                            21800
                                    24100
                                              8500
                                                    17000
                                                            24200
                                                                      8700
                                                                             18300
                                                                                      7600
##
    [131]
             9300
                    25000
                             8900
                                    19000
                                            12500
                                                    16700
                                                              8900
                                                                    17100
                                                                             29200
                                                                                    35700
                    10700
                            19300
                                                    12800
                                                              2700
                                                                    23800
##
    [141]
            11300
                                      7700
                                              8300
                                                                             15000
                                                                                     10900
##
    [151]
            23100
                     5400
                            11700
                                    16500
                                            11400
                                                      8200
                                                            13100
                                                                      7600
                                                                             14500
                                                                                     12700
##
    [161]
            21300
                     6000
                             7900
                                      8900
                                              6500
                                                       800
                                                            10900
                                                                    13100
                                                                             18200
                                                                                     14400
##
    [171]
              800
                      800
                             9000
                                    13300
                                              1100
                                                      6500
                                                            12200
                                                                    15800
                                                                             10200
                                                                                      1000
##
    [181]
            11500
                    18700
                            18600
                                    11400
                                              7700
                                                      2400
                                                            11900
                                                                       800
                                                                               800
                                                                                     11200
                                    23400
##
    [191]
             9400
                    18900
                             9000
                                            23700
                                                    15400
                                                            13700
                                                                       800
                                                                            10900
                                                                                     13300
##
    [201]
            18000
                     6000
                              800
                                    13600
                                            17800
                                                      9200
                                                              6100
                                                                    13000
                                                                             11500
                                                                                      9300
    [211]
                                                      1200
                                                            11900
                                                                             12000
##
             8600
                    20200
                            12600
                                       800
                                            18200
                                                                    15100
                                                                                    12700
##
    [221]
            14300
                     7700
                              800
                                     4300
                                            12100
                                                    12100
                                                            12900
                                                                    10600
                                                                             20200
                                                                                     14200
    [231]
