ACP-SDA

Quarto

Quarto enables you to weave together content and executable code into a finished document. To learn more about Quarto see https://quarto.org.

Running Code

When you click the **Render** button a document will be generated that includes both content and the output of embedded code. You can embed code like this:

```
#Importul datelor in R
  date = read.csv("cantitative SDA.csv", header=TRUE, sep=',')
  head(date)
  insured_cod months_as_customer insured_age policy_number policy_bind_year
       466132
1
                               328
                                             48
                                                        521585
                                                                            2014
2
                                             42
       468176
                               228
                                                        342868
                                                                            2006
3
       430632
                               134
                                             29
                                                        687698
                                                                            2000
4
       608117
                               256
                                             41
                                                        227811
                                                                            1990
5
       610706
                               228
                                             44
                                                        367455
                                                                            2014
                                             39
6
       478456
                               256
                                                        104594
                                                                            2006
  policy_bind_month policy_bind_day policy_deductable incident_year
                                   17
1
                  10
                                                    1000
                                                                   2015
2
                                   27
                   6
                                                    2000
                                                                   2015
3
                   9
                                    6
                                                    2000
                                                                   2015
4
                   5
                                   25
                                                    2000
                                                                   2015
5
                   6
                                    6
                                                    1000
                                                                   2015
                                   12
                                                    1000
                                                                   2015
  incident_month incident_day number_of_vehicles_involved bodily_injuries
                             25
1
                1
                                                            1
                                                                             1
2
                1
                             21
                                                            1
                                                                             0
```

```
3
                 2
                               22
                                                                 3
                                                                                   2
4
                 1
                               10
                                                                 1
                                                                                   1
                 2
                                                                                   0
5
                               17
                                                                 1
6
                 1
                                2
                                                                 3
                                                                                   0
  witnesses vehicle_price injury_claim auto_year fraud_reported
                       71610
                                       6510
                                                   2004
1
2
           0
                        5070
                                        780
                                                   2007
                                                                        1
3
           3
                       34650
                                       7700
                                                   2007
                                                                        0
4
           2
                       63400
                                                   2014
                                       6340
                                                                        1
5
           1
                        6500
                                       1300
                                                   2009
                                                                        0
6
           2
                       64100
                                       6410
                                                   2003
                                                                        1
```

attach(date)
View(date)

You can add options to executable code like this

#Statistici descriptive
summary(date)

```
insured cod
                 months_as_customer
                                      insured age
                                                      policy_number
       :430104
                 Min. : 0.0
                                     Min.
                                             :19.00
                                                      Min.
                                                             :100804
                 1st Qu.:115.2
1st Qu.:448444
                                     1st Qu.:32.00
                                                      1st Qu.:336189
Median: 466446
                 Median :199.5
                                     Median :38.00
                                                      Median:533135
       :501312
                         :203.9
                                             :38.94
Mean
                 Mean
                                     Mean
                                                      Mean
                                                             :546495
3rd Qu.:603257
                 3rd Qu.:276.8
                                     3rd Qu.:44.00
                                                      3rd Qu.:759819
Max.
       :620962
                 Max.
                         :479.0
                                     Max.
                                             :64.00
                                                      Max.
                                                             :999435
policy_bind_year policy_bind_month policy_bind_day policy_deductable
       :1990
                 Min.
                        : 1.000
                                    Min.
                                          : 1.00
                                                     Min.
                                                            : 500
                 1st Qu.: 3.000
                                    1st Qu.: 8.00
1st Qu.:1995
                                                     1st Qu.: 500
Median :2002
                 Median : 7.000
                                    Median :16.00
                                                     Median:1000
Mean
       :2002
                 Mean
                         : 6.558
                                    Mean
                                           :15.47
                                                     Mean
                                                            :1137
3rd Qu.:2008
                 3rd Qu.:10.000
                                    3rd Qu.:23.00
                                                     3rd Qu.:2000
                         :12.000
                                            :31.00
                                                            :2000
Max.
       :2015
                 Max.
                                    Max.
                                                     Max.
               incident month
                                                 number_of_vehicles_involved
incident year
                                 incident day
                       :1.000
                                       : 1.00
                                                        :1.000
Min.
       :2015
               Min.
                                                 Min.
1st Qu.:2015
               1st Qu.:1.000
                                1st Qu.: 8.00
                                                 1st Qu.:1.000
Median:2015
               Median :1.000
                                Median :15.00
                                                 Median :1.000
Mean
       :2015
               Mean
                       :1.495
                                Mean
                                       :14.99
                                                 Mean
                                                        :1.841
3rd Qu.:2015
               3rd Qu.:2.000
                                3rd Qu.:22.00
                                                 3rd Qu.:3.000
                       :3.000
                                       :31.00
                                                        :4.000
Max.
       :2015
               Max.
                                Max.
                                                 Max.
bodily_injuries
                                 vehicle_price
                                                    injury_claim
                  witnesses
```

```
Min.
       :0.000
                Min.
                        :0.000
                                 Min.
                                        :
                                             100
                                                   Min.
1st Qu.:0.000
                1st Qu.:1.000
                                 1st Qu.: 42060
                                                   1st Qu.: 4348
Median :1.000
                Median :1.000
                                 Median: 58150
                                                   Median: 6780
Mean
       :0.993
                Mean
                       :1.488
                                 Mean
                                        : 52863
                                                   Mean
                                                          : 7448
3rd Qu.:2.000
                3rd Qu.:2.000
                                 3rd Qu.: 70598
                                                   3rd Qu.:11315
Max.
       :2.000
                Max.
                        :3.000
                                 Max.
                                        :114920
                                                   Max.
                                                          :21450
  auto year
               fraud reported
Min.
       :1995
               Min.
                       :0.0000
1st Qu.:2000
               1st Qu.:0.0000
Median:2005
               Median :0.0000
Mean
       :2005
               Mean
                      :0.2475
3rd Qu.:2010
               3rd Qu.:0.0000
       :2015
Max.
               Max.
                       :1.0000
 #Analiza distributiei datelor
 # Abaterea standard
 apply(date, 2, sd)
```

```
insured cod
                           months_as_customer
    7.173551e+04
                                 1.152149e+02
     insured age
                                policy number
                                 2.568843e+05
    9.148001e+00
policy_bind_year
                            policy_bind_month
    7.357591e+00
                                 3.503277e+00
policy_bind_day
                            policy_deductable
    8.804254e+00
                                 6.121311e+02
   incident_year
                               incident_month
    0.000000e+00
                                 5.237345e-01
    incident_day number_of_vehicles_involved
    8.669223e+00
                                 1.019208e+00
 bodily_injuries
                                    witnesses
    8.203474e-01
                                 1.112235e+00
   vehicle_price
                                 injury_claim
    2.634192e+04
                                 4.875062e+03
       auto_year
                               fraud_reported
    6.017980e+00
                                 4.317731e-01
```

```
# Calcul coeficient de variatie
cv=function(x){
    (sd(x)/mean(x))*100
}
```

apply(date,2,cv)

```
insured_cod
                          months_as_customer
      14.3095551
                                  56.5003810
     insured_age
                               policy_number
      23.4902090
                                  47.0058073
policy_bind_year
                           policy_bind_month
       0.3675876
                                  53.4189490
 policy_bind_day
                           policy_deductable
      56.9267598
                                  53.8481156
   incident_year
                              incident_month
       0.000000
                                  35.0326439
    incident_day number_of_vehicles_involved
      57.8179946
                                  55.3712280
 bodily_injuries
                                   witnesses
      82.6141955
                                  74.7481904
   vehicle_price
                                injury_claim
      49.8308487
                                  65.4553881
       auto_year
                             fraud_reported
       0.3001318
                                 174.4573147
```

Coeficientii de asimetrie si aplatizare
library(moments)
apply(date,2,skewness)

insured_cod	months_as_customer
0.81262794	0.36222190
insured_age	policy_number
0.47919921	0.04068165
<pre>policy_bind_year</pre>	<pre>policy_bind_month</pre>
0.05510974	-0.01619904
<pre>policy_bind_day</pre>	<pre>policy_deductable</pre>
0.05171381	0.47484722
incident_year	incident_month
NaN	0.27145447
incident_day	<pre>number_of_vehicles_involved</pre>
0.03968438	0.49860045
bodily_injuries	witnesses
0.01293959	0.01713341
vehicle_price	injury_claim

765 0.2	26355179
rear fraud_n	reported
7864 1.1	17020538

apply(date, 2, kurtosis)

insured_cod	months_as_customer
1.804212	2.507564
insured_age	policy_number
2.732078	1.867170
<pre>policy_bind_year</pre>	<pre>policy_bind_month</pre>
1.788506	1.766922
<pre>policy_bind_day</pre>	<pre>policy_deductable</pre>
1.774192	1.620784
incident_year	incident_month
NaN	1.642850
incident_day	<pre>number_of_vehicles_involved</pre>
1.862907	1.497883
bodily_injuries	witnesses
1.487554	1.654908
vehicle_price	injury_claim
2.558404	2.237091
auto_year	fraud_reported
1.828252	2.369381

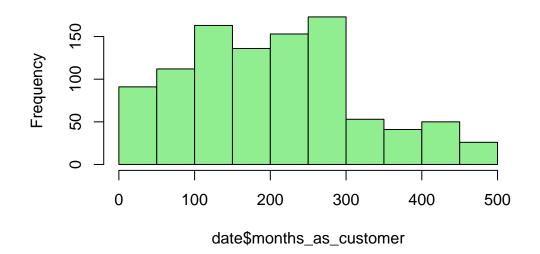
Varianta apply(date,2,var)

${\tt months_as_customer}$	insured_cod
1.327448e+04	5.145984e+09
policy_number	insured_age
6.598954e+10	8.368592e+01
policy_bind_month	<pre>policy_bind_year</pre>
1.227295e+01	5.413414e+01
policy_deductable	<pre>policy_bind_day</pre>
3.747045e+05	7.751489e+01
${\tt incident_month}$	incident_year
2.742978e-01	0.000000e+00
<pre>number_of_vehicles_involved</pre>	incident_day
1.038785e+00	7.515543e+01

```
bodily_injuries witnesses
6.729698e-01 1.237067e+00
vehicle_price injury_claim
6.938966e+08 2.376623e+07
auto_year fraud_reported
3.621608e+01 1.864280e-01
```

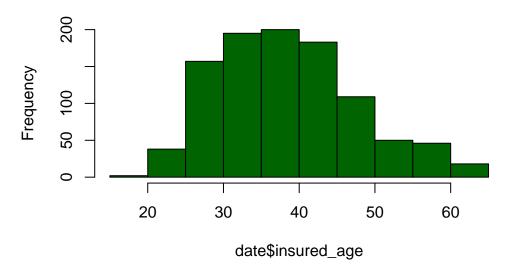
```
# Histograme
hist(date$months_as_customer, main="Histograma - months_as_customer", col="lightgreen")
```

Histograma – months_as_customer



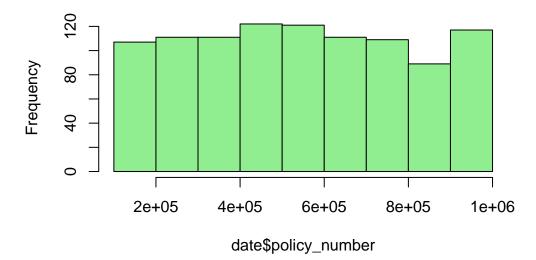
hist(date\$insured_age, main="Histograma - insured_age", col="darkgreen")

Histograma – insured_age

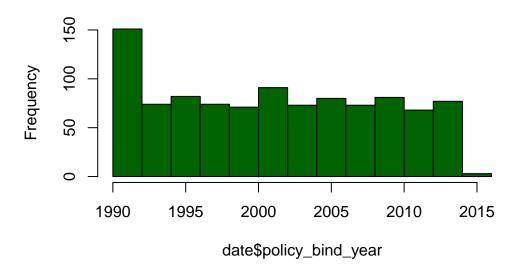


hist(date\$policy_number, main="Histograma - policy_number", col="lightgreen")

Histograma – policy_number

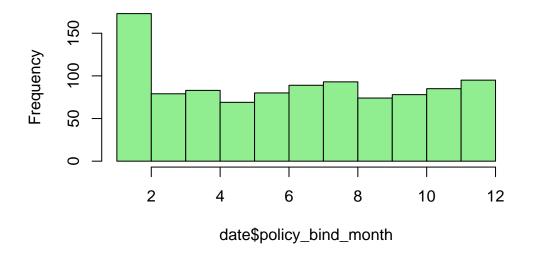


Histograma - policy_bind_year



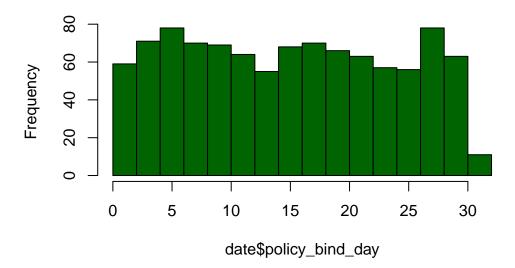
hist(date\$policy_bind_month, main="Histograma - policy_bind_month",
col="lightgreen")

Histograma – policy_bind_month

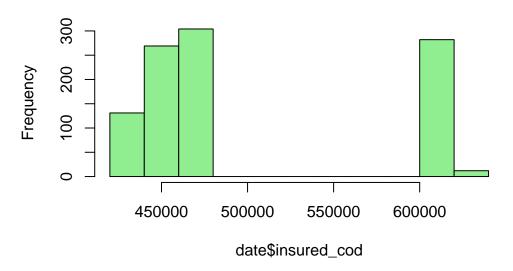


hist(date\$policy_bind_day, main="Histograma - policy_bind_day", col="darkgreen")

Histograma – policy_bind_day

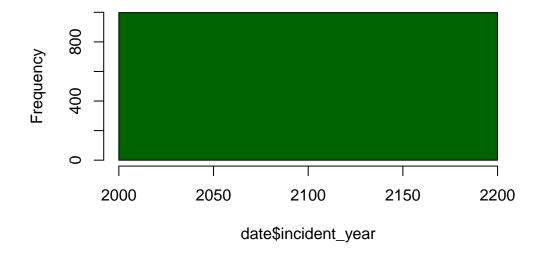


Histograma – insured_cod



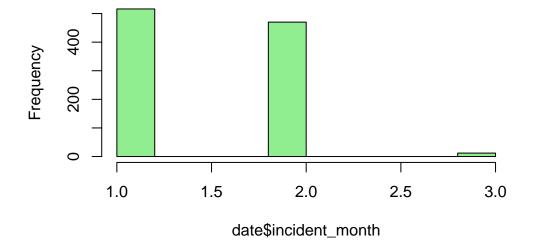
hist(date\$incident_year, main="Histograma - incident_year", col="darkgreen")

Histograma – incident_year

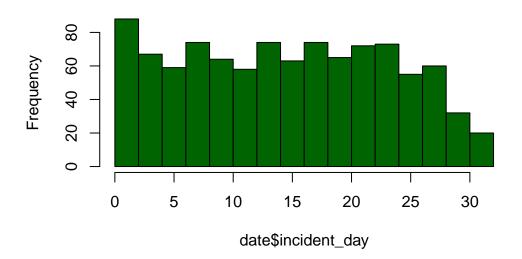


hist(date\$incident_month, main="Histograma - incident_month", col="lightgreen")

Histograma – incident_month

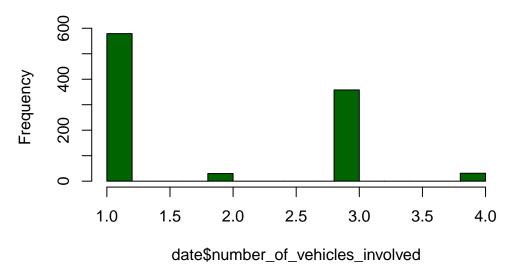


Histograma - incident_day



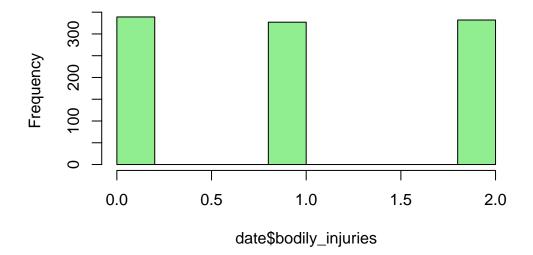
hist(date\$number_of_vehicles_involved, main="Histograma - number_of_vehicles_involved", co

