MoneyBall

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The purpose of the assignment was to analyze 2276 records of baseball team data collected from 1871 to 2006 inclusive, in order to predict the number of wins for the team. The collected data was normalized for 162 games .Ordinary least square linear regression was used to predict the number of wins for the team. OLS regression was performed using forward, backward and stepwise using series of variables deemed fit for the model based on exploratory data analysis. The best model based on goodness of fit was analyzed to determine if the model was adequate to be deemed good enough to predict baseball wins. The best model was run on test data to create a scorecard

```
  infile<-read.csv("H:/Prasanna Krishna/MS/411/MoneyBall/moneyball.csv")
  infile1<-data.frame(infile)
  rows<-dim(infile1)[1]

for( index in 1:rows)

{

       indicator<-is.na(infile1$TEAM_BATTING_H[index])
        if ( indicator %in%  FALSE)
           {if  ((infile1$TEAM_BATTING_H  [index] <= 1188)  )

         { infile1$TEAM_BATTING_H  [index] = 1118 }
            else
      if   (infile1$TEAM_BATTING_H  [index] >= 1950)
           { infile1$TEAM_BATTING_H  [index] = 1950} }

        indicator<-is.na(infile1$TEAM_BATTING_H[index])
        if ( indicator %in%  FALSE)
    { if  ((infile1$TEAM_BATTING_H  [index] <= 1188)  )
        { infile1$TEAM_BATTING_H  [index] = 1118 }
           else
     if   (infile1$TEAM_BATTING_H  [index] >= 1950)
          { infile1$TEAM_BATTING_H  [index] = 1950} }

          indicator<-is.na(infile1$TEAM_BATTING_2B[index])
           if ( indicator %in%  FALSE)
     { if  ((infile1$TEAM_BATTING_2B [index] <= 141)  )
        { infile1$TEAM_BATTING_2B [index] = 141}
           else
     if   (infile1$TEAM_BATTING_2B  [index] >= 352)
          { infile1$TEAM_BATTING_2B  [index] =  352}}



           indicator<-is.na(infile1$TEAM_BATTING_3B[index])
           if ( indicator %in%  FALSE)
    { if  ((infile1$TEAM_BATTING_3B [index] <= 17)  )
        { infile1$TEAM_BATTING_3B [index] = 17}
```

```
      else
if   (infile1$TEAM_BATTING_3B  [index] >= 134)
     { infile1$TEAM_BATTING_3B  [index] =  134}}



      indicator<-is.na(infile1$TEAM_BATTING_BB[index])
           if ( indicator %in%  FALSE)
   { if  ((infile1$TEAM_BATTING_BB [index] <= 141)  )
   { infile1$TEAM_BATTING_BB [index] = 141}
      else
if   (infile1$TEAM_BATTING_BB  [index] >= 755)
     { infile1$TEAM_BATTING_BB  [index] =  755}}


    indicator<-is.na(infile1$TEAM_PITCHING_HR[index])
     if ( indicator %in%  FALSE)
    { if  ((infile1$TEAM_PITCHING_HR [index] <= 8)  )
    { infile1$TEAM_PITCHING_HR[index] = 8}
      else
 if   (infile1$TEAM_PITCHING_HR [index] >= 244)
      { infile1$TEAM_PITCHING_HR  [index] =  244}}

    indicator<-is.na(infile1$TEAM_FIELDING_E[index])
     if ( indicator %in%  FALSE)
 { if  ((infile1$TEAM_FIELDING_E  [index] <= 86)  )
       { infile1$TEAM_FIELDING_E [index] = 86}
    else
if   (infile1$TEAM_FIELDING_E  [index] >= 1237)
     { infile1$TEAM_FIELDING_E  [index] =  1237}}

   indicator<-is.na(infile1$TEAM_PITCHING_H[index])
   if ( indicator %in%  FALSE)
   { if  ((infile1$TEAM_PITCHING_H [index] <= 1244)  )
        { infile1$TEAM_PITCHING_H[index] = 1244}
      else
if   (infile1$TEAM_PITCHING_H[index] >= 7000 )
     { infile1$TEAM_PITCHING_H [index] = 7000 }}