             8000
                    11700
                                    15600
                                                    10200
                                                            14900
                                                                    17800
##
                            11300
                                            10100
                                                                             13700
                                                                                    12500
    [241]
                    10200
                            15400
                                    14300
                                            11900
                                                       800
                                                              7300
                                                                    10700
                                                                             10400
##
             5100
                                                                                    16100
    [251]
             9900
                    10000
                             1200
                                    16300
                                            17800
                                                    15600
                                                             8800
                                                                      3900
                                                                             10500
                                                                                    13700
##
                    12400
                                    10400
                                                    14800
                                                            13100
                                                                    15200
                                                                             18100
##
    [261]
            12400
                             3000
                                            16800
                                                                                     11400
##
    [271]
            13700
                     6400
                             9600
                                      4900
                                              6000
                                                     8200
                                                            11300
                                                                      1400
                                                                             14900
                                                                                    10600
##
    [281]
            14200
                    15000
                             9400
                                    12300
                                            15000
                                                      9900
                                                            13100
                                                                    13200
                                                                            19200
                                                                                     13200
    [291]
            20600
                    14900
                            17800
                                    14200
                                            13800
                                                    20300
                                                            22100
                                                                    20800
                                                                             11300
##
                                                                                      8400
##
    [301]
            12900
                    12000
                            16400
                                    14800
                                            14600
                                                    28800
                                                            19900
                                                                    19800
                                                                             15600
                                                                                      5400
                                                    25500
                                                                    25600
##
    [311]
            20000
                    11400
                            12700
                                    14600
                                             7700
                                                            17700
                                                                             26700
                                                                                     11400
##
    [321]
            25600
                    19900
                            11700
                                    10800
                                            16100
                                                    15200
                                                            13100
                                                                       800
                                                                             15800
                                                                                     12600
##
    [331]
              800
                    16300
                            13700
                                      5000
                                            13300
                                                    12600
                                                            31300
                                                                    13100
                                                                             11100
                                                                                       800