Histograma – number_of_vehicles_involved

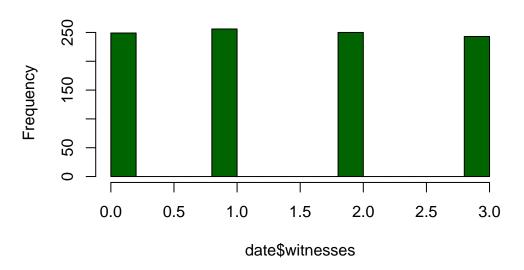


hist(date\$bodily_injuries, main="Histograma -bodily_injuries", col="lightgreen")

Histograma -bodily_injuries

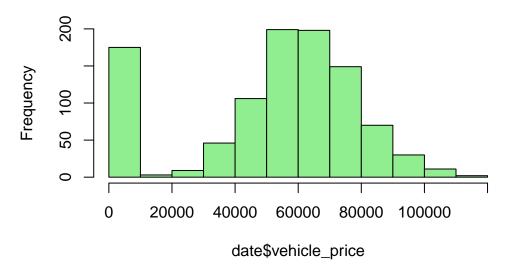


Histograma – witnesses



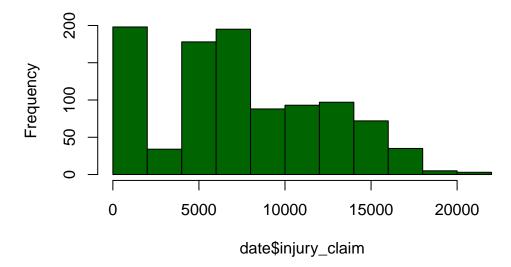
hist(date\$vehicle_price, main="Histograma -vehicle_price", col="lightgreen")

Histograma -vehicle_price

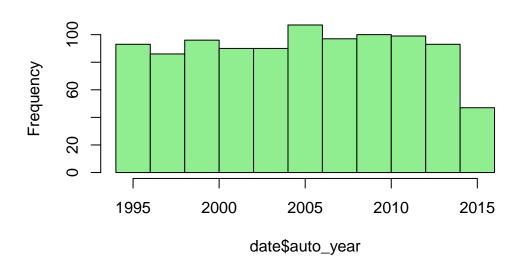


hist(date\$injury_claim, main="Histograma - injury_claim", col="darkgreen")

Histograma – injury_claim

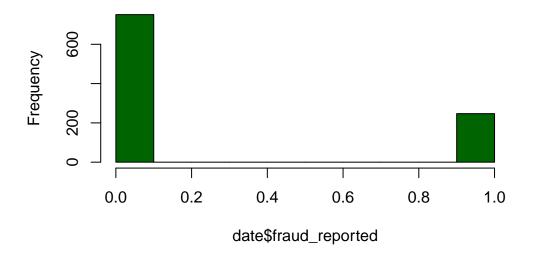


Histograma -auto_year



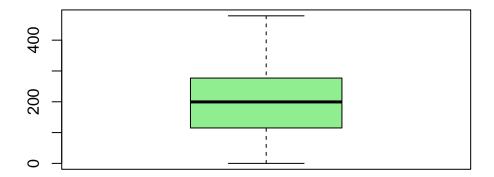
hist(date\$fraud_reported, main="Histograma - fraud_reported", col="darkgreen")

Histograma – fraud_reported

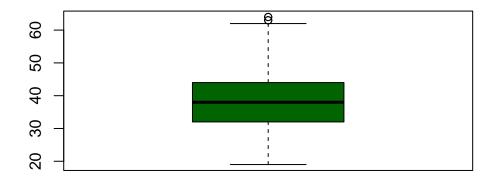


Boxploturi
boxplot(date\$months_as_customer, main="BOXPLOT - months_as_customer", col="lightgreen")

BOXPLOT – months_as_customer

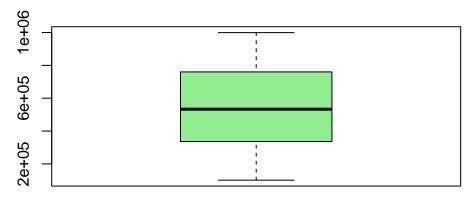


BOXPLOT - insured_age



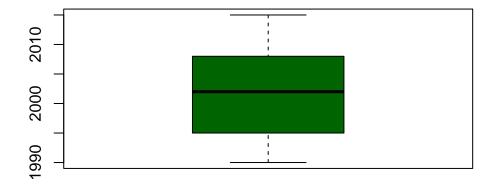
boxplot(date\$policy_number, main="BOXPLOT - policy_number", col="lightgreen")

BOXPLOT – policy_number



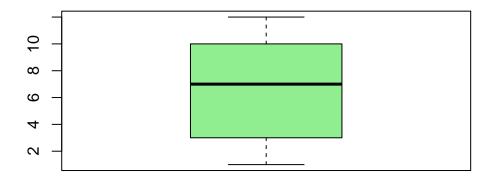
boxplot(date\$policy_bind_year, main="BOXPLOT - policy_bind_year", col="darkgreen")

BOXPLOT – policy_bind_year



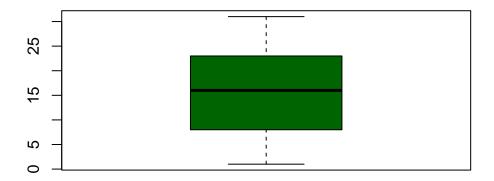
boxplot(date\$policy_bind_month, main="BOXPLOT - policy_bind_month",
col="lightgreen")

BOXPLOT – policy_bind_month



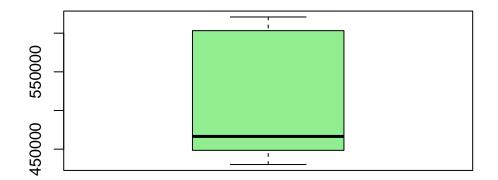
boxplot(date\$policy_bind_day, main="BOXPLOT - policy_bind_day", col="darkgreen")

BOXPLOT - policy_bind_day

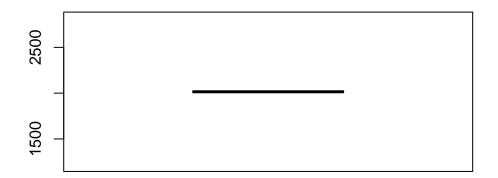


boxplot(date\$insured_cod, main="BOXPLOT - insured_cod", col="lightgreen")

BOXPLOT - insured_cod

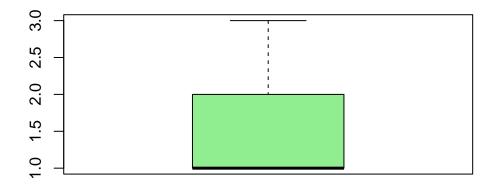


BOXPLOT – incident_year



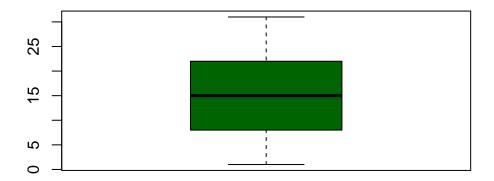
boxplot(date\$incident_month, main="BOXPLOT - incident_month", col="lightgreen")

BOXPLOT – incident_month

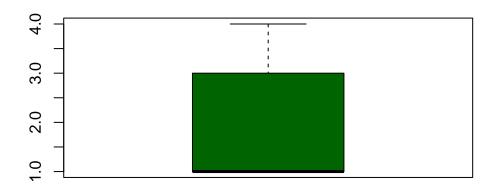


boxplot(date\$incident_day, main="BOXPLOT - incident_day", col="darkgreen")

BOXPLOT - incident_day

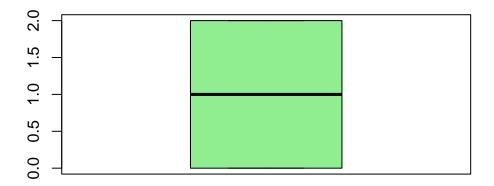


BOXPLOT - number_of_vehicles_involved



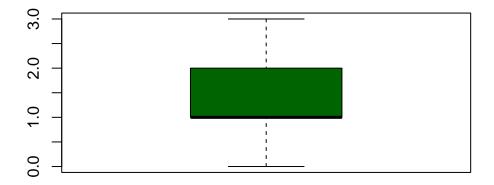
boxplot(date\$bodily_injuries, main="BOXPLOT -bodily_injuries", col="lightgreen")

BOXPLOT -bodily_injuries

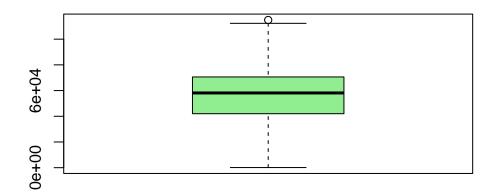


boxplot(date\$witnesses, main="BOXPLOT - witnesses", col="darkgreen")

BOXPLOT – witnesses

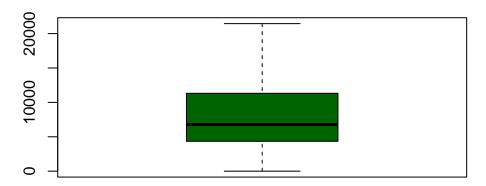


BOXPLOT -vehicle_price



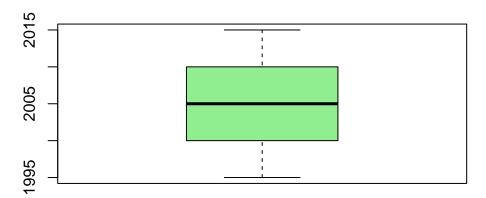
boxplot(date\$injury_claim, main="BOXPLOT - injury_claim", col="darkgreen")

BOXPLOT - injury_claim

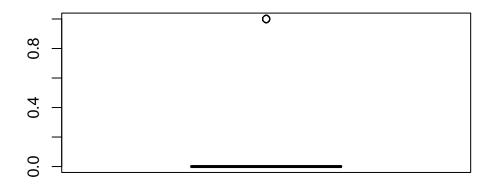


boxplot(date\$auto_year, main="BOXPLOT -auto_year", col="lightgreen")

BOXPLOT -auto_year

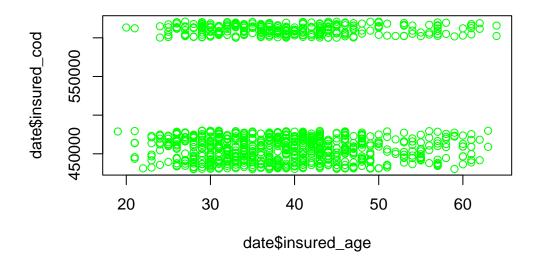


BOXPLOT – fraud_reported



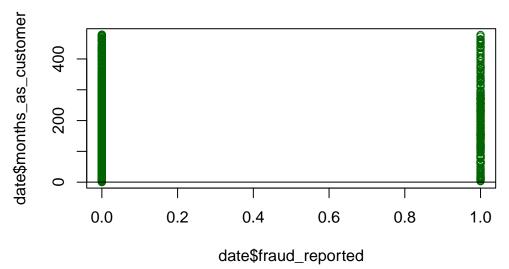
```
# Ploturi
plot(date$insured_age, date$insured_cod, main="PLOT", col="green")
```

PLOT



```
plot(date$fraud_reported, date$months_as_customer, main="PLOT - Dependenta fraud_reported
col="darkgreen")
abline(lm(date$fraud_reported~date$months_as_customer))
```

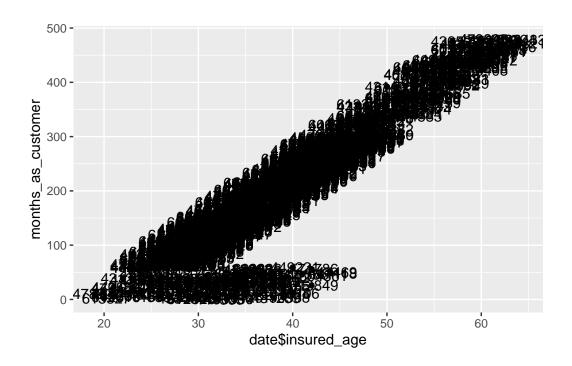




```
library(ggplot2)
ggplot(date, aes(x=date$insured_age, y=months_as_customer))+
geom_point() +
geom_text(label= date$insured_cod,
nudge_x=0.25, nudge_y=0.25,
check_overlop=T)

Warning in geom_text(label = date$insured_cod, nudge_x = 0.25, nudge_y = 0.25, :
Ignoring unknown parameters: `check_overlop`

Warning: Use of `date$insured_age` is discouraged.
i Use `insured_age` instead.
Use of `date$insured_age` is discouraged.
i Use `insured_age` instead.
```



#Matrice de corelatie si covarianta
library(corrplot)