   indicator<-is.na(infile1$TEAM_PITCHING_SO[index])
    if ( indicator %in%  FALSE)
    { if  ((infile1$TEAM_PITCHING_SO[index] <= 205)  )
   { infile1$TEAM_PITCHING_SO[index] = 205}
 else
if   (infile1$TEAM_PITCHING_SO [index] >= 1474)
     { infile1$TEAM_PITCHING_SO[index] =  1474}}


   indicator<-is.na(infile1$TEAM_FIELDING_DP[index])
      if ( indicator %in%  FALSE)
 {
    if  ((infile1$TEAM_FIELDING_DP[index] <= 79)  )
   { infile1$TEAM_FIELDING_DP[index] = 79}
```

```
       else
      if   (infile1$TEAM_FIELDING_DP[index] >= 204)
           { infile1$TEAM_FIELDING_DP[index] =  204}}

        indicator<-is.na(infile1$TEAM_BASERUN_CS[index])
           if ( indicator %in%  FALSE)
       {
          if  ((infile1$TEAM_BASERUN_CS[index] <= 79)  )
         { infile1$TEAM_BASERUN_CS[index] = 79}
       else
      if   (infile1$TEAM_BASERUN_CS[index] >= 204)
           { infile1$TEAM_BASERUN_CS[index] =  204}}

         }
   library(caret)
```

```
## Warning: package 'caret' was built under R version 3.0.3
```

```
## Loading required package: lattice
```

```
## Warning: package 'lattice' was built under R version 3.0.3
```

```
## Loading required package: ggplot2
```

```
## Warning: package 'ggplot2' was built under R version 3.0.3
```

```
   preProc <- preProcess(method="bagImpute",infile1)
```

```
## Warning: package 'ipred' was built under R version 3.0.3
```

```
   infile1 <- predict(preProc, infile1)
   fit <- lm( TARGET_WINS~TEAM_BATTING_H  +
  TEAM_BATTING_2B+
  TEAM_BATTING_3B +
  TEAM_BATTING_HR  +
  TEAM_BATTING_BB  +
  TEAM_BATTING_SO +
  TEAM_BASERUN_SB +
  TEAM_BASERUN_CS  +
  TEAM_PITCHING_H +
  TEAM_PITCHING_HR +
  TEAM_PITCHING_BB +
  TEAM_PITCHING_SO +
  TEAM_FIELDING_E +
  TEAM_FIELDING_DP ,data=infile1)
   library(MASS)
```

```
## Warning: package 'MASS' was built under R version 3.0.3
```

```r
stepAIC(fit, direction="both")
```

```
## Start:  AIC=11781
## TARGET_WINS ~ TEAM_BATTING_H + TEAM_BATTING_2B + TEAM_BATTING_3B +
##     TEAM_BATTING_HR + TEAM_BATTING_BB + TEAM_BATTING_SO + TEAM_BASERUN_SB +
##     TEAM_BASERUN_CS + TEAM_PITCHING_H + TEAM_PITCHING_HR + TEAM_PITCHING_BB +
##     TEAM_PITCHING_SO + TEAM_FIELDING_E + TEAM_FIELDING_DP
##
##                     Df Sum of Sq    RSS   AIC
## - TEAM_PITCHING_BB  1         1 397563 11779
## - TEAM_PITCHING_HR  1         3 397565 11779
## - TEAM_BASERUN_CS   1        26 397589 11779
## - TEAM_BATTING_SO   1       301 397863 11781
## <none>                          397562 11781
## - TEAM_PITCHING_SO  1       369 397931 11781
## - TEAM_BATTING_HR   1       654 398217 11783
## - TEAM_BATTING_2B   1       739 398302 11783
## - TEAM_PITCHING_H   1       749 398312 11783
## - TEAM_BATTING_BB   1      1243 398805 11786
## - TEAM_BATTING_3B   1      6829 404392 11818
## - TEAM_BASERUN_SB   1      7024 404587 11819
## - TEAM_FIELDING_E   1     10228 407790 11837
## - TEAM_FIELDING_DP  1     12091 409654 11847
## - TEAM_BATTING_H    1     20578 418140 11894
##
## Step:  AIC=11779
## TARGET_WINS ~ TEAM_BATTING_H + TEAM_BATTING_2B + TEAM_BATTING_3B +
##     TEAM_BATTING_HR + TEAM_BATTING_BB + TEAM_BATTING_SO + TEAM_BASERUN_SB +
##     TEAM_BASERUN_CS + TEAM_PITCHING_H + TEAM_PITCHING_HR + TEAM_PITCHING_SO +
##     TEAM_FIELDING_E + TEAM_FIELDING_DP
##
##                     Df Sum of Sq    RSS   AIC
## - TEAM_PITCHING_HR  1         3 397566 11777
## - TEAM_BASERUN_CS   1        27 