            25500
                    11200
                            20600
                                    13100
                                            10600
                                                    14300
                                                            15000
                                                                              9400
##
    [341]
                                                                    10500
                                                                                    13600
##
    [351]
            14500
                    15400
                             5000
                                    15400
                                              9300
                                                    13400
                                                              9900
                                                                    12600
                                                                             17100
                                                                                      9700
    [361]
            20000
                    17300
                            17400
                                    14900
                                            19300
                                                    12100
                                                              3800
                                                                              9500
##
                                                                     8600
                                                                                    12900
##
    [371]
            15400
                    12600
                            14600
                                    14500
                                            11800
                                                    13000
                                                              6200
                                                                    10100
                                                                             17000
                                                                                     11000
##
    [381]
              800
                    12900
                            10200
                                    12600
                                            14900
                                                      9600
                                                            19000
                                                                    14300
                                                                             14900
                                                                                    11400
    [391]
            12700
                    11200
                            13600
                                    15700
                                            15600
                                                      8000
                                                            25200
                                                                    15500
                                                                             11700
                                                                                    13100
##
```

[401]

##

##	[411]	20900	10100	11100	23500	13100	27400	23900	4500	13700	19000
##	[421]	13800	11700	10000	15800	800	9500	14200	11100	9800	12300
##	[431]	24300	10600	16200	16300	10100	13700	11900	6600	5500	13800
##	[441]	14200	23200	12100	12800	15400	9900	15400	15800	12100	10500
##	[451]	9400	17700	15400	12000	10100	18100	14600	18800	10400	20300
##	[461]	7500	20500	6000	11900	12100	19000	16500	15000	9500	8200
##	[471]	16400	21400	12600	1500	13000	12100	22100	14900	15700	13900
##	[481]	10200	17700	11000	15500	12700	5400	11900	12400	20200	10500
##	[491]	12300	5800	9900	17700	15000	18400	15000	8600	16700	10600
##	[501]	9500	10100	24800	15500	11400	6900	11600	17800	30600	6900
##	[511]	11200	11300	18600	17400	12600	16700	14200	10900	6900	33900
##	[521]	3600	13700	14600	6900	13100	18000	15500	12200	36000	13800
##	[531]	11200	14500	22100	30200	10500	25300	14400	500	7200	13600
##	[541]	11300	14600	16400	20700	16700	22700	11300	9000	20300	11500
##	[551]	13400	19600	15400	12900	15200	15500	16100	8300	13200	24300
##	[561]	12500	8300	10100	22200	15600	100	6400	14900	10900	15000
##	[571]	17600	14600	14600	20100	12300	20500	10500	21800	9400	22900
##	[581]	16400	20000	4000	14500	800	18600	28800	10100	800	12600
##	[591]	16100	10000	14900	10800	4200	17000	12700	13400	21500	11200
##	[601]	8700	13400	18600	14900	17800	9600	16900	14500	11500	9900
##	[611]	8200	16100	14000	18900	11700	12600	17600	14000	11600	22400
##	[621]	12500	10700	12100	9500	21400	10200	10000	16900	15100	12700
##	[631]	100	4500	9500	10800	11700	16900	17600	12700	16700	12500
##	[641]	16400	10600	9500	13700	10600	15400	20200	800	9600	15600
##	[651]	11900	10700	17700	15800	13400	10500	19200	12500	11800	9200
##	[661]	22600	20900	21400	5000	12700	9500	16200	19600	13300	11800
##	[671]	10500	5100	20100	12100	15300	10700	14300	13100	14600	4300
##	[681]	19200	11500	12100	800	20500	1300	15600	8900	14900	15100
##	[691]	11400	11900	1900	13400	10600	6500	12900	11300	8200	8200
##	[701]	13400	5700	9600	12100	14900	6100	19900	800	18100	12000
##	[711]	7500	15800	15200	14300	13100	11500	26300	13400	17700	19600
##	[721]	7700	4500	4400	10600	22400	9800	10400	12200	23200	11500
##	[731]	11400	14100	17600	21700	14600	14800	10900	13700	7400	12600
##	[741]	23100	3700	22400	13700	16500	3700	10400	13400	22200	16400
##	[751]	22000	9200	18800	13900	19000	15200	13800	15600	5600	12100
##	[761]	14300	7100	20300	14200	11900	16100	23100	14600	9700	9500
##	[771]	7600	5000	14900	18100	14000	17100	16400	21500	8000	15600
##	[781]	13100	21400	18900	12600	15800	20200	10700	13400	15800	15700
##	[791]	18000	16300	26800	18800	8200	14400	18600	11400	16100	10800
##	[801]	16400	1900	23500	20100	7600	11900	11800	6100	6700	4200
##	[811]	11700	16700	15000	20500	11400	14100	800	20100	