corrplot 0.92 loaded

corelatie <- cor(date)</pre>

Warning in cor(date): the standard deviation is zero

corelatie

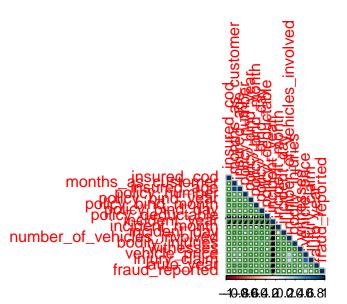
	insured_cod mor	nths_as_customer	insured_age
insured_cod	1.000000000	0.0182740752	0.026097987
months_as_customer	0.0182740752	1.000000000	0.922082353
insured_age	0.0260979869	0.9220823528	1.000000000
policy_number	0.0057955509	0.0585555116	0.060539574
<pre>policy_bind_year</pre>	0.0001139187	-0.0483829134	-0.037673049
policy_bind_month	0.0261096054	-0.0015973222	0.008301699
policy bind day	-0.0453978771	0.0548191860	0.056912945

```
policy_deductable
                              0.0039024572
                                                  0.0267663664 0.029224431
incident_year
                                        NA
                                                            NΑ
                                                                         NΑ
                             -0.0313662354
incident_month
                                                 -0.0431659317 -0.037531910
incident day
                                                 -0.0007978160 0.004397009
                              0.0265882043
number of vehicles involved
                              0.0263591336
                                                  0.0149996595
                                                                0.022491817
bodily_injuries
                                                 -0.0096099131 -0.015021707
                              0.0275974191
witnesses
                              0.0192227196
                                                  0.0585349880
                                                                0.052574524
vehicle_price
                             -0.0358827947
                                                  0.0608795258
                                                                0.069092576
injury_claim
                             -0.0195867439
                                                  0.0659605892
                                                                0.076397270
auto_year
                             -0.0336874553
                                                 -0.0002125182
                                                                0.001535593
fraud_reported
                              0.0186044705
                                                  0.0207278154
                                                                0.012407207
                             policy_number policy_bind_year policy_bind_month
                              0.0057955509
insured_cod
                                                0.0001139187
                                                                   0.026109605
months_as_customer
                              0.0585555116
                                               -0.0483829134
                                                                  -0.001597322
insured_age
                              0.0605395741
                                               -0.0376730486
                                                                   0.008301699
policy_number
                              1.0000000000
                                                                  -0.003319089
                                               -0.0402968893
policy_bind_year
                             -0.0402968893
                                                1.000000000
                                                                  -0.029636698
policy_bind_month
                             -0.0033190887
                                               -0.0296366976
                                                                   1.00000000
policy_bind_day
                              0.0462073037
                                                0.0107534458
                                                                   0.031168726
policy deductable
                             -0.0063979187
                                               -0.0479447077
                                                                  -0.024874689
incident year
                                                0.0435832402
incident month
                             -0.0315945204
                                                                   0.075051597
incident day
                              0.0523610798
                                                0.0325589474
                                                                   0.002488433
number of vehicles involved
                                                0.0284253832
                             0.0126404597
                                                                  -0.026759378
bodily_injuries
                             -0.0066402384
                                                0.0307622623
                                                                  -0.025160938
witnesses
                             -0.0131233255
                                                0.0569393710
                                                                   0.018842105
vehicle_price
                             -0.0166123927
                                                0.0053451230
                                                                   0.015944210
injury_claim
                             -0.0103789275
                                                0.0056998629
                                                                  -0.008418117
auto_year
                             -0.0003469237
                                                0.0170828922
                                                                  -0.030091678
fraud_reported
                             -0.0300747467
                                                0.0011746488
                                                                  -0.035047616
                             policy_bind_day policy_deductable incident_year
insured_cod
                                -0.045397877
                                                    0.003902457
                                                                            NA
months_as_customer
                                 0.054819186
                                                    0.026766366
                                                                           NA
insured_age
                                 0.056912945
                                                    0.029224431
                                                                           NA
                                                                           NA
policy number
                                 0.046207304
                                                   -0.006397919
policy_bind_year
                                 0.010753446
                                                   -0.047944708
                                                                            NA
policy_bind_month
                                 0.031168726
                                                   -0.024874689
                                                                            NA
policy_bind_day
                                 1.000000000
                                                   -0.002065756
                                                                            NA
policy_deductable
                                -0.002065756
                                                    1.00000000
                                                                           NA
incident_year
                                          NΑ
                                                             NΑ
                                                                             1
incident_month
                                 0.006488576
                                                   -0.025235651
                                                                           NA
incident_day
                                                   -0.021769820
                                                                            NA
                                 0.010037123
number_of_vehicles_involved
                                -0.002338005
                                                    0.050234935
                                                                            NA
```

```
-0.046208037
                                                  -0.023055029
                                                                           NA
bodily_injuries
                                                                           NΑ
witnesses
                                -0.009413971
                                                   0.066134152
vehicle_price
                                0.013843227
                                                   0.020542668
                                                                           NA
injury_claim
                                0.021969473
                                                   0.037368433
                                                                           NA
                                                                           NA
auto year
                                0.034752867
                                                   0.024962652
fraud_reported
                                 0.061982219
                                                   0.014105537
                                                                           NΑ
                             incident month incident day
insured_cod
                               -0.031366235 0.026588204
months_as_customer
                               -0.043165932 -0.000797816
insured_age
                               -0.037531910 0.004397009
policy_number
                               -0.031594520 0.052361080
policy_bind_year
                                0.043583240 0.032558947
policy_bind_month
                                0.075051597 0.002488433
policy_bind_day
                                0.006488576 0.010037123
policy_deductable
                               -0.025235651 -0.021769820
incident_year
                                         NΑ
                                                      NA
incident_month
                                1.000000000 -0.140504782
incident_day
                               -0.140504782 1.000000000
number_of_vehicles_involved
                                0.053934210 -0.013276514
                                0.003419894 -0.022289464
bodily injuries
witnesses
                                0.013671337 0.003841335
vehicle price
                               -0.035554773 -0.033006644
injury_claim
                               -0.017858580 -0.026641751
                               -0.017005925 0.008126037
auto_year
fraud_reported
                               -0.027777140 -0.045959072
                            number_of_vehicles_involved bodily_injuries
                                             0.026359134
                                                             0.027597419
insured_cod
months_as_customer
                                             0.014999660
                                                            -0.009609913
insured_age
                                             0.022491817
                                                            -0.015021707
policy_number
                                             0.012640460
                                                            -0.006640238
policy_bind_year
                                             0.028425383
                                                             0.030762262
policy_bind_month
                                            -0.026759378
                                                            -0.025160938
policy_bind_day
                                            -0.002338005
                                                            -0.046208037
policy_deductable
                                             0.050234935
                                                            -0.023055029
incident year
                                                                      NA
incident month
                                             0.053934210
                                                             0.003419894
incident day
                                            -0.013276514
                                                            -0.022289464
number_of_vehicles_involved
                                             1.000000000
                                                             0.013057605
bodily_injuries
                                                             1.00000000
                                             0.013057605
witnesses
                                            -0.015405994
                                                            -0.006138595
vehicle_price
                                             0.272204110
                                                             0.047045863
injury_claim
                                             0.222845004
                                                             0.045619301
auto_year
                                             0.033334091
                                                            -0.021173087
```

```
0.050944476
                                                            0.033223143
fraud_reported
                               witnesses vehicle_price injury_claim
insured_cod
                             0.019222720 -0.035882795 -0.019586744
months_as_customer
                             0.058534988
                                           0.060879526 0.065960589
insured age
                             0.052574524
                                           0.069092576 0.076397270
policy_number
                            -0.013123325 -0.016612393 -0.010378928
policy_bind_year
                             0.056939371
                                           0.005345123 0.005699863
policy_bind_month
                             0.018842105
                                           0.015944210 -0.008418117
                                           0.013843227 0.021969473
policy_bind_day
                            -0.009413971
policy_deductable
                             0.066134152
                                           0.020542668 0.037368433
incident_year
                                                    NA
                                                                 NA
                                      NA
                             0.013671337 -0.035554773 -0.017858580
incident_month
incident_day
                             0.003841335
                                          -0.033006644 -0.026641751
number_of_vehicles_involved -0.015405994
                                           0.272204110 0.222845004
                                           0.047045863 0.045619301
bodily_injuries
                            -0.006138595
                             1.000000000 -0.012832008 -0.026209093
witnesses
vehicle_price
                            -0.012832008
                                           1.00000000 0.804147079
injury_claim
                            -0.026209093
                                           0.804147079 1.000000000
auto_year
                             0.045156884 -0.036526609 -0.016017996
fraud reported
                             0.049019020
                                           0.162046218 0.089499786
                                auto_year fraud_reported
insured cod
                            -0.0336874553
                                             0.018604471
months_as_customer
                            -0.0002125182
                                             0.020727815
insured age
                             0.0015355926
                                             0.012407207
policy_number
                            -0.0003469237
                                            -0.030074747
policy_bind_year
                             0.0170828922
                                             0.001174649
policy_bind_month
                                            -0.035047616
                            -0.0300916776
policy_bind_day
                             0.0347528666
                                             0.061982219
                                             0.014105537
policy_deductable
                             0.0249626518
incident_year
                                       NA
                                                      NA
incident_month
                            -0.0170059250
                                            -0.027777140
incident_day
                             0.0081260372
                                            -0.045959072
number_of_vehicles_involved 0.0333340915
                                             0.050944476
bodily_injuries
                            -0.0211730873
                                             0.033223143
witnesses
                             0.0451568835
                                             0.049019020
vehicle_price
                            -0.0365266094
                                             0.162046218
injury_claim
                            -0.0160179964
                                             0.089499786
auto_year
                             1.0000000000
                                             0.007056479
fraud_reported
                             0.0070564790
                                             1.00000000
```

corrplot(corelatie,method="square",type="lower",bg="forestgreen")



covariance<-cov(date) covariance</pre>

	insured_cod	months_as_customer	insured_age
insured_cod	5.145984e+09	1.510353e+05	1.712645e+04
months_as_customer	1.510353e+05	1.327448e+04	9.718620e+02
insured_age	1.712645e+04	9.718620e+02	8.368592e+01
policy_number	1.067988e+08	1.733062e+06	1.422666e+05
<pre>policy_bind_year</pre>	6.012638e+01	-4.101440e+01	-2.535669e+00
policy_bind_month	6.561588e+03	-6.447268e-01	2.660527e-01
<pre>policy_bind_day</pre>	-2.867229e+04	5.560756e+01	4.583844e+00
policy_deductable	1.713629e+05	1.887742e+03	1.636503e+02
incident_year	0.000000e+00	0.00000e+00	0.000000e+00
incident_month	-1.178441e+03	-2.604720e+00	-1.798200e-01
incident_day	1.653497e+04	-7.968776e-01	3.487095e-01
<pre>number_of_vehicles_involved</pre>	1.927206e+03	1.761379e+00	2.097073e-01
bodily_injuries	1.624054e+03	-9.082930e-01	-1.127310e-01
witnesses	1.533718e+03	7.501029e+00	5.349314e-01
vehicle_price	-6.780596e+07	1.847683e+05	1.664964e+04
injury_claim	-6.849780e+06	3.704874e+04	3.407095e+03
auto_year	-1.454297e+04	-1.473519e-01	8.453818e-02
fraud_reported	5.762449e+02	1.031141e+00	4.900674e-02

```
policy_number policy_bind_year policy_bind_month
                              1.067988e+08
insured_cod
                                               6.012638e+01
                                                                  6.561588e+03
months_as_customer
                              1.733062e+06
                                              -4.101440e+01
                                                                 -6.447268e-01
insured_age
                                                                  2.660527e-01
                              1.422666e+05
                                              -2.535669e+00
policy number
                              6.598954e+10
                                              -7.616312e+04
                                                                 -2.986970e+03
policy_bind_year
                             -7.616312e+04
                                               5.413414e+01
                                                                 -7.639059e-01
policy bind month
                             -2.986970e+03
                                              -7.639059e-01
                                                                  1.227295e+01
policy_bind_day
                              1.045059e+05
                                               6.965878e-01
                                                                  9.613600e-01
policy_deductable
                                                                 -5.334289e+01
                             -1.006053e+06
                                              -2.159339e+02
incident_year
                              0.000000e+00
                                               0.000000e+00
                                                                  0.000000e+00
incident_month
                             -4.250701e+03
                                               1.679447e-01
                                                                  1.377037e-01
incident_day
                              1.166075e+05
                                               2.076759e+00
                                                                  7.557542e-02
number_of_vehicles_involved
                              3.309506e+03
                                               2.131595e-01
                                                                 -9.554616e-02
bodily_injuries
                             -1.399326e+03
                                               1.856743e-01
                                                                 -7.231012e-02
witnesses
                             -3.749540e+03
                                               4.659560e-01
                                                                  7.341765e-02
vehicle_price
                             -1.124131e+08
                                               1.035955e+03
                                                                  1.471380e+03
injury_claim
                             -1.299781e+07
                                               2.044467e+02
                                                                 -1.437704e+02
auto_year
                             -5.363178e+02
                                               7.563934e-01
                                                                 -6.344123e-01
                             -3.335763e+03
                                               3.731636e-03
                                                                 -5.301375e-02
fraud_reported
                             policy bind day policy deductable incident year
insured cod
                               -2.867229e+04
                                                   1.713629e+05
                                                                            0
months as customer
                                5.560756e+01
                                                   1.887742e+03
insured_age
                                4.583844e+00
                                                   1.636503e+02
                                                                            0
policy_number
                                                                             0
                                1.045059e+05
                                                 -1.006053e+06
policy_bind_year
                                6.965878e-01
                                                 -2.159339e+02
                                                                             0
                                                                             0
policy_bind_month
                                9.613600e-01
                                                 -5.334289e+01
                                                                             0
policy_bind_day
                                7.751489e+01
                                                 -1.113310e+01
policy_deductable
                               -1.113310e+01
                                                  3.747045e+05
                                                                             0
                                                                             0
incident_year
                                0.000000e+00
                                                   0.000000e+00
incident_month
                                2.991942e-02
                                                 -8.090403e+00
                                                                             0
                                                                             0
incident_day
                                7.660939e-01
                                                  -1.155259e+02
number_of_vehicles_involved
                               -2.097977e-02
                                                   3.134102e+01
                                                                             0
bodily_injuries
                               -3.337397e-01
                                                 -1.157732e+01
                                                                             0
witnesses
                               -9.218537e-02
                                                   4.502636e+01
                                                                             0
                                                                             0
vehicle price
                                3.210534e+03
                                                  3.312445e+05
injury_claim
                                9.429580e+02
                                                   1.115140e+05
                                                                            0
auto year
                                1.841340e+00
                                                  9.195723e+01
                                                                             0
fraud_reported
                                2.356217e-01
                                                  3.728118e+00
                                                                             0
                             incident_month incident_day
insured_cod
                              -1.178441e+03 1.653497e+04
months_as_customer
                              -2.604720e+00 -7.968776e-01
insured_age
                              -1.798200e-01 3.487095e-01
policy_number
                              -4.250701e+03 1.166075e+05
```

```
1.679447e-01 2.076759e+00
policy_bind_year
policy_bind_month
                              1.377037e-01 7.557542e-02
policy_bind_day
                              2.991942e-02 7.660939e-01
policy_deductable
                             -8.090403e+00 -1.155259e+02
incident year
                              0.000000e+00 0.000000e+00
incident month
                              2.742978e-01 -6.379439e-01
incident day
                             -6.379439e-01 7.515543e+01
number_of_vehicles_involved
                              2.878978e-02 -1.173078e-01
                              1.469338e-03 -1.585176e-01
bodily injuries
                              7.963771e-03 3.703897e-02
witnesses
                             -4.905197e+02 -7.537528e+03
vehicle_price
                             -4.559721e+01 -1.125960e+03
injury_claim
                             -5.359968e-02 4.239452e-01
auto_year
fraud_reported
                             -6.281369e-03 -1.720311e-01
                            number_of_vehicles_involved bodily_injuries
insured_cod
                                          1927.20590931
                                                           1.624054e+03
months_as_customer
                                             1.76137933
                                                          -9.082930e-01
insured_age
                                             0.20970728
                                                          -1.127310e-01
policy_number
                                          3309.50613263
                                                          -1.399326e+03
policy bind year
                                             0.21315952
                                                           1.856743e-01
policy_bind_month
                                            -0.09554616
                                                          -7.231012e-02
policy_bind_day
                                            -0.02097977
                                                          -3.337397e-01
policy_deductable
                                            31.34101704
                                                          -1.157732e+01
incident_year
                                             0.00000000
                                                           0.000000e+00
incident_month
                                             0.02878978
                                                           1.469338e-03
                                                          -1.585176e-01
incident_day
                                            -0.11730784
number_of_vehicles_involved
                                             1.03878469
                                                           1.091752e-02
bodily_injuries
                                             0.01091752
                                                           6.729698e-01
                                                          -5.600971e-03
witnesses
                                            -0.01746422
vehicle_price
                                          7308.10558228
                                                          1.016639e+03
injury_claim
                                          1107.25036834
                                                           1.824427e+02
auto_year
                                             0.20445706
                                                          -1.045280e-01
fraud_reported
                                             0.02241896
                                                           1.176777e-02
                                witnesses vehicle_price injury_claim
                             1.533718e+03 -6.780596e+07 -6.849780e+06
insured cod
months as customer
                             7.501029e+00 1.847683e+05 3.704874e+04
insured age
                             5.349314e-01 1.664964e+04 3.407095e+03
policy_number
                            -3.749540e+03 -1.124131e+08 -1.299781e+07
                             4.659560e-01 1.035955e+03 2.044467e+02
policy_bind_year
policy_bind_month
                             7.341765e-02 1.471380e+03 -1.437704e+02
policy_bind_day
                            -9.218537e-02 3.210534e+03 9.429580e+02
policy_deductable
                             4.502636e+01 3.312445e+05 1.115140e+05
incident_year
                             0.000000e+00 0.000000e+00 0.000000e+00
```

```
incident_month
                             7.963771e-03 -4.905197e+02 -4.559721e+01
incident_day
                             3.703897e-02 -7.537528e+03 -1.125960e+03
number_of_vehicles_involved -1.746422e-02 7.308106e+03 1.107250e+03
bodily_injuries
                            -5.600971e-03 1.016639e+03 1.824427e+02
witnesses
                             1.237067e+00 -3.759574e+02 -1.421113e+02
vehicle_price
                            -3.759574e+02 6.938966e+08 1.032673e+08
injury_claim
                            -1.421113e+02 1.032673e+08 2.376623e+07
auto_year
                            3.022535e-01 -5.790385e+03 -4.699364e+02
fraud_reported
                            2.354056e-02 1.843070e+03 1.883900e+02
                                auto_year fraud_reported
insured_cod
                            -1.454297e+04
                                           5.762449e+02
months_as_customer
                            -1.473519e-01
                                           1.031141e+00
                                           4.900674e-02
insured_age
                            8.453818e-02
policy_number
                            -5.363178e+02 -3.335763e+03
policy_bind_year
                             7.563934e-01
                                            3.731636e-03
                            -6.344123e-01 -5.301375e-02
policy_bind_month
policy_bind_day
                             1.841340e+00
                                           2.356217e-01
policy_deductable
                            9.195723e+01
                                           3.728118e+00
incident_year
                            0.000000e+00
                                           0.000000e+00
incident month
                            -5.359968e-02 -6.281369e-03
incident day
                             4.239452e-01 -1.720311e-01
number_of_vehicles_involved 2.044571e-01
                                           2.241896e-02
bodily_injuries
                            -1.045280e-01 1.176777e-02
witnesses
                            3.022535e-01
                                           2.354056e-02
vehicle_price
                            -5.790385e+03 1.843070e+03
injury_claim
                            -4.699364e+02
                                            1.883900e+02
auto_year
                            3.621608e+01
                                           1.833557e-02
fraud_reported
                            1.833557e-02
                                           1.864280e-01
  # METODA ACP
  # Standardizare
  date standardizate<-scale(date[-1],scale=TRUE)</pre>
  date_standardizate
       months_as_customer insured_age policy_number policy_bind_year
  [1,]
                                                           1.68694127
             1.0769539397 0.989955357 -0.096968959
  [2,]
             0.2090107971 0.334074335 -0.792679068
                                                           0.59962884
  [3,]
            -0.6068557570 -1.087001213
                                       0.549676258
                                                          -0.21585549
```