397590 11777
## - TEAM_BATTING_SO   1       310 397873 11779
## <none>                          397563 11779
## - TEAM_PITCHING_SO  1       390 397953 11779
## - TEAM_BATTING_HR   1       663 398226 11781
## + TEAM_PITCHING_BB  1         1 397562 11781
## - TEAM_BATTING_2B   1       753 398316 11781
## - TEAM_PITCHING_H   1       992 398555 11783
## - TEAM_BATTING_BB   1      2510 400074 11791
## - TEAM_BATTING_3B   1      6906 404470 11816
## - TEAM_BASERUN_SB   1      7276 404839 11818
## - TEAM_FIELDING_E   1     10810 408373 11838
## - TEAM_FIELDING_DP  1     12177 409740 11846
## - TEAM_BATTING_H    1     22045 419608 11900
##
## Step:  AIC=11777
## TARGET_WINS ~ TEAM_BATTING_H + TEAM_BATTING_2B + TEAM_BATTING_3B +
##     TEAM_BATTING_HR + TEAM_BATTING_BB + TEAM_BATTING_SO + TEAM_BASERUN_SB +
##     TEAM_BASERUN_CS + TEAM_PITCHING_H + TEAM_PITCHING_SO + TEAM_FIELDING_E +
##     TEAM_FIELDING_DP
```

```
##
##                     Df Sum of Sq    RSS   AIC
## - TEAM_BASERUN_CS    1        27 397594 11775
## <none>                            397566 11777
## - TEAM_BATTING_SO    1       364 397930 11777
## - TEAM_PITCHING_SO   1       497 398063 11778
## + TEAM_PITCHING_HR   1         3 397563 11779
## + TEAM_PITCHING_BB   1         1 397565 11779
## - TEAM_BATTING_2B    1       750 398316 11779
## - TEAM_PITCHING_H    1      1093 398659 11781
## - TEAM_BATTING_BB    1      2513 400079 11789
## - TEAM_BATTING_3B    1      7087 404654 11815
## - TEAM_BASERUN_SB    1      7329 404896 11816
## - TEAM_BATTING_HR    1      7700 405267 11819
## - TEAM_FIELDING_E    1     11604 409170 11840
## - TEAM_FIELDING_DP   1     12263 409830 11844
## - TEAM_BATTING_H     1     22054 419620 11898
##
## Step:  AIC=11775
## TARGET_WINS ~ TEAM_BATTING_H + TEAM_BATTING_2B + TEAM_BATTING_3B +
##     TEAM_BATTING_HR + TEAM_BATTING_BB + TEAM_BATTING_SO + TEAM_BASERUN_SB +
##     TEAM_PITCHING_H + TEAM_PITCHING_SO + TEAM_FIELDING_E + TEAM_FIELDING_DP
##
##                     Df Sum of Sq    RSS   AIC
## <none>                            397594 11775
## - TEAM_BATTING_SO    1       365 397959 11775
## - TEAM_PITCHING_SO   1       491 398085 11776
## + TEAM_BASERUN_CS    1        27 397566 11777
## + TEAM_PITCHING_HR   1         4 397590 11777
## + TEAM_PITCHING_BB   1         1 397592 11777
## - TEAM_BATTING_2B    1       751 398344 11777
## - TEAM_PITCHING_H    1      1114 398708 11779
## - TEAM_BATTING_BB    1      2509 400103 11787
## - TEAM_BATTING_3B    1      7154 404748 11814
## - TEAM_BASERUN_SB    1      7422 405016 11815
## - TEAM_BATTING_HR    1      7674 405267 11817
## - TEAM_FIELDING_E    1     11859 409452 11840
## - TEAM_FIELDING_DP   1     12337 409931 11843
## - TEAM_BATTING_H     1     22036 419629 11896


##
## Call:
## lm(formula = TARGET_WINS ~ TEAM_BATTING_H + TEAM_BATTING_2B +
##     TEAM_BATTING_3B + TEAM_BATTING_HR + TEAM_BATTING_BB + TEAM_BATTING_SO +
##     TEAM_BASERUN_SB + TEAM_PITCHING_H + TEAM_PITCHING_SO + TEAM_FIELDING_E +
##     TEAM_FIELDING_DP, data = infile1)
##
## Coefficients:
##      (Intercept)    TEAM_BATTING_H   TEAM_BATTING_2B   TEAM_BATTING_3B
##         15.24835           0.04530          -0.01930           0.11496
##  TEAM_BATTING_HR   TEAM_BATTING_BB   TEAM_BATTING_SO   TEAM_BASERUN_SB
##          0.05991           0.01322          -0.00568           0.02818
##  TEAM_PITCHING_H  TEAM_PITCHING_SO   TEAM_FIELDING_E  TEAM_FIELDING_DP
##          0.00189           0.00560          -0.02526          -0.10845
```