19000	15500
##	[821]	11400	17300	19300	9500	19300	14900	9900	20700	8100	10200
##	[831]	5500	18400	14300	5000	10500	12600	20300	10800	4900	11800
##	[841]	1300	14000	13600	16700	800	21200	10700	15400	14000	12500
##	[851]	7700	9400	16700	14400	19600	5800	6000	8400	15800	8200
##	[861]	18600	1900	5800	13300	7700	11100	22400	15100	11300	8800
##	[871]	12300	6700	19600	16100	14000	15200	17100	11400	23200	100
##	[881]	21200	17300	4200	12000	15800	15600	14900	15200	6700	19000
##	[891]	14300	26800	13800	12700	16900	19800	29600	18000	17400	11300
##	[901]	12300	13300	25300	8600	13000	8100	12300	30100	12100	5400
##	[911]	11800	9600	10700	12900	15500	19200	15000	25100	14000	27700
##	[921]	12700	17700	15700	12600	17300	11300	10800	18100	11300	16500
##	[931]	14400	5000	9300	10100	12700	12000	15000	16700	20800	19800
##	[941]	19500	10900	12700	14000	6800	12300	10200	7600	8900	19000

##	[951]	17800	10900	16500	7800	24800	6800	8400	14200	7300	14000
##	[961]	19600	15800	16500	13200	11800	14900	11100	26900	13400	14500
##	[971]	23800	13900	14300	8900	14300	37100	15000	17400	13700	8200
##	[981]	14500	15200	14300	7000	16700	15700	13200	11800	11100	18100
##	[991]	10800	22900	7100	15000	26100	14500	13800	13700	12100	14500
##	[1001]	13600	12600	19800	3500	18900	14000	13200	14600	9200	7400
##	[1011]	9500	14900	13600	11100	17600	15400	17600	9900	13400	9900
##	[1021]	6000	11200	17300	11800	12500	16700	9800	22800	9500	18100
##	[1031]	7300	12600	10600	14800	6700	12500	4000	8600	22500	12500
##	[1041]	16400	12500	20100	15400	24900	6800	14900	8300	19800	15200
##	[1051]	17800	11200	22500	11400	3200	13300	28600	12300	16900	13800
##	[1061]	27700	17400	19500	5700	13400	4500	18900	24200	30000	11300
##	[1071]	12400	10100	14000	11100	14100	8400	15100	8000	8300	7300
##	[1081]	23300	10700	15100	9500	15400	12500	8300	17100	15700	14000
##	[1091]	10500	11100	9900	14900	11400	14400	16500	18900	16200	10100
##	[1101]	11800	12500	18800	15600	13700	13900	20300	8900	20200	20200
##	[1111]	2100	12500	5400	12600	14400	15700	9400	10700	11400	10700
##	[1121]	22100	16500	11100	14300	28400	22000	13700	13400	11500	15100
##	[1131]	23000	3000	12900	17100	11600	5100	13600	14200	12000	17400
##	[1141]	19300	14000	19500	10400	12600	7000	13700	12600	11200	11500
##	[1151]	7300	18200	14700	6000	6500	8400	14200	12500	11600	15700
##	[1161]	19900	3800	27600	9500	16300	15500	16900	11800	12400	11200
##	[1171]	17000	15900	12000	9300	5600	11300	12900	15700	12900	12400
##	[1181]	13100	14800	5300	9300	15000	9900	11400	10000	9600	20300
##	[1191]	1200	14600	20900	2500	8400	14300	12100	10200	11200	13900
##	[1201]	28200	13300	13700	8600	14800	11900	19000	12300	16100	6900
##	[1211]	3600	14400	16700	17500	3700	19800	16200	15100	4800	7100
##	[1221]	9500	17300	27300	11800	13100	9200	11700	11100	11300	23800
##	[1231]	10600	6000	14000	19900	13200	29200	23800	16300	5500	10400
##	[1241]	12500	13100	17300	9400	14200	16700	9500	13000	11900	13800
##	[1251]	12900	3600	17500	13300	12100	100	11200	21900	11100	12500
##	[1261]	10400	10600	19900	9500	8300	1200	14500	16200	13300	12300
##	[1271]	7700	14400	19300	12500	12300	10500	10900	11800	10400	18600
##	[1281]	19300	14500	29800	15400	14900	11000	14400	4200	13000	10200
##	[1291]	16200	15200	7400	13100	14000	17100	17700	12500	13700	16500
##	[1301]	8900	18000	16300	14600	10900	18300	21400	20300	10800	15000
##	[1311]	11700	9400	11300	6400	11900	16100	13100	9600	11200	6100
##	[1321]	22800	14900	19500	14500	18300	16100	11300	15200	17800	15100
##	[1331]	12300	11200	13800	22600	10400	21800	13900	14500	14300	22400
## ##	[1341] [1351]	6000 10600	12700	13100 10700	10700	28600	4800 14600	13800 14800	18300	7300 13300	10400 18000
##	[1361]	13100	15100 20300	6500	21200 12500	17300 11700	13000	11200	12100 4200	13400	18400
##	[1371]	11300	15100	4200	5800	10100	16800	14300	13100	12000	18100
##	[1381]	14800	12800	17300	20200	4900	20000	16900	14800	11700	13200
##	[1391]	13800	10700	17300	16400	4800	10700	13100	20700	10400	10700
##	[1401]	11300	7900	15000	1900	6400	6800	8200	24900	5000	13400
##	[1411]	12000	14000	16800	10900	21100	11000	10000	5100	6200	10700
##	[1421]	15000	13700	15400	15000	4200	11200	12500	5100	13700	20300
##	[1431]	13100	15500	12600	13100	12900	15400	16400	16900	8000	4000
##	[1441]	20900	21300	12500	11100	17000	13100	9400	20800	4400	8100
##	[1451]	12100	5400	9000	10200	17800	18200	11900	14900	13100	9400
##	[1461]	9500	10400	4000	6100	5700	15000	10700	14500	20300	13600
##	[1471]	19000	9000	11300	13400	12100	11500	11700	18400	14200	4800
##	[1481]	15400	13000	11100	11300	11200	13300	14300	12600	7000	9300

##	[1491]	15500	16100	13800	18800	4600	9600	12700	10800	8300	12600
##	[1501]	14400	14400	12500	12600	5000	15100	17400	14300	25000	10900
##	[1511]	13000	5100	13700	400	15200	15200	9300	11000	16500	12500
##	[1521]	5000	13400	18800	16100	16100	15800	16100	13400	11900	14200
##	[1531]	17800	1300	4800	13800	10500	17000	9300	11100	22000	18100
##	[1541]	7100	19000	19600	4800	12300	9800	6000	15100	13400	8800
##	[1551]	15600	10100	18600	17100	13100	6300	16400	13200	400	20700
##	[1561]	12500	16400	11800	14500	20000	12000	14300	15000	15700	3800
##	[1571]	14300	10400	1200	1800	10700	10000	11500	14300	7500	7600
##	[1581]	11200	9300	9900	13000	11700	13300	12300	1600	12800	13600
##	[1591]	13000	10700	9200	15000	10800	12900	13200	6300	15200	14900
##	[1601]	14000	15600	12100	9200	13600	16100	13400	14000	10500	10500
##	[1611]	17100	12700	28900	14200	29200	17600	14200	4800	11200	4200
##	[1621]	16100	9500	14200	13100	16100	12200	4500	15100	3200	13900
##	[1631]	9300	8800	10100	6500	6000	15300	15200	6300	14500	14100
##	[1641]	12100	11300	4800	13100	12400	11800	13200	9900	5000	12000
##	[1651]	9800	10800	14800	9900	13400	10400	13600	11200	15800	25300
##	[1661]	20100	21500	12000	3600	10800	13700	14300	5000	23400	11800
##	[1671]	14300	12500	14800	8400	20400	13300	11700	14900	16800	16400
##	[1681]	9000	11500	4300	11300	19000	10200	17300	10100	800	11400
##	[1691]	7500	12100	10700	10000	9400	11400	14900	10900	40900	9500
##	[1701]	16100	10600	13600	11200	4900	12800	5500	11900	13800	12900
##	[1711]	9900	11900	9300	11500	10700	4000	14600	8900	12500	