-1.57499603

1.68694127

0.59962884

0.4520348770 0.224760831 -1.240573325

0.2090107971 0.552701342 -0.696966716

0.4520348770 0.006133824 -1.720232857

[4,]

[5,]

[6,]

```
[7,]
           -0.5808174627 -0.540433694
                                        -0.515861833
                                                           -0.21585549
 [8,]
           -0.3377933828 -0.212493183
                                        -0.457279037
                                                           -1.57499603
                                        -0.236798450
                                                           -0.62359765
 [9,]
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incident_month

incident_day

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          policy_bind_month
                                         policy_bind_day
              -5.458991e-17
                                            -3.760677e-17
          policy_deductable
                                            incident_year
              -4.007890e-17
                                                      NaN
             incident_month
                                             incident_day
               1.164210e-16
                                             8.595572e-17
number_of_vehicles_involved
                                         bodily_injuries
               1.071929e-16
                                            -4.213679e-17
                   witnesses
                                            vehicle_price
              -2.652384e-18
                                            -7.463309e-17
               injury_claim
                                                auto_year
               2.553622e-17
                                            -1.816458e-14
             fraud_reported
               1.671888e-17
  cor_dstd<-round(cor(date_standardizate),3)</pre>
  View(cor_dstd)
  cov_dstd<-round(cov(date_standardizate),3)</pre>
  View(cov_dstd)
  # Extragerea componentelor principale
  # Eliminare coloana incident_year
  date_standardizate1 = subset(date_standardizate, select =- incident_year)
  View(date_standardizate1)
  comp_principale<-princomp(date_standardizate1, cor=TRUE)</pre>
```

comp_principale

Call:

princomp(x = date_standardizate1, cor = TRUE)

Standard deviations:

Comp.1 Comp.2 Comp.3 Comp.4 Comp.5 Comp.6 Comp.7 Comp.8 1.4512426 1.3545262 1.0857534 1.0635655 1.0424004 1.0338562 1.0146467 1.0064365 Comp.9 Comp.10 Comp.11 Comp.12 Comp.13 Comp.14 Comp.15 Comp.16 $0.9877026\ 0.9704017\ 0.9516726\ 0.9288168\ 0.9060752\ 0.8819295\ 0.4350252\ 0.2785786$

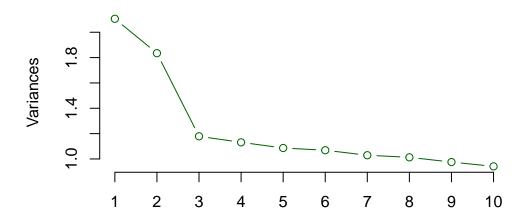
16 variables and 998 observations.

```
# Determinarea valorilor proprii
valproprii<-comp_principale$sdev*comp_principale$sdev
# Determinarea procentului informational retinut
procent_info<-valproprii*100/14
# Determinarea procentului cumulat
procent_cumulat<-cumsum(procent_info)
# Alcatuirea outputului final
output_final<-round(data.frame(comp_principale$sdev, valproprii, procent_info, procent_cumulat), 4)
output_final</pre>
```

	${\tt comp_principale.sdev}$	valproprii	<pre>procent_info</pre>	<pre>procent_cumulat</pre>
Comp.1	1.4512	2.1061	15.0436	15.0436
Comp.2	1.3545	1.8347	13.1053	28.1489
Comp.3	1.0858	1.1789	8.4204	36.5693
Comp.4	1.0636	1.1312	8.0798	44.6491
Comp.5	1.0424	1.0866	7.7614	52.4105
Comp.6	1.0339	1.0689	7.6347	60.0453
Comp.7	1.0146	1.0295	7.3536	67.3989
Comp.8	1.0064	1.0129	7.2351	74.6340
Comp.9	0.9877	0.9756	6.9683	81.6022
Comp.10	0.9704	0.9417	6.7263	88.3285
Comp.11	0.9517	0.9057	6.4691	94.7977
Comp.12	0.9288	0.8627	6.1621	100.9598
Comp.13	0.9061	0.8210	5.8641	106.8239
Comp.14	0.8819	0.7778	5.5557	112.3796
Comp.15	0.4350	0.1892	1.3518	113.7314
Comp.16	0.2786	0.0776	0.5543	114.2857

```
# Scree plot
screeplot<-prcomp(date_standardizate1)
plot(screeplot,type="l",main = "Screeplot", col="darkgreen")</pre>
```

Screeplot



```
# Vectori proprii
vectori_proprii<-comp_principale$loadings
vectori_proprii[,1:8]</pre>
```

	Comp.1	Comp.2	Comp.3	Comp.4
months_as_customer	0.463026626	0.5166418638	0.06488112	0.02504128
insured_age	0.467391662	0.5115558782	0.06614199	0.03026564
policy_number	0.040120521	0.0989132545	-0.28965669	0.17538736
<pre>policy_bind_year</pre>	-0.028756781	-0.0690646408	0.10819891	-0.29001373
policy_bind_month	-0.006333211	0.0161464890	0.25917437	0.30248415
<pre>policy_bind_day</pre>	0.068866551	0.0523347374	-0.02714523	-0.07994958
policy_deductable	0.065402299	0.0003654204	-0.01643999	-0.36507520
incident_month	-0.048993014	-0.0489141060	0.66359911	0.09753509
incident_day	-0.027585130	0.0584110693	-0.58589851	-0.00602995
number_of_vehicles_involved	0.240246623	-0.2437757859	0.05369671	-0.08777903
bodily_injuries	0.032763079	-0.0806763703	0.06559605	0.02069472
witnesses	0.032650535	0.0803631161	0.15571145	-0.54318442

```
0.489892640 -0.4323219703 -0.04905868
                                                        0.06982525
vehicle_price
injury_claim
                        0.481397616 -0.4158307838 -0.05824611
                                                        0.08518462
                       -0.009817018 0.0250417303 -0.07108077 -0.47097033
auto_year
                        0.144224094 -0.1232706181 0.04128273 -0.32518073
fraud_reported
                            Comp.5
                                       Comp.6
                                                  Comp.7
                                                            Comp.8
months as customer
                        0.087504366 0.015064288 0.007579726 0.02514516
insured age
                        0.079243512 0.025389130
                                              0.022113951
                                                        0.02829507
policy_number
                       -0.264623022 0.081751526
                                             0.009820524 0.33297891
policy_bind_year
                       policy_bind_month
                       -0.382054825 0.182189678 0.216450796 -0.49253927
                       policy_bind_day
policy_deductable
                       -0.185445140 -0.555470860 0.236705456 -0.06333936
incident_month
                       -0.132113451 0.121794929 0.122855022 0.24164714
incident_day
                       -0.012198187 0.319973503 0.279672240 -0.20995955
number_of_vehicles_involved -0.087091650 0.011603738 0.245234854 0.36443591
                        0.552753266 0.073052130 -0.193892111 0.06174483
bodily_injuries
witnesses
                       vehicle_price
                       -0.017656097 0.023764494 0.036462890 -0.09075452
injury_claim
                       auto year
                       -0.226242445 0.069226119 0.080156293 0.40248339
fraud_reported
                       -0.004058425 -0.005443388 -0.625607264 -0.23335339
```

Scoruri principale
scoruri_principale<-comp_principale\$scores[,1:8]
rownames(scoruri_principale)=date\$insured_cod
round(scoruri_principale,3)</pre>

```
Comp.1 Comp.2 Comp.3 Comp.4 Comp.5 Comp.6 Comp.7 Comp.8 466132 1.242 0.866 -0.615 -0.808 0.395 1.749 -0.567 -1.809 468176 -1.167 1.650 -0.917 -1.246 -0.989 -0.211 -1.626 -0.398 430632 -0.859 -0.756 0.398 -0.836 0.082 -0.537 1.980 -0.043 608117 0.683 0.378 -0.236 -2.000 -0.822 -1.784 -1.908 -0.763 610706 -1.674 1.749 0.829 -0.440 0.537 0.829 1.096 0.567 478456 0.776 -0.483 1.255 -0.902 -0.040 -0.234 -0.596 -1.343 441716 1.372 -2.457 -0.990 0.550 -0.159 -0.750 1.180 0.868 603195 -0.021 -0.653 -0.489 -0.633 1.042 -0.806 1.190 1.328 601734 -2.387 0.034 -2.186 -0.130 1.020 -0.066 0.287 0.490 600983 -0.458 0.698 0.237 1.109 1.075 1.250 -1.272 -0.163 462283 0.832 -0.057 -0.049 0.439 0.760 0.604 -1.247 -0.263 615561 4.587 0.189 0.954 -0.567 -0.633 -0.329 0.631 0.191 432220 -1.865 -0.924 -1.557 2.273 -0.865 0.571 -0.509 -0.620
```

```
464652 -1.412 0.158 -0.066 -0.190 -0.758 1.219 -0.467 0.114
476685 -0.301 0.556 -0.374 -0.730 -2.261 -0.552 -1.235 -1.986
458733 3.445 1.477 -1.682 0.893 -1.692 -0.942 -0.130 -0.294
619884 -1.336 -1.387 0.068 -0.741 -0.039 0.571 1.503 0.941
470610 0.087 -1.391 0.257 -0.245 -0.899 0.541 0.438 -0.868
477670 0.034 -0.550 0.408 0.061 0.623 -1.693 1.421 0.835
618845
     1.598 2.740 0.838 -0.060 0.182 -0.223 -0.801 1.508
442479 -0.525 0.780 1.784 0.038 -1.029 -0.016 0.532 -0.517
443920
      453148
434733 0.244 0.246 -0.428 -0.152 0.926 -0.453 1.149 -0.012
613982
      436984 -0.982 2.464 -1.535 -0.437 -1.222 -0.970 0.601 -1.146
607730 -1.657 0.908 0.084 0.015 0.917 0.271 -2.549 -0.308
609837
      0.364 0.208 -1.416 0.520 0.022 -2.611 -0.241 1.399
432211
      1.523 -0.694  0.442 -1.259  1.622  0.091  1.423  0.706
473328 0.113 -2.462 -2.084 0.665 -1.016 -0.237 0.359 1.981
610393 0.620 -1.020 -0.143 -1.619 0.007 0.656 -0.103 0.037
614780 -1.210 -0.053  0.776 -0.784  1.313  0.369  1.876 -0.143
472248 0.481 -1.961 -0.803 -0.527 0.137 -1.415 0.823 1.001
603381 -0.096 -0.366 -0.452 1.762 -0.426 -0.767 -0.418 1.041
479224 -0.305 -1.295 -0.603  0.633  2.200  0.573 -1.144 -1.961
430141 -1.147 -1.498 -0.233 -0.789 1.280 -0.738 -1.678 -0.715
620757 -0.797 2.676 -1.519 0.350 0.882 -2.224 0.357 0.621
615901 2.713 1.010 -0.636 0.531 -0.334 0.038 0.451 0.192
474615
      0.586 -0.051 -0.682 -0.942 -1.916  0.477 -1.876 -0.489
456446 -1.649 -1.046 0.275 -0.186 1.455 -0.903 -0.591 -0.181
      1.229 -2.235 0.209 0.228 -0.378 1.430 -2.500 -0.842
441648 -1.477 -1.722 -1.153 0.002 -0.564 1.147 -0.829 1.528
433782 -1.365 -0.578 0.549 0.346 0.907 0.562 -0.308 0.788
468104 0.511 0.323 1.533 -0.972 -0.566 -0.390 2.121 -1.027
459407 0.491 0.081 0.935 -0.378 0.415 1.282 0.835 -0.302
472573 -0.722 -0.480 -0.243 0.040 0.265 -0.715 0.285 2.125
433473
      1.931 0.702 -0.889 -0.381 0.149 -1.979 -1.725 0.869
                                               1.186
446326 -2.269 0.946 -0.717 1.274 2.053 0.483 -0.006
435481 0.677 -1.135 -0.501 1.493 0.242 -1.510 -0.508 0.373
477310
      3.717  0.812  0.004 -0.798  0.528 -1.477  1.169  0.291
609930 -2.596 0.579 -0.817 -0.742 -0.991 -1.292 0.049 -0.629
603993 -2.002 1.429 0.534 0.800 1.984 -0.116 0.547 -0.113
478423 -2.178 1.564 0.325 -0.481 -0.345 1.657 0.929 -0.009
467784 -0.353 -2.546  0.106  0.795  0.759 -0.073  0.240 -1.626
```

```
606714 1.251 2.445 0.774 -0.796 0.107 2.501 1.266 0.259
464691 -2.775 0.975 0.697 -0.940 -0.956 0.227 0.579 -0.687
431683 -0.644 -0.604 -0.819 -0.062 -1.355 -1.991 -0.216 0.107
431725
       0.638 -1.200 -0.381 -0.466 -0.078 -0.872 -0.294 0.838
609216
       1.226 -1.934 -0.985 -0.539 0.589 -0.823 -1.919 1.227
452787
       0.522 0.591 1.539 0.390 -1.675 -0.110 0.177 -0.892
468767 -1.179 -0.371 -0.122 -1.666 0.240 0.734 1.027 -0.666
435489
       1.444 -1.027 1.869 -0.210 -0.168 1.700 -1.587 -0.204
450149
       1.101 -0.038 -0.752 -1.409 -0.477 -0.353 -0.971 0.041
458364 1.802 -1.379 1.012 1.253 0.485 0.400 -0.598 -1.955
       0.383 -1.960 -1.593 -0.537 -0.381 1.830 -0.627 -1.460
476458
      1.456 3.236 2.198 1.731 0.115 -0.653 -0.615 0.598
602433
478575 -0.195 -1.062 -0.706 0.121 0.264 -1.333 0.097 -1.106
449718 -0.877 2.900 -0.299 0.256 -0.357 -0.200 -0.229 0.464
463181
      1.398 -0.579 1.002 -0.789 1.075 1.956 -0.517 -1.066
441992 0.310 0.015 1.858 -0.002 -0.618 -1.434 -0.444 -2.401
452597 -1.138 1.115 1.315 1.443 0.044 -0.654 0.800 -1.035
614417 0.401 -0.547 0.150 2.081 -0.820 1.809 -0.089 0.610
472895 -0.002 -0.741 2.950 0.640 0.381 -0.195 0.109 2.047
475847 -0.132 -1.514 -0.712 -0.063 2.216 -0.870 0.427
                                                      1.220
476978 2.105 -1.105 -0.427 0.094 1.891 0.150 0.457 0.240
      1.412 0.519 0.317 0.580 -0.501 -0.239 0.680 0.748
600648
608335 -1.679 1.514 -1.083 -0.586 1.020 1.268 -0.200 -0.125
471600 1.108 -0.847 -0.435 -1.343 -0.380 2.351 -1.239 -1.473
441175 -0.221 -1.090 0.558 0.008 -0.972 -1.118 1.540 -0.322
603123 -1.452 1.696 0.193 0.094 1.141 -2.121 0.004 0.260
457767 -2.763 0.478 -1.793 -0.700 1.576 1.115
                                               0.053 0.058
618498 -1.710 1.868 -1.179 -0.461 -1.798 -1.095 0.463 -0.915
      1.243 0.774 -0.651 -2.469 0.437 -0.944 -0.706 -0.569
605486
617970
      0.643  0.325  1.621  0.138  -2.289  -1.152  0.340  0.713
432934 0.358 -1.312 -2.199 0.059 1.535 0.519 1.209 1.037
456762 -0.320 -1.053 -1.074 0.214 1.583 -1.324 -0.478 1.325
601748 -2.599 0.954 -1.875 0.131 -1.081 -0.734 0.821 -0.819
607763 -1.570 -1.210 -1.253 -0.429 0.224 -1.338 -2.417 2.253
436973 -0.344 -1.354 0.101 1.558 -0.494 -0.705 1.659 -1.164
471300 -0.355 -2.492 1.704 -1.430 -0.450 -2.432 -0.458 -1.809
453277 -1.757 2.024 -0.457 0.388 -1.027 -0.653 1.869 0.058
465100 0.665 -0.081 1.272 0.379 -1.601 1.644 0.313 0.984
603248 2.273 -1.251 -1.350 1.381 0.404 -0.609 -0.291 0.686
601112 -3.007 -0.040 -0.516  0.323  1.535 -0.306  0.822  1.442
438830
      1.247  0.982  -0.948  -1.477  0.587  -0.087  -0.500  -0.388
464959 -0.555 -2.613 -0.271 -2.476 0.244 0.132 1.384 -0.883
439787 -1.026 2.548 0.375 0.246 0.430 1.168 0.411 0.012
```

```
464839 -1.625 2.018 -1.069 0.636 -0.709 0.153 -0.027 -0.528
448984 1.378 -0.126 -1.906 2.226 -1.569 0.061 -0.042 -0.371
440327 -1.318 -1.489 0.372 1.433 0.497 -0.687 0.524 -0.416
460742 -0.676 1.345 -0.973 -1.184 1.471 0.776 1.212 0.103
446895 -2.360 1.192 0.132 -0.299 -0.364 0.848 -0.614 1.561
609374 3.035 0.042 0.454 0.875 -2.183 2.503 0.382 2.057
451672 -0.850
            2.881 0.272 0.439 0.287 -0.864 -0.664 -0.064
604450 3.129 1.788 -0.025 0.526 -0.380 -1.169 -0.306 -1.256
432896 -0.501 -1.592 3.042 1.906 -1.928 -1.430 -0.385 -0.133
618929
      1.433 -0.009 2.056 0.653 -0.586 -1.727 -0.893 -1.355
451312 -0.290 -0.985 -1.607 -1.810 -1.485 1.555 -0.471 -0.517
       0.491 0.388 -0.997 -0.578 1.159 0.741 -0.006 0.960
605141
459504
       2.963
            1.290 0.001 -0.646 0.395 0.062 -2.029 0.481
432781
       1.322 -1.442 -1.094 1.641 1.873 1.617 1.553 -0.591
452748
       0.095 -1.349 1.996 1.069 -0.137 -0.550 0.746 2.126
618316 -0.330 2.990 0.829 0.156 -0.630 -0.155 -0.016 -0.850
455365 0.687 0.603 -1.425 0.062 0.398 -0.476 -0.632 -0.209
470603 -0.933 -0.606 -0.201 -0.930 -0.353 -1.684 1.038 -1.175
475292
       467743
       1.502 -1.196 -0.588 -1.410 -1.805 -0.263 0.360 -1.427
460675
       1.157 -0.751 -0.130 0.293 -0.956 0.888 0.525 1.397
618123
       0.876 -0.674 -0.075 0.175 2.216 -0.071 0.679 0.601
607452 0.834 -1.170 -0.825 -0.551 0.926 1.712 -1.786 -1.093
603527 -0.306 -2.692 -0.710 0.569 0.286 -1.131 0.417 1.434
445601 -0.720 0.312 1.082 0.891 -0.874 0.067 -0.696
                                                   1.015
603948 -0.406 0.557 0.534 -1.456 -0.562 2.258 0.609
                                                   1.568
435758 -0.843 0.400 -0.181 1.336 -0.848 -2.281 0.376 -1.019
611586 -2.638  0.574  1.403  1.326  2.322  0.653  -0.207  0.635
465263
      1.120 0.151 1.302 -1.738 -0.632 -1.176 -0.477 -0.800
617858 -0.908 -1.354 0.006 -0.881 0.115 0.872 -0.758 -1.057
607889 2.078 -0.538 -0.989 0.326 0.470 1.211 1.177 -0.329
455689 0.177 -0.239 0.183 -0.362 -0.354 1.986 0.228 1.114
450341 -0.913 -1.225  0.048  0.295 -1.669  1.487  1.122  0.905
431277 -1.585 -0.485 -1.972 0.405 0.952 -0.315 -0.844 0.319
454656 0.487 -1.976 0.910 0.083 -1.401 -0.006 0.007 -0.262
605169 0.871 -0.981 -1.760 -0.460 -0.084 -1.228 -1.372 -0.920
444822 -1.881 1.741 -0.382 -0.227 -0.367 -0.055 -0.213 2.123
447442 -0.618 -1.297 -0.183 -1.778 0.490 -0.201 1.192 0.659
474360 2.022 -0.321 1.567 0.935 0.661 1.144 0.903 1.008
447925 0.283 -1.507 -0.194 1.432 -0.537 -0.828 1.414 -0.250
451586 -0.227 0.112 -1.800 -0.349 -0.294 -1.508 0.849 0.238
477519 -1.113 2.212 -0.583 -1.553 0.620 -0.159 -0.514 -0.588
```

```
469429
     2.646  0.888  2.110  1.148  0.692  0.438 -1.889 -0.787
472214 1.437 -1.218 1.635 1.710 -0.061 0.877 -2.122 0.477
476727 -0.544 -1.744 1.093 -1.082 -0.004 0.238 -1.316 -1.956
438555
     2.024 -2.001 0.966 0.653 -0.093 -0.166 -1.819 -0.162
440961 -0.462 -1.160 -0.389 0.126 0.594 -0.654 -0.097 0.359
616714 0.909 0.191 0.166 0.675 0.645 0.706 1.588 0.531
      0.303 -1.419 -0.391 -0.681 -0.458 -0.001 -1.048 -0.239
434247
      2.491 1.212 0.829 0.820 0.995 -0.669 0.636 -1.382
436547
0.268 1.948 1.783 -1.336 2.216 0.413 -1.765 -1.111
466283
449557
      2.861 1.852 0.433 -0.094 -0.239 0.405 0.407
                                            1.473
473329
      0.233 3.641 2.207 -0.686 -0.013 0.993 -0.813 0.121
470117
      0.434 -2.135 0.222 0.260 0.413 0.574 0.432 2.094
600702 -2.495 0.468 0.806 1.225 0.413 1.327 -1.756 1.688
615921 -1.890 1.719 -0.717 -0.671 0.220 -0.233 0.645 -1.146
475588
     1.489 0.101 -0.378 1.005 0.800 -0.928 -0.625 -1.084
609409 2.113 0.054 -2.132 0.915 0.678 -0.189 -0.431 0.328
479852 0.547 -2.353 -0.874 1.114 1.131 0.132 -1.539 -1.875
452249
     1.546 -2.607 -0.876 1.377 0.362 0.387 0.243 1.625
441536 -0.390 -1.890 0.891 -0.324 0.651 0.974 2.022 -0.346
1.372 -0.090 -0.342 2.090 -0.076 -0.799 1.496 0.212
442598
430987 -1.343 2.312 0.381 -0.878 -0.639 1.346 -0.520
                                            1.109
430104 -2.372 0.778 -0.896 -0.638 -0.183 -0.881 -0.432 2.001
612904 0.819 0.028 -2.506 1.242 -1.230 0.963 0.232 1.241
430886 -0.993 -0.995 0.364 -1.186 -1.501 0.872 -0.187 -1.466
467947 -1.136 -1.139 -0.646  0.471 -0.026 -1.038 -1.422  0.982
604804 -0.962 -1.693 -0.329 -0.925 -0.338 0.702 1.228
                                            1.369
460308 -1.257 2.331 1.413 1.230 -0.820 -1.308 -0.338 0.081
618862
     1.879 -0.066 -1.660 -0.301 0.977 -0.405 1.021 0.838
      0.019 -0.459 -0.684 2.219 -1.163 -0.289 -1.358 -0.475
462479
457555
      0.775  0.304 -0.194  0.357  0.123 -0.017  0.015 -0.633
459984
     0.892 -0.719 1.667 1.679 -0.030 0.102 0.112 -1.063
434982 -1.845
           1.667 -1.508 -0.523 2.299 1.087 -0.018 1.253
614233 -0.390 -1.664 0.861 0.238 0.389 -0.543 0.977 0.345
605258 3.499 0.581 0.233 0.264 0.237 -0.714 0.146 -2.287
604377
      0.279 -2.305 -1.116 -0.963 2.261 0.720 0.584 -0.135
434923
      476456 0.477 1.616 -0.973 -0.491 -1.222 -0.850 -0.740 1.241
```