You can also embed plots, for example:

```
 infile2<-read.csv("H:/Prasanna Krishna/MS/411/MoneyBall/moneyball_test.csv")
 infile3<-data.frame(infile2)
 rows<-dim(infile2)[1]

for( index in 1:rows)

{

       indicator<-is.na(infile3$TEAM_BATTING_H[index])
        if ( indicator %in%  FALSE)
           {if  ((infile3$TEAM_BATTING_H  [index] <= 1188)  )

         { infile3$TEAM_BATTING_H  [index] = 1118 }
            else
      if   (infile3$TEAM_BATTING_H  [index] >= 1950)
           { infile3$TEAM_BATTING_H  [index] = 1950} }

        indicator<-is.na(infile3$TEAM_BATTING_H[index])
        if ( indicator %in%  FALSE)
     { if  ((infile3$TEAM_BATTING_H  [index] <= 1188)  )
         { infile3$TEAM_BATTING_H  [index] = 1118 }
            else
      if   (infile3$TEAM_BATTING_H  [index] >= 1950)
           { infile3$TEAM_BATTING_H  [index] = 1950} }

          indicator<-is.na(infile3$TEAM_BATTING_2B[index])
           if ( indicator %in%  FALSE)
      { if  ((infile3$TEAM_BATTING_2B [index] <= 141)  )
         { infile3$TEAM_BATTING_2B [index] = 141}
            else
      if   (infile3$TEAM_BATTING_2B  [index] >= 352)
           { infile3$TEAM_BATTING_2B  [index] =  352}}



            indicator<-is.na(infile3$TEAM_BATTING_3B[index])
            if ( indicator %in%  FALSE)
     { if  ((infile3$TEAM_BATTING_3B [index] <= 17)  )
         { infile3$TEAM_BATTING_3B [index] = 17}
            else
      if   (infile3$TEAM_BATTING_3B  [index] >= 134)
           { infile3$TEAM_BATTING_3B  [index] =  134}}



            indicator<-is.na(infile3$TEAM_BATTING_BB[index])
                 if ( indicator %in%  FALSE)
         { if  ((infile3$TEAM_BATTING_BB [index] <= 141)  )
         { infile3$TEAM_BATTING_BB [index] = 141}
            else
      if   (infile3$TEAM_BATTING_BB  [index] >= 755)
           { infile3$TEAM_BATTING_BB  [index] =  755}}
```

```
    indicator<-is.na(infile3$TEAM_PITCHING_HR[index])
     if ( indicator %in%  FALSE)
    { if  ((infile3$TEAM_PITCHING_HR [index] <= 8)  )
    { infile3$TEAM_PITCHING_HR[index] = 8}
      else
 if   (infile3$TEAM_PITCHING_HR [index] >= 244)
      { infile3$TEAM_PITCHING_HR  [index] =  244}}

    indicator<-is.na(infile3$TEAM_FIELDING_E[index])
     if ( indicator %in%  FALSE)
 { if  ((infile3$TEAM_FIELDING_E  [index] <= 86)  )
       { infile3$TEAM_FIELDING_E [index] = 86}
    else
if   (infile3$TEAM_FIELDING_E  [index] >= 1237)
     { infile3$TEAM_FIELDING_E  [index] =  1237}}

   indicator<-is.na(infile3$TEAM_PITCHING_H[index])
   if ( indicator %in%  FALSE)
   { if  ((infile3$TEAM_PITCHING_H [index] <= 1244)  )
        { infile3$TEAM_PITCHING_H[index] = 1244}
      else
if   (infile3$TEAM_PITCHING_H[index] >= 7000 )
     { infile3$TEAM_PITCHING_H [index] = 7000 }}

   indicator<-is.na(infile3$TEAM_PITCHING_SO[index])
    if ( indicator %in%  FALSE)
    { if  ((infile3$TEAM_PITCHING_SO[index] <= 205)  )
   { infile3$TEAM_PITCHING_SO[index] = 205}
 else
if   (infile3$TEAM_PITCHING_SO [index] >= 1474)
     { infile3$TEAM_PITCHING_SO[index] =  1474}}


   indicator<-is.na(infile3$TEAM_FIELDING_DP[index])
      if ( indicator %in%  FALSE)
 {
    if  ((infile3$TEAM_FIELDING_DP[index] <= 79)  )
   { infile3$TEAM_FIELDING_DP[index] = 79}
 else
if   (infile3$TEAM_FIELDING_DP[index] >= 204)