15700
##	[1721]	14000	13600	7000	3500	17700	10100	13800	7900	10000	6800
##	[1731]	9600	12500	3200	5000	6700	14900	13300	5500	14900	20800
##	[1741]	6900	7100	15500	14300	3300	11500	10800	8600	14300	9800
##	[1751]	16300	10900	11400	6400	20500	14200	19500	10200	14200	10000
##	[1761]	6000	14900	9300	10900	6000	12000	10100	11700	10800	13000
##	[1771]	3600	10600	9900	8000	12000	9800	9900	11300	11000	15000
##	[1781]	13300	22600	13400	13700	2400	11100	22600	9500	10000	13200
##	[1791]	11300	11100	10200	3600	9300	10500	20300	5000	12800	4400
##	[1801]	9100	13100	10900	8600	8300	900	12000	10700	8900	3500
##	[1811]	15700	9900	24400	30200	10900	11200	21200	17100	8900	5000
##	[1821]	9000	15200	11200	15800	21100	18200	3000	16200	15800	11500
##	[1831]	9400	11900	100	8900	16600	9200	15400	16700	17000	8400
##	[1841]	19200	11200	24400	13100	21700	12400	4500	10700	25700	5500
##	[1851]	6400	18300	10400	14500	13800	16100	12100	11900	10700	4900
##	[1861]	4600	3300	8900	7300	13000	15100	11500	13700	17000	11400
##	[1871]	8000	15400	9500	16800	22500	10100	14300	8600	800	10500
##	[1881]	17300	3600	12500	15700	22400	16100	15400	11900	8700	13700
##	[1891]	8000	13700	10600	16500	13400	20900	15700	9800	8300	25700
##	[1901]	14700	11900	14300	19200	12700	6700	9700	6400	16200	30800
##	[1911]	15100	4900	29500	15100	6000	10100	8300	9000	15200	5700
##	[1921]	15100	9000	11700	9000	9600	15500	6300	10000	10600	15600
##	[1931]	10900	14900	16100	9400	3800	18100	11000	4000	5400	12000
##	[1941]	6700	10000	12700	7700	8300	16200	7900	10100	13700	15800
##	[1951]	12800	13200	15900	20600	11900	16700	2800	14300	14300	7300
##	[1961]	11500	8400	23900	11300	7300	17300	13100	5000	9000	17500
##	[1971]	13300	12800	9900	12400	9500	16100	17300	12500	20500	3300
##	[1981]	14900	11400	16200	11800	21700	17000	27400	9000	8200	10900
##	[1991]	14800	9800	16400	8900	15800	19200	18800	29200	10000	9200
##	[2001]	16100	9300	23800	9800	10100	13600	9900	9400	22100	8300
##	[2011]	14500	13800	12900	21500	10900	5400	9500	15500	16800	9900
##	[2021]	8600	21400	11900	12900	18700	10800	17600	10200	10800	15600

##	[2031]	9800	9000	11900	6900	8100	9300	14600	9500	10100	15100
##	[2041]	22300	8800	18000	11700	20300	8900	13300	14300	3800	10900
##	[2051]	11300	11700	11400	22800	9500	24500	14900	16900	13300	17700
##	[2061]	13700	8700	9000	9000	18400	14900	9300	9800	13100	16100
##	[2071]	17000	24100	21300	12500	14900	13400	14200	11400	8300	15700
##	[2081]	7900	12900	16700	10500	15900	8100	9500	16400	14400	7100
##	[2091]	8000	25000	20500	22300	13200	13400	4300	12800	5100	3600
##	[2101]	16200	9500	11900	25500	19300	14400	16700	9200	10600	8100
			4200	9000							10700
##	[2111]	6100			17200	12000	14200	9800	14400	9300	
##	[2121]	8200	20200	26200	10800	14500	22400	10100	21200	11900	16200
##	[2131]	13400	9800	3300	21500	17600	16800	9200	13400	7300	20100
##	[2141]	12900	19900	15400	24400	6300	11300	29800	13300	18200	10100
##	[2151]	16700	3200	14900	11400	10200	15800	15700	15100	18600	18700
##	[2161]	25900	19000	10700	20600	15500	34500	8700	22700	10800	12300
##	[2171]	12600	9200	8700	17300	4600	17500	3500	13900	32100	7100
##	[2181]	8900	10300	23500	12200	12100	9300	11200	40500	14400	9200
##	[2191]	11100	13100	10000	8900	22000	20600	13400	13600	23000	18300
##	[2201]	24500	16200	15900	10600	11900	14500	8600	13900	10900	10900
##	[2211]	13700	24700	8700	10700	19600	8100	18600	11500	8400	9000
##	[2221]	7000	11900	21700	13200	10700	12400	5700	9800	5600	17600
##	[2231]	29500	8200	15300	13300	9500	15900	9900	16100	9600	4200
##	[2241]	9900	9400	22700	11600	9500	12300	9000	12300	6200	4900
##	[2251]	9600	9600	8300	14000	27000	16100	12600	19600	10100	16400
##	[2261]	9400	14300	13300	10100	5700	16300	13100	13800	9000	10800
##	[2271]	12700	8700	9900	6200	6300	25000	25100	10200	15200	12100
##	[2281]	9400	15500	18100	15100	6900	10100	4900	7900	12700	12900
##	[2291]	9000	14900	8300	14600	9200	22800	10700	16500	9000	30900
##	[2301]	18900	8900	13600	9600	10800	13400	20000	35700	10100	16700
##	[2311]	23500	22000	15100	10700	5400	19600	40000	20800	10200	11500
##	[2321]	4900	11200	8900	3300	30000	24900	36500	9200	10800	25000
##	[2331]	7700	15200	12700	21900	10200	10100	1100	13100	9600	16300
##	[2341]	12900	13700	22600	10600	10500	8600	9600	12000	14200	10100
##	[2351]	1200	18000	3600	10800	15500	8300	13300	10700	17400	26200
##	[2361]	9500	23600	12600	21200	13200	9900	19200	9400	14400	12000
##	[2371]	14000	9400	16100	10000	4000	10400	20700	9900	4400	10000
##	[2381]	8200	27400	16400	15500	20000	9800	13400	7600	11400	10900
##	[2391]	1000	9200	12900	7900	32100	11300	9500	21300	5000	15200
##	[2401]	14300	10600	16900	32100	28100	17100	24400	11900	8300	30300
##	[2411]	10700	4500	23500	6000	25100	39300	14300	10100	23300	20700
##	[2421]	9400	10200	33100	10200	11800	10900	10600	14200	10600	7600
##	[2431]	8400	29200	9300	20500	9800	10500	8100	10700	4400	22000
##	[2441]	8600	8300	13000	10900	5000	32800	19500	8900	17500	26200
##	[2451]	8400	3900	13300	15500	9400	16700	17600	11100	10900	15600
##	[2461]	10800	1800	13300	13300	13000	11900	10500	2100	18200	24000
##	[2471]	11400	14600	14400	200	17400	12000	17300	13200	10900	11400
##	[2481]	18200	17300	12100	24800	15600	12700	9600	19300	15000	11200
##	[2491]	15900	16400	16700	16700	700	8600	20500	16300	15600	14500
##	[2501]	12600	19200	20100	16700	18100	3600	19800	7900	14900	16400
##	[2511]	13300	14000	11700	3800	22300	17500	13700	15600	10800	19400
##	[2521]	5800	18000	13700	5800	13600	12700	33300	19000	12600	13600
##	[2531]	17500	20200	14400	19900	14200	19500	15500	8400	21200	11100
##	[2541]	37200	16500	14900	15100	14000	13700	19000	5500	13600	16100
##	[2551]	16100	26800	9800	11900	19200	21300	8200	15500	17800	32700
##	[2561]	10900	18800	15000	18400	19300	13200	14600	10700	17600	13200

##	[2571]	24600	18400	23900	13400	200	19900	12700	13400	18900	24500
##	[2581]	13400	28300	19400	26800	16500	12500	21700	20500	13000	13800
##	[2591]	16100	700	17700	13100	11300	15000	22000	12700	16200	12500
##	[2601]	24000	10700	12700	12000	17400	18600	23000	7500	14000	17700
##	[2611]	12400	200	16100	11000	22100	26900	16800	13300	15800	19600
##	[2621]	16300	8700	18800	12500	