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446788 0.134 -1.226 0.225 -0.549 0.976 0.473 -0.626 -1.462
477382 -1.337 0.141 0.643 -1.824 0.216 0.211 0.465 1.787
600275 -1.765 1.666 1.173 -1.419 0.119 -0.009 2.077 -1.557
461958 0.142 -2.907 -0.232 -0.184 0.275 1.888 -1.372 1.134
472720
      0.725 -2.397  0.660  0.374 -1.214  0.974  1.203 -1.132
442395
       0.098
            3.625
                  1.260 -0.602 -0.320 -1.351 0.170 0.780
455340 -0.377 0.650 0.279 0.218 1.086 0.051 0.518 0.758
613247 0.868 2.025 -0.438 -0.827 -2.043 -1.224 0.658 -0.666
454985 -2.866 0.273 -0.675 -0.864 1.048 -0.837 -0.048 2.126
468813 -1.502 -1.066 0.066 -0.019 -0.613 -1.297 1.500 1.526
452747 0.413 0.268 2.293 -0.978 2.006 0.726 1.116 -0.137
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451400 -1.466 2.355 -0.824 -0.488 -0.582 0.496 -0.220 0.371
464874 0.587 1.305 -0.323 0.604 0.686 1.097 0.335 -0.106
452496 -1.352 2.161 0.365 0.803 0.582 -2.018 0.451 -1.748
430714 -2.993 -0.166 1.871 -1.194 1.569 -0.855 0.658 0.837
472634 1.038 0.837 -0.495 1.507 1.679 0.457
                                            0.181 0.701
608371 -1.591 1.964 -1.130 -2.086 -1.278 -0.071 0.257
                                                  0.686
468168 2.626 2.395 0.924 -0.439 -1.396 1.269 0.356 0.762
464107 -0.495 1.057 -1.865 0.388 0.403 -1.234 1.691 -0.445
466959 -0.310 0.464 0.828 0.228
                               1.376 0.993 0.023 1.330
443522 -0.703 -0.874 -0.278 0.366 0.184 -0.789 -0.505 -0.844
441726 -0.377 -1.050 -0.016  0.338 -1.773  0.644  1.071 -0.482
473412 1.591 0.337 0.995 -0.037 1.707 0.844 1.492 -0.449
466201 -0.278 3.204 0.027 1.040 0.133 1.489 0.696 -0.526
469621 -3.090 -0.218  0.726 -0.686  0.779 -2.409 -0.545  2.219
466676 -1.784 1.244 0.825 -0.527 1.195 -1.406 0.649 -1.255
615346
      1.055 1.226 -1.027 -1.430 1.955 0.566 1.212 0.686
440106
       0.088 -1.463 -1.986 -0.469 0.112 -0.984 -0.362 0.404
450332
      0.178 -0.751 -1.490 -2.227 -0.233 -1.277 -1.034 -0.930
      615226
437688 -1.233 -1.086 -0.500 -1.404 0.265 -0.563 -0.594 0.361
437387 -2.772 0.241 0.046 0.619 -0.484 -0.184 -1.513 1.588
458139
      1.712 0.111 0.830 -0.107 1.209 0.658 -1.428 -2.070
       1.077 0.038 -0.429 1.641 0.168 -1.104 -0.340 0.574
443191
613647
       1.066   0.187   -0.210   -0.990   -0.627   -0.371   -0.113   -0.288
460820 -0.396 1.978 1.002 -0.128 0.176 2.117 0.195 -0.136
431121
       0.830 1.246 1.866 2.232 -1.243 0.288 -0.607 -0.729
619735
      1.178 0.741 0.379 0.655 2.928 -0.493 0.318 0.339
      1.563 -0.448 -1.414 -0.831 -1.824 -1.564 1.064 0.147
470485
620473
       449800
       1.824 0.899 0.077 1.520 0.106 0.344 0.580 0.880
602402
```

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452456 1.497 1.543 0.662 -0.114 -0.096 0.313 1.788 0.885
439269 0.699 -1.053 -0.252 -1.069 0.088 0.591 -0.396 -0.858
617774 -1.166 -0.152 1.582 -0.070 0.216 0.690 1.489 -0.651
477678 -0.421 1.659 0.864 -0.498 1.870 0.403 1.009 0.086
444913 0.943 -0.369 0.591 1.302 -0.450 0.272 0.060 0.943
456602
      1.219 -1.843 -0.296  0.924  0.263 -0.641  0.256 -0.041
451560 -0.748 -1.461 0.971 -1.839 -3.092 -1.042 -1.039 0.809
453407 2.794 0.668 -1.419 -0.270 1.233 -1.044 1.370 1.356
618655 -1.572 -0.428 0.258 0.038 0.703 0.909 -0.515 -0.897
612550 0.907 -2.725 -0.084 -1.518 0.726 -1.456 -1.338 -1.392
466718 0.287 0.356 0.445 -0.067 0.240 -2.024 0.750 0.146
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0.235
463842 0.265 -1.052 1.165 -0.545 2.047 -1.008 -1.399 0.944
610354 -1.649 1.261 1.465 -0.714 0.841 -0.653 -1.191
                                                   1.204
461328 0.594 -1.140 1.446 -0.782 -0.387 -0.315 1.199 0.812
458727 -2.911 0.517 0.833 -0.276 0.047 -1.833 0.179 -0.691
452587 1.754 1.309 -0.334 -1.529 -0.702 0.764 -0.300 -1.689
433184 -1.648 -1.126 -0.826 -0.677 -0.739 -0.177 -0.135 -0.825
451280 2.504 -1.473 2.223 0.094 -1.387 0.614 -0.953 -0.335
442632 -1.164 -1.000 0.575 -1.090 1.358 -1.267 1.533 -1.145
447300 -0.944 -1.202 1.167 -0.752 -0.700 0.319 -1.804 0.652
441783 -0.053 -1.894 -0.026 -0.774 -1.112 1.628 -0.550 -0.253
468702 -1.737 1.701 -1.169 0.612 1.903 -0.162 -0.277 -0.652
      1.895 2.406 -0.252 -0.248 2.090 -0.222 -0.535 -2.507
467942
463678 -0.945 -2.197 -0.933 -0.387 1.145 -0.751 -0.667 0.036
615220 2.508 1.874 -0.190 2.304 -0.885 0.374 0.391 -0.643
       0.164 -0.524 -0.392 1.574 -0.431 0.859 0.246 1.541
432711
463583 0.658 0.657 -0.775 -1.545 -0.905 -1.403 -1.592 -0.770
439502 -1.658 1.849 1.742 -1.118 0.036 0.756 -0.075 0.926
613287 -0.244 -0.806 -0.047 -0.761 -1.805 -0.248 -1.074 -0.895
620104 -2.785 0.775 1.712 0.228 -1.988 -0.944 -0.442 0.253
446895 -0.480 -0.847 1.048 -0.490 -0.738 -1.116 -1.859 0.279
431531 1.080 -0.156 -1.262 -0.702 -0.801 0.527 -0.939 0.849
605408 0.453 -0.110 0.185 0.095 0.339 -1.557 0.773 -0.408
457551 -1.249 -0.457 -2.583 0.066 -0.741 -0.208 0.547 0.589
619892 -0.061 3.451 -1.267 1.173 0.552 0.736 -1.433 0.250
445853 1.461 -0.203 -2.006 -0.818 1.568 -0.108 -0.242 0.372
475483 0.292 -2.539 -0.692 0.051 -2.268 0.865 1.319 1.253
606290 -0.544 -0.050 0.712 -0.834 -0.478 1.097 -0.148 -0.317
611852 0.868 -0.988 0.146 -0.387 -0.202 -0.110 2.373 -0.324
444734 3.290 -0.118 -1.549 0.086 1.388 0.499 1.064 0.799
```