     { infile3$TEAM_FIELDING_DP[index] =  204}}

  indicator<-is.na(infile3$TEAM_BASERUN_CS[index])
     if ( indicator %in%  FALSE)
 {
    if  ((infile3$TEAM_BASERUN_CS[index] <= 79)  )
   { infile3$TEAM_BASERUN_CS[index] = 79}
 else
if   (infile3$TEAM_BASERUN_CS[index] >= 204)
     { infile3$TEAM_BASERUN_CS[index] =  204}}

   }
```

```
   library(caret)
   preProc <- preProcess(method="bagImpute",infile3)
   infile3 <- predict(preProc, infile3)
     infile3$P_TARGET = 16.310849  + infile3$TEAM_BATTING_H*0.045216  - 0.019104 * infile3$TEAM_BATTING
                        0.115396* infile3$TEAM_BATTING_3B + 0.059895*infile3$TEAM_BATTING_HR -0.014036*in
                       -0.005792*infile3$TEAM_BATTING_SO +  0.026133 *infile3$TEAM_BASERUN_SB +
                       0.001826 *infile3$TEAM_PITChING_H +.005742 *infile3$TEAM_PITCHING_SO -
                       infile3$TEAM_FIELDING_E *.024937+ 0.116501*infile3$TEAM_FIELDING_DP
```

```
## numeric(0)
```

```
   scorecard<-infile3[,c(1,17)]
   scorecard
```

```
##     INDEX P_TARGET
## 1       9    70.23
## 2      10    70.01
## 3      14    77.66
## 4      47    86.04
## 5      60    83.94
## 6      63    80.20
## 7      74    77.38
## 8      83    77.74
## 9      98    73.69
## 10    120    77.40
## 11    123    76.85
## 12    135    89.07
## 13    138    86.80
## 14    140    83.91
## 15    151    80.56
## 16    153    84.02
## 17    171    74.49
## 18    184    81.16
## 19    193    72.55
## 20    213    95.56
## 21    217    81.37
## 22    226    84.39
## 23    230    81.97
## 24    241    76.91
## 25    291    85.39
## 26    294    86.64
## 27    300    82.03
## 28    348    81.59
## 29    350    81.32
## 30    357    78.77
## 31    367    86.76
## 32    368    85.80
## 33    372    82.33
## 34    382    84.71
## 35    388    84.40
## 36    396    84.11
## 37    398    76.93
## 38    403    93.75
```

```
## 39    407    85.98
## 40    410    92.63
## 41    412    80.55
## 42    414    84.52
## 43    436    66.42
## 44    440    92.28
## 45    476    85.66
## 46    479    94.57
## 47    481   100.17
## 48    501    77.26
## 49    503    73.90
## 50    506    79.95
## 51    519    83.82
## 52    522    86.19
## 53    550    82.09
## 54    554    79.00
## 55    566    79.15
## 56    578    81.40
## 57    596    89.11
## 58    599    74.01
## 59    605    65.63
## 60    607    80.19
## 61    614    85.91
## 62    644    76.20
## 63    692    84.16
## 64    699    87.53
## 65    700    85.57
## 66    716    90.82
## 67    721    84.20
## 68    722    91.19
## 69    729    77.10
## 70    731    84.21
## 71    746    94.78
## 72    763    78.28
## 73    774    83.59
## 74    776    89.18
## 75    788    87.25
## 76    789    90.91
## 77    792    78.79
## 78    811    81.79
## 79    835    73.39
## 80    837    78.90
## 81    861    87.40
## 82    862    93.58
## 83    863   101.21
## 84    871    83.23
## 85    879    84.72
## 86    887    83.16
## 87    892    79.00
## 88    904    83.08
## 89    909    79.02
## 90    925    85.59
## 91    940    80.27
## 92    951   107.75
```

```