13200	16800	23300	14500	12700	16500
##	[2631]	24600	19600	10600	18800	16800	12900	800	15700	19800	40700
##	[2641]	16700	1900	16900	11800	13200	7200	12300	11600	21700	16200
##	[2651]	26100	15100	12300	18000	5400	13100	15200	21500	11100	15500
##	[2661]	12500	14400	18800	14900	10600	20800	19000	17300	22600	21400
##	[2671]	12500	12500	19400	16500	36700	10400	15000	17500	62500	18900
##	[2681]	44600	20500	5700	11400	19500	20000	30600	15900	14100	22600
##	[2691]	13100	1000	23200	14500	13400	17400	15100	14400	5600	19800
##	[2701]	17300	18200	9400	21900	15200	5600	34000	19400	22700	9800
##	[2711]	13200	13100	26500	3800	10700	28600	26200	2400	18800	15100
##	[2721]	14500	17100	14300	43000	13200	24600	14800	10600	18700	22000
##	[2731]	7400	20500	12000	22000	31900	22600	13100	27900	33300	800
##	[2741]	18100	10700	35300	11700	12300	18600	14900	14900	20200	15200
##	[2751]	17400	13600	29200	700	13800	17700	21500	34300	12700	25000
##	[2761]	15700	15800	19200	10800	14000	15600	14400	17300	15300	13900
##	[2771]	16700	1300	12400	7600	20500	58300	19000	29600	19000	19700
##	[2781]	15800	15000	10600	14000	14300	3400	23900	11900	15600	12900
##	[2791]	15700	10800	14500	13700	24100	27400	27100	16400	16800	10900
##	[2801]	31500	21400	8800	19300	18400	14600	14600	11400	10900	19000
##	[2811]	15200	22400	10900	18800	23000	15000	24500	10500	11700	14100
##	[2821]	14800	13100	5700	20700	63700	21300	9900	40500	14600	100
##	[2831]	11300	11100	13900	14600	13700	16200	19900	9000	12300	22100
##	[2841]	17800	17600	29500	16700	13600	20300	11100	15400	11400	10700
##	[2851]	20000	3500	14300	12300	20300	22400	13900	28000	13800	13600
##	[2861]	12200	14000	6000	13900	16200	15600	10400	14900	13600	20100
##	[2871]	8000	14000	10900	18500	16800	21600	13300	12100	12400	17400
##	[2881]	19300	11400	9300	25000	10600	16500	18000	20800	18100	17800
##	[2891]	10400	11700	24000	13700	16700	11700	15200	22300	13700	18400
##	[2901]	22000	13400	17500	16800	14400	22500	19300	20200	13300	18000
##	[2911]	13600	12400	14000	12400	10900	21100	9500	19000	14900	14500
##	[2921]	12700	14500	10000	20000	6000	21100	38700	15500	13600	6000
##	[2931]	29600	30000	12700	29400	20500	6300	19300	3100	75000	12500
##	[2941]	27100	18400	21400	18200	51200	8900	23600	20000	7100	10800
##	[2951]	13100	17300	27400	21200	24800	10900	12600	22000	27300	8000
##	[2961]	11400	19300	12300	14100	13400	10900	22400	4900	23000	19700
##	[2971]	28000	6000	13000	10100	13900	18200	8200	24400	20500	12500
##	[2981]	6600	19200	13400	2600	5600	20400	18100	17400	34600	19200
##	[2991]	12500	9500	19200	11100	25700	15600	15100	15600	34900	13100
##	[3001]	12100	16700	27300	12800	14200	3800	15100	15400	15400	10500
##	[3011]	19400	23900	28600	11900	13000	20300	25700	28100	11300	20500
##	[3021]	13000	15600	26800	17700	7300	13600	11200	19600	12500	14900
##	[3031]	11100	12800	10900	25000	12700	12500	13200	14200	23400	12500
##	[3041]	13700	20200	4900	12400	12700	26100	19400	10200	21100	12100
##	[3051]	7200	24900	14400	2400	9400	40700	39900	24000	11900	9500 65400
## ##	[3061] [3071]	9900 30600	12300 11800	400 16200	21300 11800	4900 19800	11400 15600	20700 16100	14900 17300	13300 1400	65400 12600
##	[3081]	23900	31500	19200	36900	14500	22600	10200	20800	5100	10800
##	[3091]	5000	13600	52400	19300	13200	38000	26700	16300	14200	12400
##	[3101]	17100	12900	16400	17300	10400	13000	13600	16700	25300	20800
πĦ	[OIOI]	11100	12300	10400	11300	10400	10000	10000	10100	20000	20000

##	[3111]	21900	17300	27100	11800	14200	14300	25000	16400	22400	32600
##	[3121]	13100	13100	20600	19000	24900	15400	24300	15600	6700	22500
##	[3131]	9900	14200	11300	20800	23800	6800	14400	17700	18200	11200
##	[3141]	17400	9900	14300	12100	13700	11400	15400	12100	13100	14000
##	[3151]	11300	7900	10900	19300	4500	27400	17300	12900	15800	21900
##	[3161]	23100	18400	27300	13100	16000	17800	900	19600	16500	18000
##	[3171]	16800	14500	19900	6400	13000	12300	13400	11500	13200	15500
##	[3181]	16700	11100	17300	10100	18100	18400	4700	14300	17400	17100
##	[3191]	15000	17100	4500	12900	14900	15200	16100	11500	500	15700
##	[3201]	15500	12700	23200	23100	13200	14900	14300	12000	18100	18100
##	[3211]	20200	15900	4800	39200	19300	10900	11500	16400	12700	20500
##	[3221]	13700	14600	10000	18200	16800	14900	14800	14000	4800	21800
##	[3231]	10500	20300	32100	14600	11700	24800	11700	12200	14200	16100
##	[3241]	36200	37200	20500	10900	17000	16500	10900	19100	9800	11000
##	[3251]	15200	24000	13400	16300	24400	20500	11800	11400	14000	10900
##	[3261]	17300	33100	11100	7000	15700	17600	27100	16900	22000	31300
##	[3271]	4200	13800	27100	31400	21200	22800	20800	19300	14800	6600
##	[3281]	15200	21100	18200	18000	7700	18400	800	13900	19900	13200
##	[3291]	12500	20800	47300	12300	20000	18200	22600	4000	17700	15000
##	[3301]	14000	12100	15800	17100	12400	32000	11900	20600	22400	16400
##	[3311]	20600	17800	12400	21400	14300	18100	6900	14300	16200	8400
##	[3321]	68300	13400	11100	15100	16800	19400	9900	11100	13000	6100
##	[3331]	21400	13100	15500	12400	18200	13100	12000	12100	11300	18700
##	[3341]	10100	16700	18300	12000	14500	68300	15100	11500	14800	16800
##	[3351]	18100	17500	7400	22000	4400	13100	10500	26900	17300	12900
##	[3361]	17900	14000	11200	12700	15200	700	12300	19600	7200	15400
##	[3371]	10500	16400	13000	11900	13600	9800	11500	9900	26200	16100
##	[3381]	900	20200	22200	14300	17000	12900	21400	800	15800	1400
##	[3391]	13400	11100	12600	16300	20200	11300	15100	11100	30000	4900
##	[3401]	14300	12400	3600	14800	30900	1400	11900	13700	3400	13000
##	[3411]	16400	8500	13400	25800	17400	13900	15700	10100	10100	11200
##	[3421]	900	11900	27300	12100	29300	12200	17100	10800	13300	18000
##	[3431]	12500	11800	7300	13800	14500	20800	1100	5100	16200	12300
##	[3441]	13700	5800	15000	17300	1000	13700	19300	15200	18800	400
##	[3451]	16700	10400	5200	12100	12900	15400	13800	11700	6700	25500
##	[3461]	11300	11300	14900	16100	14600	6800	13800	13200	10200	16000
##	[3471]	19300	14800	12500	5400	27000	10200	14900	11800	13200	10600
##	[3481]	10300	13800	13300	19200	18500	16300	12000	16900	9400	10500
##	[3491]	19800	16800	14600	16100	27800	15800	11900	28800	9800	