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433683 -1.733 2.198 0.120 1.390 -1.440 -0.292 0.834 0.730
448882 2.460 -0.148 -1.968 0.404 -0.113 -1.270 0.580 0.329
466838 -0.349 -1.949 -1.310 0.844 0.331 1.607 0.098
                                                  1.114
605490 0.983 -0.455 -0.618 -0.005 -0.489 -2.232 0.559 -0.160
466137 -0.310 0.730 -1.547 -0.300 1.114 0.490 1.287 0.866
466970 0.951 0.235 0.345 -1.411 -0.295 -0.496 1.131
474801
       0.732 -0.293 1.352 1.093 -0.021 0.525 -1.707 -0.448
450703 0.091 -1.001 -1.752 -1.714 -1.717 -1.675 -1.491 0.689
478172 0.313 -2.373 1.281 0.863 1.934 0.677 0.105 0.914
604668 0.380 0.375 -0.708 -0.916 -0.652 0.167 0.953 -0.618
469429 -1.719 0.922 -1.006 -1.796 0.447 1.008 -2.579 1.192
471806 -1.584 1.855 0.172 1.422 -2.809 -0.940 -0.129 -0.011
475705
      2.868 1.946 -0.722 -0.595 -1.171 -0.561 -1.760 -0.662
      1.288 -1.134  0.183 -1.477 -1.463  0.402  0.839  1.304
476737 -0.305 -1.086 -0.270 1.337 -0.866 0.028 0.641 0.431
460359 -0.448 -1.379 0.151 0.886 2.519 -1.148 0.150 0.431
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613583 -0.909 -1.592 1.140 -1.369 -1.093 1.171 -1.267 -0.844
438178 0.906 0.173 -1.842 1.836 0.780 -0.280 0.687 -1.237
449221 -0.450 -0.624 1.542 -1.391 -2.040 0.377 0.894 0.656
459322 -0.078 -1.784 -2.488 -1.813 -1.043 -0.112 -1.310 1.470
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608331 0.219 -0.816 -0.756 -1.258 0.667 -0.684 -0.934 0.634
438546 -0.380 -1.230 0.239 0.493 0.211 0.900 1.054 0.044
441981
      1.134 -0.454 1.587 -1.005 0.064 -0.499 0.620
                                                  1.451
602177 -1.825 1.894 0.874 0.736 0.728 0.355 0.789 -1.534
441659 -2.303 1.003 -0.008 0.477 1.349 1.467 -0.017 0.735
614812 -0.874 -1.400 0.948 0.760 -0.210 -1.848 0.761 0.725
458470 -1.516 1.717 2.438 -0.867 1.437 0.498 0.595 -0.269
469646 1.089 -1.992 -1.578 0.437 -1.794 -0.446 1.019 -1.220
611118 1.424 -1.936 -1.441 -1.438 0.012 -1.737 1.947 0.306
465158 -1.629 1.986 -0.475 0.666 0.517 1.140 0.898 -1.703
457130
      1.669 0.015 -0.692 1.949 -0.999 0.829 0.392 -0.040
607893 -0.901 0.242 -0.379 -0.035 -0.497 0.943 -2.502 0.501
464736 -1.117 -1.023 -0.173 -0.473 1.440 0.706 -2.607 -0.668
476198 0.122 -0.769 0.875 0.213 -0.407 1.946 -0.598 -0.245
444903 1.024 -1.475 -0.512 1.575 -0.188 -0.899 0.515 -0.926
471453 1.432 -0.940 0.785 -2.912 1.445 -0.577 -0.610 0.509
466191 -1.771 -1.266 0.781 -1.989 -0.742 -0.371 0.384 -0.568
440930 -1.599 0.101 0.576 -0.383 -0.246 -0.714 1.152 -0.268
430380 3.067 0.993 0.495 -1.104 0.919 1.152 0.530 0.282
```

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613178
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460564
       0.611 0.392 -1.729 1.569 1.202 -0.801 -0.275 -0.189
439929
       2.266 -0.740 -0.503 -0.926 1.281 -0.961 1.208 0.185
605756 0.855 0.456 -0.276 1.178 -0.074 -1.893 1.323 -1.228
451184 -1.523 -1.093 -0.660 1.066 -0.292 0.024 -0.181 0.029
459588 0.093 -1.348 -2.199 0.361 -2.386 0.455 -1.431 -1.576
616637 0.878 -0.470 0.869 0.895 -1.427 -2.059 1.462 -0.607
447979 -0.336 -0.846  0.968 -1.150 -1.523 -1.055  1.713  1.023
460176 -0.596 1.552 0.707 0.340 0.079 -0.161 0.213 -0.393
459429
      1.073 1.034 0.279 -0.481 0.224 0.968 2.266 0.742
465456 -0.671 -1.891 1.799 0.435 0.759 -1.215 -0.815 -1.680
464665
       3.612 0.223 0.301 0.326 -0.797 -1.582 0.772 2.082
430853
       1.924 0.395 0.389 -0.274 -1.674 0.527
                                              1.480
                                                    0.551
       1.026 0.726 -1.150 0.578 -1.439 -0.744 0.065
615712
                                                    1.825
608228
       0.827 -0.504 2.111 -0.644 -0.194 1.056 -0.855
                                                    0.051
457535 -1.042 -1.081 0.794 -0.531 -0.215 -0.533 -2.846
                                                    1.238
442540 -0.892 -0.512 -0.510 -0.125 -0.146 -0.264 -0.475 0.316
455332 1.939 0.079 0.272 -1.807 -1.141 -0.512 -1.159 -1.054
439534 -3.244 -0.086 1.423 0.012 1.775 0.835 0.674 -0.692
462420 -2.931 0.411 1.246 1.575 0.912 -1.520 -0.067 -0.223
448913 -2.072 -0.068 -0.031 1.386 -1.340 1.130 -0.280 -0.138
440837 -0.913 -0.888 1.030 0.459 0.087 -0.318 0.006 0.863
466634 -0.335 -0.091 1.379 0.809 -0.327 1.665 0.097 1.578
446435 -0.096 -0.650 0.228 1.373 0.519 -0.292 -1.552 -0.796
438237 -0.402 -1.432 1.017 1.472 0.101 0.347 -0.383 -0.023
468313 0.039 0.258 -1.170 -0.454 -0.945 -1.295 0.025 -0.637
476303
      1.738 -0.753 2.669 -0.846 1.380 -0.369 -0.659 2.100
450339
      1.159 0.114 0.540 -0.734 0.022 0.451 1.202 -1.473
476502 -1.805 -0.987 1.974 -0.472 0.021 -0.376 -1.577 -0.872
600561 -0.921 2.910 -1.112 -1.327 -0.284 1.171 0.226 -0.913
      1.178 -1.220 0.205 -2.066 1.968 0.644 -0.405 -0.972
600754
439304 -0.446 -1.239 -0.339 0.392 -2.082 -1.063 0.706 -1.047
460722
      1.170 2.582 -1.307 2.109 0.599 0.414 0.284 -0.610
618632
      0.875  0.301  -0.886  -0.767  0.920  -1.144  -0.197  0.011
452204 -0.038 -2.119 1.319 1.006 -1.777 0.012 -0.543 1.088
454530
       1.344 -0.770 1.163 -0.407 -1.125 0.858 -1.261 -2.280
       0.764 0.097 -1.182 -1.258 1.052 1.435 1.726 -1.195
474848
435985
       0.680 0.147
                   1.350 -0.335  0.061 -1.377 -0.422  1.304
457942 -1.779 -0.929 1.822 -0.673 -0.586 0.933 -0.107 -0.301
436522 2.135 2.648 -2.367 0.954 -0.069 0.457 0.100 -0.160
455810 0.548 0.088 1.209 2.433 -0.516 1.488 0.437 0.005
446544 0.854 -0.868 -1.418 0.735 1.120 -1.519 1.754 -1.018
```

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461919 -0.242 -1.745 0.026 -1.007 -0.365 0.606 1.091 0.353
470128 1.675 -1.791 -0.637 -0.541 -1.382 1.188 -1.196 -2.611
462836 0.240 0.809 -0.465 0.934 0.188 0.804 -0.920 0.589
475407 4.075 0.491 1.668 0.217 0.636 -1.215 -1.190 0.113
473611 -0.457 -2.546 -0.646 -0.886 1.482 -0.653 -1.570 0.604
608425 -2.700
           1.004 0.416 0.480 -0.833 0.931 0.949 -1.542
476227 0.020 0.920 0.441 -1.430 -1.192 1.650 -1.126 -0.014
452701 -0.722 2.224 -1.289 -1.108 1.365 0.701 -1.327 -0.241
456789 -2.322 0.726 -0.468 -1.259 -0.554 0.726 -1.506 0.996
600904 -2.144 1.212 1.175 0.242 -1.061 -0.506 -0.073 1.603
450889 0.549 1.355 -1.887 1.136 -0.719 -0.112 -0.387 -0.822
478837 -2.351 -1.961 2.024 -1.711 0.039 0.293 -0.434 -0.609
611322
     2.197 -0.805 0.534 0.739 0.631 1.220 1.967 0.713
438180 2.316 1.347 -1.117 1.990 1.008 -0.224 0.806 -1.046
449793 -0.134 1.192 -2.333 -1.396 0.115 1.434 0.789 1.416
450730 -0.011 -1.545 -0.196 -1.806 0.949 -0.902 1.289 -1.209
445339 2.056 1.290 0.911 -0.685 -1.371 -1.263 -0.073 3.029
438328 -0.026 0.899 1.356 0.919 0.847 -1.463 0.319 1.391
479913 -1.251 -0.949 -1.409 1.260 -0.112 -0.432 0.001 0.553
460760 -1.684 -1.307 0.166 -0.980 -0.565 1.047 1.814 -1.018
444797 0.110 0.173 1.118 1.941 -0.516 -0.644 0.061 1.060
436711 0.370 -1.358 0.806 -2.305 -0.889 -0.298 -0.686 -0.348
432491 0.388 0.927 -0.288 -1.686 -1.829 -0.495 0.498 0.189
617527 -0.491 -1.108 0.549 -0.631 -1.215 1.216 -0.468 -1.453
601213 -0.501 -1.135 -0.715 -1.841 0.235 -1.497 -0.059 0.932
431361 2.143 -1.222 0.513 -0.964 -0.046 0.367 0.730 -0.700
477695 -0.884 -0.901 0.913 1.409 -1.299 0.464 -0.642 2.114
612597 0.890 -0.328 -0.595 1.062 -1.997 -0.051 0.955 0.273
445638 -1.905 -1.792 1.316 0.831 -0.757 -0.784 0.054 -1.425
476185 0.581 -0.856 0.696 1.015 -1.023 -1.488 1.680 -0.417
430232 -1.030 -0.416 -2.244 0.092 -0.460 1.537 0.674 -0.288
443861 0.790 1.070 -1.687 -0.090 -1.039 1.241 0.640 1.618
460801 -0.373 -0.415 -1.357 0.168 1.290 1.020 0.746 1.012
605121 2.664 1.270 0.626 -0.356 0.216 -1.341 1.654 0.394
458622 -0.390 -1.293 1.408 -0.648 0.954 -0.740 -0.364 0.041
478661 -2.369 0.823 -0.619 -0.361 -0.106 -1.203 -0.230 0.441
435299
     1.850 2.028 -0.246 0.747 -0.772 -0.322 -1.305 0.823
601961 1.335 -0.019 0.838 0.979 -0.513 0.171 1.223 -0.143
604328 -3.542 0.190 0.257 0.378 -0.844 -0.548 0.541 0.556
```

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438584
      1.992 1.460 0.624 -1.029 -1.164 -0.973 0.647
                                                1.066
478703
      0.576  0.575  0.823  1.398 -0.910 -0.368 -0.634
                                                 0.234
615683
      0.053 -1.022 -0.386 -0.238 -0.408 0.399 -0.706
                                                 1.004
455672
           1.280 1.012 -0.049 -1.700 -1.597 -0.456
      1.690
                                                0.435
      2.760 1.920 0.217 -1.516 -0.051 0.137 -1.350 0.699
602942
616706
      0.381 - 2.723
                  1.246 0.370 1.220 1.303 1.362 -0.791
473243
      0.900 0.446 0.141 0.272 -2.039 -0.435 2.037 -1.316
435552 -0.323 1.534 -0.956 1.025 -1.261 0.289 -0.207 1.015
434206 0.162 0.884 0.701 -0.199 -0.657 -1.785 0.099 -2.137
469895 -1.116 2.646 -0.613 1.024 -0.129 1.113 -0.817 -1.182
457722 -1.083 2.490 -0.624 -1.094 -0.834 -1.244 0.847 -0.849
473645 -2.897 0.211 0.436 0.737 1.210 -0.227 -0.400 1.395
619108
     1.464 -0.332  0.151 -0.292  0.620 -1.962  1.064  1.768
474998 -1.576 1.674 0.314 0.541 0.116 -0.796 -1.037 -0.407
460535
      1.008 1.199 -0.057 1.339 -0.325 0.728 1.682 -0.371
606487 0.023 -0.299 -1.458 -1.838 0.585 0.120 0.654 -0.542
620737 -1.135 2.401 1.471 -0.048 -0.699 0.673 -0.850 0.813
445904 0.528 -1.933 -0.622 1.046 1.146 0.388 -0.650 0.825
464145
      0.447 -1.168 -0.705 2.714 0.691 -1.385 0.315 -1.351
466818
464237 -0.926 -3.094 1.149 0.832 -0.546 0.970 0.629 0.339
618455 0.569 1.329 -1.344 1.275 0.037 -1.412 -0.409 1.044
456602 0.254 -0.950 0.394 -0.587 -1.930 -0.563 -1.637 -1.146
616126 -0.299 -2.151 0.724 0.741 -0.810 0.583 -1.530 0.628
468508 -0.446 0.284 0.688 -0.145 -1.848 -0.831 -0.427 -1.196
431937 -1.233 -0.864 -0.057 0.751 -0.605 0.438 0.230 -0.005
448603 0.494 -1.255 -1.290 -0.314 0.498 -1.438 -0.678 0.434
444500
      1.930 2.722 -0.111 -2.034 0.881 -0.951 -0.214 1.198
601117
      1.107  0.178  0.780  -0.581  0.580  -0.881  1.609
                                                1.358
615383
      0.850 0.219 0.008 1.313 -1.122 1.341 0.511 0.882
434342 0.664 0.885 0.098 0.436 0.504 0.379 -0.934 -0.326
435100 -0.248 -0.779 0.256 -0.067 1.197
                                     2.014 0.059 0.133
431278 -0.838 -0.442 1.847 0.479 -0.635 -1.944 1.410 -2.622
445648 -0.868 -1.106 0.045 2.452 -1.028 0.883 -1.085 0.129
448857 -2.354 -0.969 -0.096 0.409 1.287 0.932 0.493 -0.480
435267 -0.929
           1.681 0.967 -1.557 1.593 -1.399 -1.063 1.024
461275 -1.697 1.781 -0.401 0.239 0.013 -1.018 -1.333 -0.026
613816 -2.858 0.164 0.283 -0.453 1.259 -1.446 -1.263 0.669
620869 2.337 0.142 0.117 -0.057 -1.506 1.131 0.811 -1.037
478981 -0.461 -0.791 -1.138 1.003 -0.263 0.553 -1.038 -2.344
```