## 93    976    79.51
## 94    981    85.47
## 95    983    79.98
## 96    984    78.84
## 97    989    80.20
## 98    995   100.64
## 99   1000    88.62
## 100  1001    90.72
## 101  1007    87.01
## 102  1016    76.18
## 103  1027    86.14
## 104  1033    81.59
## 105  1070    82.27
## 106  1081    89.55
## 107  1084    73.45
## 108  1098    82.97
## 109  1150    83.69
## 110  1160    74.17
## 111  1169    81.46
## 112  1172    82.59
## 113  1174    91.63
## 114  1176    91.55
## 115  1178    85.80
## 116  1184    80.98
## 117  1193    90.28
## 118  1196    80.72
## 119  1199    81.65
## 120  1207    79.45
## 121  1218    90.37
## 122  1223    69.08
## 123  1226    73.50
## 124  1227    68.40
## 125  1229    72.84
## 126  1241    94.00
## 127  1244    96.04
## 128  1246    81.25
## 129  1248    91.29
## 130  1249    98.34
## 131  1253    87.22
## 132  1261    77.13
## 133  1305    77.00
## 134  1314    84.60
## 135  1323    85.65
## 136  1328    82.72
## 137  1353    78.14
## 138  1363    81.51
## 139  1371    79.68
## 140  1372    78.79
## 141  1389    72.99
## 142  1393    74.92
## 143  1421    92.69
## 144  1431    80.93
## 145  1437    72.70
## 146  1442    76.43
```

```
## 147  1450    80.58
## 148  1463    79.78
## 149  1464    85.87
## 150  1470    82.75
## 151  1471    85.99
## 152  1484    79.88
## 153  1495    84.89
## 154  1507    79.41
## 155  1514    75.69
## 156  1526    76.03
## 157  1549    85.60
## 158  1552    82.53
## 159  1556    97.29
## 160  1564    75.64
## 161  1585   103.83
## 162  1586    99.32
## 163  1590    89.23
## 164  1591   101.50
## 165  1592    93.94
## 166  1603    90.34
## 167  1612    86.89
## 168  1634    84.60
## 169  1645    77.12
## 170  1647    81.37
## 171  1673    89.05
## 172  1674    83.37
## 173  1687    81.44
## 174  1688    90.96
## 175  1700    85.39
## 176  1708    75.54
## 177  1713    73.95
## 178  1717    80.18
## 179  1721    77.56
## 180  1730    79.04
## 181  1737    74.59
## 182  1748    83.44
## 183  1749    81.91
## 184  1763    83.51
## 185  1768   112.65
## 186  1778    94.79
## 187  1780    87.61
## 188  1782    80.95
## 189  1784    74.43
## 190  1794   104.90
## 191  1803    76.49
## 192  1804    83.14
## 193  1819    84.41
## 194  1832    83.99
## 195  1833    85.08
## 196  1844    73.27
## 197  1847    80.75
## 198  1854    78.68
## 199  1855    79.56
## 200  1857    85.40
```

```
## 201  1864    83.01
## 202  1865    83.01
## 203  1869    76.59
## 204  1880    82.84
## 205  1881    78.19
## 206  1882    77.15
## 207  1894    79.01
## 208  1896    77.32
## 209  1916    83.21
## 210  1918    79.94
## 211  1921   104.64
## 212  1926   100.82
## 213  1938    84.44
## 214  1979    72.12
## 215  1982    78.21
## 216  1987    89.79
## 217  1997    90.27
## 218  2004    88.98
## 219  2011    79.16
## 220  2015    76.54
## 221  2022    80.90
## 222  2025    79.14
## 223  2027    84.02
## 224  2031    83.35
## 225  2036   106.76
## 226  2066    76.68
## 227  2073    81.18
## 228  2087    80.09
## 229  2092    79.06
## 230  2125    89.17
## 231  2148    71.25
## 232  2162    96.00
## 233  2191    81.74
## 234  2203    89.16
## 235  2218    79.70
## 236  2221    74.77
## 237  2225    82.01
## 238  2232    80.39
## 239  2267    97.36
## 240  2291    78.79
## 241  2299    92.96
## 242  2317    87.89
## 243  2318    84.15
## 244  2353    85.63
## 245  2403    61.71
## 246  2411    88.59
## 247  2415    82.67
## 248  2424    86.01
## 249  2441    78.01
## 250  2464    87.39
## 251  2465    84.62
## 252  2472    82.41
## 253  2481    92.04
## 254  2487    70.78
```

```
## 255  2500    71.22
## 256  2501    73.88
## 257  2520    77.61
## 258  2521    78.76
## 259  2525    82.51
```