1000
##	[3501]	14800	4800	9900	12000	12400	19800	12100	11900	15400	18500
##	[3511]	11400	13600	19600	17400	8600	19200	12800	17300	5000	19300
##	[3521]	17500	5100	18000	16400	15500	19000	6000	19200	18600	19200
##	[3531]	15200	14500	5500	15800	12300	10400	26300	14500	15400	12900
##	[3541]	11900	11800	10100	14300	17100	14600	12600	12100	10500	10700
##	[3551]	7000	13900	18600	6100	14600	8700	16200	13900	7700	5500
##	[3561]	15900	19600	12700	12100	13300	13600	11700	12000	15500	16500
##	[3571]	18400	13900	10600	12700	12100	400	17700	8800	13100	15600
##	[3581]	15500	19000	22700	14800	12400	11200	12800	10700	51500	11400
##	[3591]	18200	16800	14800	11900	11700	68700	17300	41100	13800	21400
##	[3601]	16100	41600	11700	13400	12600	25000	18000	11300	13200	12600
## ##	[3611]	21300	15200	12700	17500	11500	12600	11700	13300	13100	5700
##	[3621]	28300	10800 4900	16700	13800	12300	7700	7700	9200	9200	3600
	[3631]	5100 7600		2400	8400	3800	11400	4300	9600	14300	9800
##	[3641]	7600	3600	9300	16700	9000	9300	15800	10700	21700	17300

	F 7										
##	[3651]	9500	9000	15400	10100	3600	11400	9400	3300	11900	1400
##	[3661]	6500	7100	15600	3200	9400	13200	9200	11700	12700	11700
##	[3671]	7000	8300	8900	4000	8900	8300	13800	11400	10700	5500
##	[3681]	8000	13700	11300	7900	14800	8300	8500	17300	10600	9300
##	[3691]	28000	9900	3300	8800	12300	10200	11800	3000	10500	5200
##	[3701]	15300	8000	3300	7100	12400	8200	3900	9800	11800	8800
##	[3711]	8300	16900	13000	2500	9900	10900	9500	9200	8900	5700
##	[3721]	8700	16300	6100	4000	10100	9900	8600	15600	9800	7500
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##	[3741]	11200	47000	18200	13100	13100	18700	3600	16900	13900	9500
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##	[3761]	16300	38000	12000	14000	5500	11700	23900	18100	18000	16100
##	[3771]	11900	15400	20600	9900	30600	18300	12400	800	16400	13200
##	[3781]	26300	17600	18200	13100	15500	42700	15300	26700	19300	35200
##	[3791]	14300	9300	12400	12300	14400	16900	800	15800	800	12900
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##	[3811]	6000	17100	27400	21500	27700	12100	13900	600	11800	16800
##	[3821]	24100	38100	13100	13600	43700	15900	10200	14900	19300	64300
##	[3831]	3700	4900	14100	11400	25700	17800	12700	12200	21500	18400
##	[3841]	10900	20800	14000	23400	33300	20800	24000	6300	19200	16900
##	[3851]	11600	7700	25100	42800	10100	14900	19800	16500	8600	33200
			22300		11700				5700	12400	29200
##	[3861]	19600		33300		26100	17500	16200			
##	[3871]	27300	21100	12400	15900	26900	15800	17100	10400	41600	11400
##	[3881]	800	17600	33800	17800	12000	13100	14500	6800	6600	32500
##	[3891]	9200	28600	18000	41200	41200	38800	29500	34500	11700	15200
##	[3901]	11900	10900	17700	28200	18900	8000	41900	36400	19100	8900
##	[3911]	13700	18000	26800	11900	15600	39900	12100	20000	48200	30500
##	[3921]	19900	10100	22100	11000	4900	16900	16800	16500	36900	27800
##	[3931]	21700	43400	34000	38100	12500	41600	18100	10900	15600	800
##	[3941]	7000	12600	37200	30900	19900	10500	11500	13700	25500	18200
##	[3951]	11900	12800	16100	31800	25700	13100	37700	22700	44000	11200
##	[3961]	11600	19600	15200	10800	21100	8900	24500	15100	15100	37500
##	[3971]	22600	13400	15600	24400	37500	30600	11900	15900	15400	14200
##	[3981]	20900	23600	15000	22000	13700	13000	34800	11800	20500	43400
##	[3991]	20500	14700	17300	16100	3000	11100	16700	17200	14900	25600
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##			19800	15500	28700	30200	20300	17000			14300
##	[4031]	11500	18600	14400	16500	11100	17600	18100	11400	10900	19300
##	[4041]	15200	34200	31500	27600	11900	43300	35100	21800	19000	12100
##	[4051]	15200	12000	17600	49900	22000	40000	19500	14500	13000	17100
##	[4061]	20500	14300	23100	18300	24100	20400	49700	13300	13300	31400
##	[4071]	33300	20100	40900	18400	20000	24400	33300	13300	23000	15600
##	[4081]	15200	22400	10000	10600	11900	18100	16100	27100	21400	15900
##	[4091]	37200	13500	47400	9500	35700	39000	15100	16100	23600	15800
##	[4101]	15800	11800	47000	25700	32700	17100	25600	23100	13400	57100
##	[4111]	63100	31900	25800	42000	15000	35300	47000	34900	17500	34500
##	[4121]	12500	14600	10600	37800	22400	16900	17600	16300	13100	15000
##	[4131]	23800	55500	14300	4900	23200	19400	30000	16400	11800	15200
##	[4141]	55300	14200	30500	26100	42200	15500	82400	32500	16200	12700
##	[4151]	15200	44300	12200	17000	35100	20700	17300	15000	16200	9900
##	[4161]	21700	10200	24400	21700	11400	18600	42800	14200	22600	14200
##	[4171]	16800	16100	20300	30100	11900	16100	16100	35000	35900	21200
##	[4171]	20600	13400	18400	19300	22900	13700	38000	41300	39900	17100
π#	[4101]	20000	10400	10400	19300	22300	10100	30000	41000	00000	11100

##	[4191]	21400	26800	13100	16100	44100	16200	36300	41100	39300	43400
##	[4201]	19900	16800	18700	22800	8100	10000	18100	17000	23200	34500
##	[4211]	17400	12600	14300	17000	46300	22300	17800	13400	17900	44300
##	[4221]	9300	18000	14900	15800	10600	12000	13800	19600	19600	13600
##	[4231]	21500	23500	11800	46500	10200	59300	17900	18600	16800	26700
##	[4241]	14900	35600	17700	16700	22900	24200	6600	30900	35300	10800
##	[4251]	23300	13100	33300	22300	19000	32700	16800	39300	23800	19500
##	[4261]	42400	21100	33600	34500	19800	43800	18800	30500	13300	9900
##	[4271]	10900	44700	26500	14600	35500	42700	19900	11900	8300	28000
##	[4281]	20900	23700	48800	23300	41300	26200	33500	11700	17600	33300
##	[4291]	8100	14200	19000	5300	11200	36100	21700	13700	19400	14000
##	[4301]	35200	12100	14800	26700	19300	26400	27300	19300	12400	13100
##	[4311]	22800	15800	21700	30300	20500	35900	9600	50000	16500	14200
##	[4321]	32200	16700	35400	15200	23000	10500	14200	13600	22700	14300
##	[4331]	12500	41600	17300	16100	21200	15800	5500	15700	39400	49900
##	[4341]	14300	23900	32200	6300	16200	6800	38400	17400	13400	36100
##	[4351]	35800	12500	22100	48800	16500	5800	100	21400	34200	12800
##	[4361]	20200	17100	37400	21800	16200	5200	32100	13000	14500	13600
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##	[4381]	41100	22400	34000	42100	16400	15500	16800	15400	14000	20700