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464630 -2.367 0.944 -0.417 0.524 0.127 0.592 -0.839 -0.974
466303 -2.046 1.466 -0.205 0.287 -3.255 -0.635 -0.231 1.093
452647
      1.423 1.558 0.073 0.041 1.785 -0.156 -2.193 -0.393
441370 -0.833 0.320 -0.953 -0.361 1.797 0.431 0.197 0.004
619166 1.852 1.077 -0.771 0.152 1.209 1.751 0.368 0.397
472803 -0.829 -1.809 1.511 0.280 -0.558 1.649 -0.784
     1.072 -0.311 -0.008 -0.232 -1.285 -0.582 0.156 0.333
614383 -0.666 -1.587 -0.224 1.893 0.897 -0.655 0.439 -0.399
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613936 -0.798 -1.443 0.296 1.030 1.259 1.481 1.455 0.634
472163 -1.431 -0.316 -0.870 -1.875 1.096 0.547 1.925 -1.771
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474792 -2.956 0.485 -1.042 0.876 -1.057 -0.810 -1.390 0.922
      0.235 -2.393 1.077 -1.276 1.156 -0.710 -0.456 -1.505
470559
432399
      1.967 0.753 0.403 1.494 -0.302 -0.160 -0.173 -1.851
607605
      0.849 -1.234 0.753 0.628 1.061 -1.081 1.703 -2.299
600153
      0.876 -0.096 1.197 -0.312 1.947 1.088 -1.857 -0.893
465979
      466555
      444155
      1.673 -1.365 -0.762  0.613 -0.122  2.475  0.349  0.467
465764 -0.547 -1.493 1.097 -1.085 1.812 0.983 0.884 0.768
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453274 -0.024 -1.125 0.136 0.002 -1.648 0.210 2.037 0.170
479320 1.370 2.420 -0.160 0.935 -1.602 -0.702 -0.870 1.297
443462 0.336 -0.717 1.840 -0.137 0.536 -0.231 1.532 0.414
446158 -0.706 -1.090 0.647 0.586 0.062 -0.619 1.224 0.091
602514 1.983 2.150 1.572 -1.684 0.392 -0.828 -0.006 -1.248
477356
      434669 2.840 -0.440 1.338 1.986 0.989 -0.723 0.095 0.951
609322 -0.755 2.591 0.199 2.015 -0.518 -0.737 -0.759 -0.063
614265 -1.247 1.512 1.037 -1.439 0.811 0.525 -1.282 -0.525
606177 -0.302 -0.676  0.820 -1.381 -0.276 -0.149  1.082  2.540
461514 -0.843 -0.937 -0.428 -0.020 -1.056 -0.505 -0.801 -2.668
      1.698 1.755 0.175 1.217 0.065 -0.380 -0.760 -1.221
454685
477260 0.271 3.036 0.295 -1.277 0.177 -1.686 -2.194 -0.116
469126 3.100 -0.843 -1.635 0.840 0.446 0.606 -1.629 -1.389
443402
      1.543 -0.193  0.133  0.387 -0.849  1.668  0.110  1.486
479408 -1.125 -1.955 -2.062  0.405 -1.320  0.394 -1.077  1.361
467227 -0.136 -0.793 -1.760 -0.521 -2.400 1.857 -0.591 -1.283
468433
      1.471 -1.222 -0.751 0.394 -0.077 1.856 0.334 -0.074
604289 2.181 1.761 -2.192 1.501 1.210 0.584 -0.013 0.743
471366 -1.204 -1.245 0.253 0.301 0.641 -1.391 -0.924 -0.287
```

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473935 0.871 0.631 0.022 -0.627 0.223 1.424 1.940 0.118
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470670 -2.214 1.275 -0.110 -0.908 -0.219 0.109 -0.117 1.045
450368 -0.869 -0.738 -0.156 -0.407 0.085 -0.711 1.244 -0.578
      1.808 0.471 -1.291 0.119 -0.419 0.195 0.494 0.938
469653 0.583 0.012 0.587 -1.928 -0.143 0.359 0.712 0.350
615688 2.469 -0.070 -0.430 -3.402 0.584 0.024 -0.997 0.531
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      1.289 0.177 -0.889 -0.872 -0.280 0.295 1.559 -1.796
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441363 -1.037 -1.472 -1.257 -0.301 0.364 0.717 0.398 1.604
462683
      1.800 1.812 -0.337 0.460 0.566 1.219 -2.202 -0.430
      1.666 0.621 -1.155 0.261 -0.854 0.804 -0.030 -0.134
463184
433155 -0.762 -0.408 -0.413 -0.890 -1.759 -0.213 -0.537 1.044
616120 0.159 -0.447 1.104 -0.857 0.256 -0.498 -0.440 0.940
461744 0.494 1.127 0.034 1.844 -0.087 -0.012 -1.559 -0.584
475916 -0.377 -2.049 0.085 -1.365 -1.910 0.742 -1.325
                                                1.301
454434 1.201 0.335 0.047 0.404 2.969 -0.088 -0.228 0.516
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610302 -0.588 -0.961 -1.946 -0.806 -0.620 1.562 0.390 -0.594
462106 -1.317 -1.840 0.058 -0.152 0.937 -0.288 1.437 0.933
431389 -0.220 -1.620 0.162 0.681 0.681 -1.729 0.333 -0.036
442866 0.257 -0.537 -1.919 -0.610 1.228 1.939 -0.854 0.830
446755 -1.017 2.481 0.207 -0.453 1.850 0.000 0.505 0.967
464743 0.050 -0.594 -1.289 0.838 0.977 0.713 -0.596 -0.816
437889 0.745 -1.065 1.934 -0.986 -1.156 -0.950 -0.524 -0.093
473638
      1.791 2.615 0.114 0.870 0.485 -2.068 0.443 -0.578
444232 -0.124 1.581 0.083 -0.048 0.902 -1.054 1.384 -1.198
458237 1.769 -2.094 1.006 -0.106 1.634 0.224 -0.977 0.804
441499 -0.129 -0.039 -0.353 -0.201 0.553 -1.502 1.075 0.601
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448912 1.231 -0.141 0.781 -0.134 -0.613 1.492 0.592 -0.606
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456600 -1.291 2.371 0.053 0.127 1.011 -1.163 -0.942 -0.146
618405 -3.142 0.178 -0.612 0.433 -0.200 1.149 -0.546 0.269
430832 1.390 -0.193 1.675 -0.398 -0.240 0.798 0.819 0.766
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447750 1.411 1.734 0.967 1.053 -1.734 1.347 0.004 -0.182
```

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459878 0.328 -0.732 -1.235 -1.883 1.247 0.211 1.390 0.336
441142 -0.494 3.171 -1.303 -1.467 -0.625 -1.603 0.561 0.301
465667
      473109 -1.404 -1.351 -0.982 0.960 -0.791 -0.151 -1.368 -0.832
619794 1.025 0.598 -0.268 -0.966 -0.372 -0.619 1.124 0.118
602258
     1.844 1.454 -0.038 1.465 2.150 1.563 1.081 -0.925
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442210 1.135 -0.042 0.327 -1.228 -1.800 -0.312 0.646 0.101
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474898 -1.555 1.832 0.743 -0.550 -0.921 1.461 1.428 0.218
431354 -0.572 -1.142 0.128 -2.495 -0.133 -0.166 1.466
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479821 0.060 -1.766 1.311 -0.107 0.649 0.569 1.166 -0.207
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     1.323 -0.112 -0.256 -0.410 -1.370 -0.700 -0.237 -0.786
603882 2.623 -0.607 2.230 -0.378 0.423 -0.543 -1.855 -0.402
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438215 -0.684 0.120 -0.117 0.342 -0.391 0.789 1.353 -1.137
444583 2.077 0.336 1.418 1.564 0.692 -0.546 0.316 0.259
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616884 -0.366 3.066 1.304 -1.241 2.107 1.075 0.813 0.810
448310 0.272 0.161 -0.631 -0.670 -0.503 -0.479 -0.989
                                             1.681
478902 2.542 0.419 -0.473 -0.447 0.276 -0.042 -2.927 0.136
442695 -2.000 1.459 -1.783 -1.884 1.329 -0.849 1.213 -0.218
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604333 0.046 -0.189 -0.839 -1.164 -0.274 -0.237 -0.299 2.447
442604 0.576 1.260 0.734 0.177 -0.457 0.025 -0.949 2.801
435663 1.884 -1.058 0.851 -0.121 -0.499 -2.566 -1.059 0.184
470866 -1.288 -0.915 -0.710 -1.132 -1.834 0.453 0.553 -0.111
441871 0.591 -1.591 1.319 -1.672 0.875 0.031 1.241 0.167
431496
     3.267 0.159 -0.569 0.545 -0.031 -1.316 -0.096 -1.261
436499 -0.558 -0.897 -0.335 1.424 -0.535 0.040 -1.416 -0.441
469853 1.547 1.642 -0.351 -2.747 -0.084 0.502 -0.850 0.275
605369 2.114 -1.145 -0.756 -0.074 1.472 -0.091 1.106 0.751
448466 -0.339 -0.040 0.105 -0.011 -1.708 3.064 0.468 -0.541
432786 -1.076 -0.282 1.761 0.843 -1.139 1.175 0.716 0.020
```

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0.858 -1.873 -0.656 -1.414 -0.511 -0.949 1.171 -0.611
      444558
457733 -0.856 -1.272 1.249 0.783 0.801 0.905 -0.920 0.299
466161 -0.197 -0.050 1.037 0.030 -0.771 1.248 1.437 -0.927
       1.463 0.228 0.467 -0.233 -0.383 -1.129 0.517 -0.172
450800
458993
       0.490 -0.375 -0.611 -0.163 1.180 0.905 -2.542 -0.014
468634
      1.552 1.656
                   1.516 -0.937 0.552 1.169 0.095 1.278
461264 -0.694 -1.113 1.460 -0.919 -0.331 2.421 -1.317 -1.241
600184 0.937 -0.094 0.495 1.872 0.965 -0.965 -0.948 -0.631
604874 -0.122 -1.963 0.541
                         1.275 1.808 1.523 1.203 1.011
462377 0.384 -1.759 -1.326 0.881 -0.972 0.088 -0.181 -0.546
      1.142 -0.548  0.776  0.572 -1.179 -2.136  1.913  0.320
619657
437323 -2.843 0.563 -1.493 -1.102 0.594 0.738 -0.003 0.377
432148 -2.110 1.231 1.481 -0.324 0.238 0.375 0.157 -0.602
439690 -2.490 1.004 -0.232 -1.547 0.490 -1.134 -0.194 -0.009
601848 2.616 1.711 1.258 0.596 0.743 -0.819 -0.413 -0.800
615821
      3.122 2.102 0.549 0.442 0.523 2.670 0.323 -0.277
472475 -1.265 -1.659 0.275 -1.152 1.371 0.811 1.701 -1.598
457463 -0.411 0.045 -0.083 0.420 1.157 1.499 -0.293 0.846
604861 0.047 -1.032 -0.536 1.444 1.199 0.068 -1.348 -2.176
471519 0.015 0.285 -0.190 1.228 1.790 -0.127 -1.174 -0.326
618682 -0.185 -1.590 1.605 0.516 0.217 1.259 -1.331 -1.605
441425 0.247 -0.906 0.229 1.233 1.022 1.099 -0.216 -0.197
609336 -1.739 0.065 -0.675 0.747 0.455
                                      1.245 0.743 -1.235
603320 -1.577 2.005 -0.027 1.797 0.797 1.001 -0.026 0.459
615446 -2.815 -0.275 1.985 0.174 -0.691 -0.102 -2.933 -0.486
435967
      0.557   0.452   0.842   -0.136   -0.069   -0.588   1.131   -0.690
610246 0.477 0.026 0.626 0.158 -1.177 -0.100 0.414 -0.365
479327 -1.285 -0.651 -0.376 -1.602 -1.031 0.286 -1.021 -1.040
468300 -1.096 -1.081 -1.493 1.841 2.608 -1.251 -0.410 -0.590
612660 -0.600 -1.457 0.960 0.152 -0.769 -0.132 -2.082 -1.396
466691 -2.916 0.503 -0.310 -0.338 0.781 0.257 -0.223 -0.786
468515 -1.215 -1.363 0.138 0.867 -1.228 -0.197 1.415 -1.096
614521 0.338 0.646 -0.787
                         1.986 0.818 -1.508 -0.773 0.893
465921 -1.554 -0.874 1.748 -1.016 0.087 0.075 1.377 -0.569
604555 -1.664 1.747 0.135 1.812 -0.432 -1.420 0.078 0.143
616276 2.382 -1.194 0.587 0.517 1.387 -1.218 1.001 -0.258
463356 1.712 2.107
                   1.686 2.724 1.046 -0.579 -1.463 0.144
450184 1.170 0.255 0.059 0.610 0.451 0.137 0.205 2.662
471786 -0.339 -0.608 -0.199 1.509 0.457 0.284 0.764 -0.891
602289 -0.533 -1.465 -1.497 0.743 -0.881 -0.912 1.373 -0.349
445120 -2.452 1.253 -1.483 -0.076 -1.226 -1.692 1.060 -0.942
```

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449260
       0.852 -1.535 -1.332 1.873 -0.783 0.651 -0.423 1.651
472724 0.978 -0.388 1.161 -0.622 1.596 0.747 -0.866 0.318
475173 -1.592 -0.558 -1.334 -0.771 0.535 1.980 -0.164
                                                    1.264
443854 -1.275 -1.253 -0.732 -0.054 1.470 0.006 -0.228 0.455
461418 -0.287   0.458 -1.891 -1.130 -0.560 -0.781   2.408 -0.308
      1.240 2.667 -0.543 1.839 0.017 -0.830 -1.300 -0.983
616164
620962 -2.013 -0.964 0.650 0.966 2.674 -0.114 -0.211 0.293
465201 -3.085 0.334 -0.081 0.939 -0.983 -0.309 -1.104 1.788
470488 0.767 -0.190 0.104 1.297 0.007 -1.247 -1.726 -1.369
462250 -2.594 0.802 -0.866 1.994 0.735 -0.010 -0.504 0.162
436408 2.944 0.999 1.306 1.512 0.487 1.124 0.798 -0.858
464230 2.278 -0.031 -1.106 -1.080 0.652 -1.566 1.879 0.897
478609 -1.845 1.753 -0.587 -0.615 1.158 -0.735 0.550 -0.251
437156 2.030 -0.942 -0.051 -1.569 -0.651 -1.774 -1.417 -0.895
432218
      1.792 0.301 2.664 -0.954 -1.501 0.558 -0.897 0.794
620493 1.264 -2.264 0.246 0.468 0.377 0.540 -0.571 0.823
475391 -0.199 -0.357 -1.777 0.245 0.606 0.905 1.796 -0.346
440720 0.058 1.098 0.138 -0.322 0.669 -0.164 0.873 -0.761
606942 -0.741 -0.410 -2.155 -1.318 0.176 0.344 -1.293 -0.888
446971 -0.355 -0.231 0.300 -0.729 -0.667 -0.792 1.173 -1.052
470538 -2.055 0.885 -0.548 -1.307 0.498 0.432 -1.590 -1.561
601177 -2.773 0.424 -0.562 0.180 1.490 -2.464 -0.119 -1.028
451470 -1.085 2.555 -0.696 0.710 0.570 -1.861 -0.106 0.048
438529 -0.679 -1.363 -0.814  0.829  0.371 -0.789 -2.369  0.124
469742 0.263 1.283 0.405 -0.388 -0.254 1.977 -0.112 2.305
435534 0.524 -0.625 -0.179 -1.369 1.363 -0.604 0.596 -0.462
442239
      0.480 2.310 1.521 0.387
                                 0.110 0.637 2.399 -0.806
468986 -0.982 -0.807 -0.249 1.649 2.200 -0.798 -0.206 -1.180
606988 -0.097 -0.350 -1.056 -0.223 0.692 1.459 -0.753 -1.245
453719 0.179 0.409 -0.392 0.164 0.366 0.904 -0.314 0.178
475524 0.590 0.299 0.534 -0.079 -0.785 -1.294 0.729 1.129
617804
       0.981 -1.524 1.535 0.796 0.082 0.536 0.985 -0.484
613399
       453400 -2.594 1.105 0.937 -0.003 -2.248 0.346 0.319 0.089
615767 -0.504 -1.559 -1.079 -0.486 -1.013 0.693 -1.052 -1.813
615311 -0.746 -0.676 -0.851 -0.840 -0.534 -0.527 -0.184 -0.385
468470 -0.438 -1.780 0.402 0.610 -1.047 1.228 1.253 0.337
461383 2.715 0.254 -0.685 -0.393 1.718 0.688 -1.323 1.468
457727 0.853 -2.668 0.704 0.137 0.373 -0.395 2.703 -1.563
613327 -2.507 -1.476 1.446 -0.422 0.788 -0.646 0.048 -0.132
614941 0.387 -0.980 -0.079 0.611 -0.266 1.004 -0.319 -0.504
440680 -2.814 0.801 0.401 -0.919 0.877 0.617 0.905 -0.261
609949 1.195 -0.618 0.402 -2.035 -0.803 1.373 -0.946 0.160
```

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0.453  0.752 -0.949  0.152  1.236 -0.684 -0.990  1.870
439964 -1.089 -0.404 -0.436 -1.430 -0.118 0.236 -0.515 -0.131
478486
       2.157 2.040 0.395 1.158 -2.035 -1.367 1.587 1.417
466498
      1.321 1.176 -0.307 -0.037 -0.771 0.882 0.443 -0.277
430878 -0.088 -0.304 -2.047 -0.947 1.185 -0.241 1.445
                                                    1.428
600127 -0.459 -0.721 0.129 -0.467 0.361 0.348 -0.253 0.448
       0.510 1.291 -0.579 1.157 -0.820 2.257 0.218 0.364
462804
      1.966 2.067 1.424 0.396 0.383 1.603 -1.657 -0.363
435809
      3.189 -0.638 1.943 -0.953 0.302 0.930 -1.550 0.458
453193 -0.459 1.009 -0.687 1.234 -1.735 -0.383 -0.145 -0.313
459630
       0.411 0.978 1.279 -0.190 0.675 1.133 -0.730 1.478
608982
      2.832 1.387 0.004 -1.190 0.058 -0.621 0.850 -0.864
452218
       0.516 -0.506 -0.836 -2.561  0.364 -0.435  1.319
       0.948 0.738 -1.525 -0.629 -1.506 -1.382 -0.045 -0.863
460579 -1.611 -1.074 0.336 0.291 -1.022 -1.309 -0.870 2.266
442142 -2.185 -0.073 -1.209 0.202 -0.813 1.176 1.459 -0.066
608807 -2.716 0.934 -0.033 2.245 -0.424 -0.154 0.720 -0.791
433153 -3.249 0.317 0.162 -0.458 -1.191 1.102 -0.303 0.162
436560 -0.839 -2.364 1.238 1.111 1.109 0.253 0.290 0.704
436784 -2.884 0.756 -0.130 0.102 1.326 1.285 1.248 -1.843
430621 1.799 -0.106 -0.589 -0.252 -0.830 0.198 -0.065 1.356
601574 -1.139 -0.327 -0.776  0.570  1.316  0.335 -0.080  0.446
433853 -0.090 0.163 0.151 -0.273 0.532 0.305 0.697 -0.249
453164 -2.632 1.065 -1.926 -0.447 -0.807 -1.914 0.542 1.178
613931 -2.915 0.549 1.246 -0.939 -1.228 -0.451 -1.210 0.537
607458
       463835
                   1.867 -1.024 2.043 0.310 -0.566 -1.037
       0.162
            1.189
613945
       0.460 1.602 -0.420 1.383 0.906 1.299 -0.098 0.367
            1.070 2.291
                          1.294 0.420 0.242 0.442 -0.650
432699 -2.396
613119
      1.563 -1.437 1.107 0.737 0.047 -0.777 0.154 0.332
472922
      1.043 0.926 -0.495 -0.419 -0.210 1.028 0.659 0.089
613849 -0.924 -0.584 0.901 0.140 1.429 1.265 1.035 -1.891
603827 0.185 0.591 0.473 1.459 0.197 0.169 -0.855 -1.519
467780 -0.097 0.059
                   1.760 -0.450 -1.679 -0.736 -1.903 -1.148
460586 -2.447 0.612 1.679 -0.139 1.492 0.421 -0.392 0.825
613842 0.470 -1.325 -1.465 2.060 0.661 -0.745 -0.061 -0.310
435371 -1.747 -0.751 -0.532 0.158 -0.501 1.307 1.109 2.023
466289 -1.074 2.597 -0.260 0.361 -1.142 0.335 0.015 0.363
436173 -0.876 0.305 0.359 0.730 -0.057 0.386 -1.638 1.218
457234 -0.494 0.251 0.303 0.204 -0.437 -1.780 0.167 -1.463
474758 -2.469 0.945 -1.608 0.103 0.641 1.667 -1.328 0.670
477373
      1.189 -1.579 2.976 -0.907 0.262 -0.426 -1.063 0.678
613471 0.648 -2.415 0.509 -0.561 0.631 -1.041 -1.001 0.836
```