##	[4391]	18700	17300	29100	16200	20200	14900	12900	11400	18300	10700
##	[4401]	17800	3500	7000	12100	16800	23200	22700	12100	17000	16700
##	[4411]	29000	26100	10100	14200	24400	24200	23800	18900	17300	16800
##	[4421]	16900	11400	17000	7500	23100	20800	10600	18000	22100	33000
##	[4431]	18300	17300	27300	38000	41200	12500	17100	31100	17700	46100
##	[4441]	12600	13700	14500	16100	14400	32800	50000	40500	11100	5100
##	[4451]	33900	20000	11900	28600	14700	12400	14500	45300	15400	14800
##	[4461]	14900	19800	18800	18700	13700	36900	13400	13400	30900	10000
##	[4471]	20100	5200	8900	23000	15600	26700	37800	32700	13400	15800
##	[4481]	44600	15400	7800	19300	5500	16700	12700	11900	14500	15500
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##	[4501]	16700	16900	14900	20800	15600	34500	27300	14600	46600	14000
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##	[4521]	39300	25800	11500	14000	15600	25900	36400	21300	31700	19500
##	[4531]	11400	34200	10500	12200	9900	39500	14900	12700	21300	23600
##	[4541]	17000	17600	14300	5800	17600	17800	15900	40500	15800	19200
##	[4551]	17200	50000	17800	17300	28300	13400	12700	38700	34500	15200
##	[4561]	36300	18100	16700	12400	8800	17700	12900	15900	20500	13800
##	[4571]	26400	36300	33200	33300	10100	14200	39300	16500	17000	23100
## ##	[4581]	14900	29800	15200 6000	26500	13400 20200	38400	11900	10000	13100	43400
##	[4591] [4601]	9300 22000	15400 13700	20800	20200 15100	20200	10000 35300	13900 16700	14100 15800	45500 7100	11900 14000
##	[4611]	13200	11300	18700	16600	55700	11900	37200	20000	22000	7900
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##	[4671]	17400	50600	35600	20500	16500	18300	35700	23100	15500	20800
##	[4681]	12800	17100	43000		142800	11300	18400	15100	32500	9500
##	[4691]	36100	23800	15500	17800	26800	14900	9500	14900	17800	20800
##	[4701]	35700	43400	34800	30000	3600	16100	6200	19800	37400	20100
##	[4711]	22000	11900	39100	3600	27400	29800	43400	11300	35700	6600
##	[4721]	22000	34200	40000	29900	11300	6300	39900	13700	46300	14400

```
## [4731]
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                  73100 15400 26500
                                         25100
                                                35400 41100 13400
                                                                       17300
                                                                              17300
## [4741]
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                                                        31100
                                                               13700
                                                                       15000
                                                                              66600
            8500
                          19000 178500
## [4751]
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                                                               28600
                                                                       11900
                                                                              10700
## [4761]
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           18100
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                                                        24500
                                                                9300
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## [4781]
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                                                        42800
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## [4791]
           20900
                   34600
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## [4801]
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                            800
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           15700
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                                                          800
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## [4811]
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                                                18600
                                                        14000
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## [4821]
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## [4831]
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                  17100
                          20200
                                 16900
                                         14900
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                                                        14200
                                                               13400
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           17000
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                          15500
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Log_Price <- log(data\$price)
print(Log Price)</pre>

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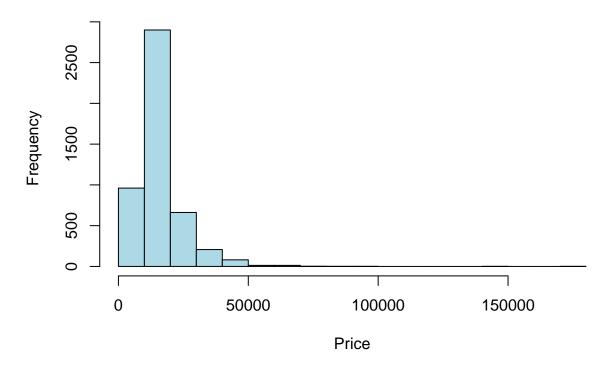
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                             9.913438
                                       9.735069
                                                 9.609116
                                                           9.517825
                                                                    9.560997
## [4838]
          9.503010 9.588777 9.769956 9.740969 10.030120
                                                           9.648595
```

Plot at least one quantitative variable, and one scatterplot - Histogram of the price variable

```
hist(data$price,
main = "Histogram of Price",
xlab = "Price",
ylab = "Frequency",
col = "lightblue",
border = "black")
```

Histogram of Price



Plot at least one quantitative variable, and one scatterplot - Scatterplot of mileage to price

```
plot(data$mileage, data$price,
    main = "Scatterplot of Mileage vs. Price",
    xlab = "Mileage",
    ylab = "Price",
    col = "blue",  # Color of points
    cex = .5)  # Size of points
```

Scatterplot of Mileage vs. Price