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601581 -0.473 -0.784 0.571 0.758 1.495 -1.133 -1.502 1.468
612102 -0.221 3.617 2.081 0.798 0.121 0.067 -0.072 -0.663
460263 0.883 0.143 -0.055 -0.871 -0.802 -0.808 -1.887 1.038
479134 -0.291 -0.061 0.534 -2.063 -0.298 -0.110 -0.195 -0.221
      1.232 0.236 -0.854 0.848 -0.489 0.166 -2.276 -0.786
451467
602670
      613607 -0.035 -1.058 0.507 -0.448 -0.028 0.069 -0.551 -0.723
611556
      1.009 -2.014 -0.268 -1.776  0.496 -0.079  1.261 -2.226
435518 0.711 0.784 0.659 -2.163 -0.264 0.140 -1.710 -1.009
465942 0.439 -0.047 0.262 0.177 0.707 0.452 -1.007 0.367
446174 -2.796 0.314 1.465 -0.644 -0.555 -1.699 -0.374 0.340
      2.837 1.930 1.657 -1.964 -0.404 1.215 -0.833 0.814
611651
446657 -1.390 -1.168 -1.399 -1.028 -0.657 -1.158 -2.372 -0.645
612506 2.225 2.389 0.807 1.321 0.180 0.960 0.830 -0.737
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454529 2.145 -0.679 -1.683 1.165 -0.450 -1.770 0.485 0.168
437422 -1.449 2.043 0.114 2.262 -0.829 -0.356 0.248 0.215
619470 1.962 1.956 -0.876 0.613 0.563 -0.565 1.603 -0.200
442666 -2.339 0.950 0.107 -2.168 0.553 1.023 -0.550 0.206
620507 2.252 -1.008 -0.656 -0.560 -0.227 -0.782 -2.013 -1.326
614867 -2.690 0.522 1.460 -0.129 0.165 0.262 -0.701 -0.763
609898 0.249 0.963 -2.300 1.175 0.095 -0.775 0.452 2.051
450702 0.329 -0.547 0.575 1.673 0.091 -1.187 0.654 0.710
600418 -1.545 2.347 -1.219 -1.373 1.316 0.569 0.417 -0.114
431202 -0.054 -2.739 -0.557 -0.128 -1.607 0.022 -2.361 0.634
457793 0.911 -1.806 1.760 0.504 -0.316 -0.161 -1.924 -1.782
470190 0.483 0.062 -0.354 0.897 -0.034 0.052 -1.877 -0.081
603733 -1.682 -0.182 -0.898 1.996 -0.022 0.871 0.470 -1.008
465136 0.312 0.574 -0.550 0.156 0.316 0.205 -0.598 0.346
611723 -0.793 -1.241 0.242 -0.845 -0.661 0.533 0.969 -0.994
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454139 -0.188  0.678  0.531 -0.149  1.416  0.891 -0.401  1.832
      1.206 0.234 0.326 -0.341 -0.935 -0.116 -0.162 1.490
447560
444378
     1.126 0.441 1.833 1.265 1.330 0.773 0.579 0.186
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455913 -0.022 0.372 -2.000 1.572 0.988 0.439 0.421 -0.005
454399 -1.867 1.674 -1.441 -0.213 -0.899 -0.431 0.180 -0.507
602842 2.402 0.605 1.021 -0.199 -0.400 -0.342 0.774 -0.380
459428 -1.427 -0.265 -0.241 0.081 0.385 1.286 0.270 -0.037
613114 2.967 0.102 -2.380 -0.372 0.803 -0.206 -0.790 1.114
450709 1.454 -1.271 0.425 -0.745 -0.694 0.531 -2.181 1.646
```

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444626
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601206
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470389 -0.597 0.831 0.668 -1.052 0.180 -0.162 0.869 -0.205
615218 -0.756 -2.111 1.353 1.412 1.009 0.698 1.001 -0.477
      1.078  0.745  1.012  -0.313  -1.887  1.067  1.587  0.086
606249
616161
       1.235 -1.184 0.757
                         0.836 -1.348 -0.760 1.124 -1.077
442335 -2.617 0.567 -2.264 1.098 1.543 1.253 -0.335 0.131
1.238 1.527 3.698 1.077 0.405 -0.339 1.260 0.844
441533
471784
      2.243 2.057 -0.070 0.655 -0.691 -1.145 0.843 0.223
453265
      0.434 -2.318 -0.053  0.617 -0.389  2.411  0.253  1.146
444922
      1.471 -1.716 -2.512 2.701 -1.958 0.756 -0.134 -0.146
474324 -1.151 -0.520 1.075 0.151 0.741 0.290 -1.513 -0.028
441298 -0.276 -0.249 1.296 0.593 0.595 0.775 0.056 -0.753
446606
      3.058
            1.751 -1.147 1.029 -0.296 -0.434 -0.019 0.107
459537 -0.716 0.058 -0.474 0.465 -0.040 -0.958 0.719 -2.249
440757 -0.999 -1.398 2.402 1.708 0.992 -1.609 0.278 1.678
604948
      3.151 0.952 1.644 -1.602 -0.133 0.224 -0.494 0.750
433275
      1.543 -0.839 -0.858 -1.095 1.940 0.975 -0.229
                                                  0.759
608309
      0.231 -1.716 -1.971 -1.265 -1.924 1.395 -0.788
                                                  0.580
       2.385  0.672  -0.039  -0.246  -0.243  -1.284  0.798
462767
                                                  0.568
471785 -0.731 0.499 -1.124 1.986 -0.141 0.321 -1.247
                                                  0.085
601397
      0.939 -0.948 1.293 0.094 0.427 1.044 0.117
                                                  1.748
477636
      0.590 0.122 0.800 0.991 0.088 0.747 0.119
                                                  1.113
441967
       2.063 1.981 0.089 0.786 2.249 -0.945 -0.491 0.543
454776
       0.900 -1.830 2.240 1.040 0.716 -0.336 0.848 -0.070
431532
      0.651 0.582 -0.429 0.922 -1.011 1.386 -0.166 1.188
614169 -0.509 0.288 0.897 2.216 0.802 -0.833 -0.213 -1.556
601425 -0.466 0.013 0.751 -0.037 1.094 1.680 1.060 -1.153
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      1.771 2.776 0.111 2.155 0.341 -0.017 0.791 -0.343
430567
      0.487 -0.210 1.099 1.593 -1.744 1.283 -0.087 0.637
439870 -0.051 -0.741 0.424 -1.301 2.379 -1.921 0.688 0.532
438837
       2.166 2.979 -1.251 0.154 -0.011 -0.390 -0.165 0.442
458997
604147 -0.562 -1.206 -0.072 -0.119 -1.271 0.210 1.086 -0.863
606638 -1.425 2.275 -1.282 -0.537 -2.246 -0.566 -0.199 0.215
619620 -2.704 0.964 0.586 1.315 -0.031 -1.074 0.202 0.290
441671 0.665
            1.185 0.646 0.045 -0.740 -1.531 0.120
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      0.763 -0.376  0.115 -1.372  1.049 -0.986 -0.444  0.959
610381
602416 -0.117 -1.967  0.706  0.091 -2.588 -1.388  0.452  2.366
```

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459562 -1.351 -0.200 1.462 -0.029 -1.210 0.478 0.215 1.369
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458132 -0.936 0.274 -1.417 0.983 -1.342 0.142 -0.580 0.744
448949 -1.837 1.583 0.053 0.409 1.156 0.058 -0.134 1.241
603732 -1.058 -0.456 -2.304 0.331 0.549 0.269 -0.640 -1.211
608929 -0.204  0.513 -0.961 -1.637 -2.247 -0.260  1.627  0.160
469875 -1.241 -0.514 0.314 0.400 -0.474 0.849 0.661 -0.907
443342
      1.127 0.910 -1.405 0.412 0.651 0.748 -0.064 0.885
456363 0.648 1.122 0.418 -0.139 -0.867 1.778 0.496 -1.415
470826 3.622 0.643 -0.727 -0.266 1.287 -0.540 -1.980 -0.737
458582 -1.690 0.511 -0.664 -0.504 -0.611 -0.618 -0.173 1.424
454480 -1.046 -1.928 0.535 0.848 0.255 -1.491 -1.051
                                                    1.236
435632 -3.287 -0.153 1.562 -0.203 -0.602 -0.663 0.044 0.210
442206 -1.760 0.071 0.626 -0.908 -1.161 -1.265 -0.020 -0.771
468303 0.219 -1.363 0.522 2.311 1.139 -1.013 0.007 1.491
447188 0.244 -2.272 -0.609 -0.322 0.882 0.954 -0.851 -0.294
469438 -1.112 2.011 2.395 -0.317 1.421 -1.081 0.499 -1.065
462519 -0.303 1.036 -0.926 -1.183 0.700 1.442 -0.126 0.654
432534 -0.693 -0.726 0.216 0.729 -1.303 0.657 0.094 -0.343
436467
      1.153 -1.361 2.253 -0.644 0.221 -0.065 0.226 -0.597
465674 0.570 -1.205 -1.902 -0.438 0.039 -1.189 1.307 -0.329
442389 0.108 -1.209 -1.376 -2.042 0.611 -0.052 -1.182 -1.119
471614 0.817 0.601 -0.598 -1.090 -1.141 -2.338 0.439 1.725
442936 -2.849 0.913 0.188 -1.426 -0.627 0.925 1.393 -0.175
       1.447 1.691 -0.433 -0.198 2.384 0.303 -1.491
437944
                                                    0.133
473705 -0.970 2.684 0.430 -0.836 -0.389 -1.999 0.295
                                                    1.560
469363 0.162 -2.255 -2.107 -0.646 -1.589 -1.422 0.472
                                                    1.631
465376 -0.214 -0.130  0.906  0.458  0.640  0.200  0.530
                                                    1.591
438775 -0.586 -1.403 0.867 0.501 -0.386 1.345 0.783 1.981
457962 1.418 -0.634 0.712 -0.076 -0.402 0.766 -2.137 -1.193
477947 -1.242 2.001 0.263 0.637 0.002 -0.186 -1.617 1.059
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612986 -0.394 -0.590 -0.010 0.021 -0.893 1.094 -0.129 1.610
615730 2.032 1.271 0.753 0.049 0.526 1.272 -0.416 -0.756
      1.564 -0.967 -0.244 0.149 0.394 -0.212 -2.491 -1.596
478640
470510 -0.227 -0.310 -0.933 1.832 0.107 0.145 0.382 -1.854
439360 0.536 1.350 0.042 1.003 0.036 -1.795 0.794 -1.190
440251 -0.778  0.314 -1.887  0.673 -1.976 -0.673  1.133 -1.003
600313 -0.099 -2.799 0.149 1.017 0.657 0.718 1.395 0.448
452216 -0.097 -1.587 -1.163 1.950 0.074 0.523 0.660 -1.185
478532 0.329 -1.862 -1.073 -0.799 -1.252 0.760 -1.270 -0.862
```

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620207 0.212 -2.865 -0.195 -1.217 1.055 -1.007 -0.887 0.589
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472814 0.145 -1.922 -0.565 0.132 -0.035 -1.591 0.293 2.130
464362 -2.252 0.947 -0.065 0.293 -0.847 -1.472 0.019 -0.416
456203 -0.260 3.296 1.215 -1.367 -1.670 0.894 1.288 -0.012
468984 2.070 -0.687 -1.044 1.308 -1.355 -0.082 0.480 0.201
473349 -2.909 -0.059 -1.462 -2.280 -1.019 -0.248 -0.882 -2.179
474771 0.223 -1.044 -0.261 -0.106 0.228 1.865 -0.945 0.387
448294
      0.388   0.453   1.962   0.650   -0.674   -0.048   -1.237   2.189
606606 -1.367 2.166 1.144 -0.923 0.005 -0.599 1.062 -0.598
605220
       0.100 0.001 -0.812 0.441 1.287 -2.106 0.563
                                                  1.522
466612 -1.348
            1.956
                  1.515 1.349
                               1.281 0.602 -0.354 0.660
       1.251 0.406 1.084 -1.239 -0.717
463331
                                     1.857 -0.596 -0.526
457843
       0.779  0.990  -0.752  -1.575  -0.877  1.984  0.984  0.121
609226
      0.171 -0.593 -2.080 -2.504 -1.104 0.739 0.060 0.714
452942
       0.024 1.411 -1.424 -0.156 -0.450 -0.155 -0.147 -0.692
609390
       1.199 0.420 0.015 -0.405 -1.191 0.680 0.819 -0.254
446608 3.162 1.163 0.592 0.557 0.183 0.824 0.319 -1.193
602500 -0.371
            3.307
                   0.685 -1.484 -0.461 0.665 0.898 -0.689
463809 -0.528 -2.795 -1.610 0.565 -0.749
                                      1.022 0.399 1.349
611996
      0.279 1.092 -0.347 -0.504 -0.136 0.928 -1.819 -0.114
459298
      1.000 0.448 3.241 0.269 1.020 -0.083 0.890 0.988
468158
      1.011 0.394 -0.753 -1.058 1.527 -0.409 0.901 -1.448
440831 -0.870 -1.184 -0.089 -0.185 0.789 1.076 0.758 0.537
0.898 0.804
617739
      1.110 0.805 -1.868 0.032 -2.192 -0.662
                                            1.558 - 0.041
607133
       0.850 0.532 -0.201 0.081 -0.738 -1.782
                                            0.276 0.188
      0.558  0.362  0.398  0.077  0.142  0.580
437470
                                            0.373 0.658
461372 -0.218 -1.093 1.474 -1.161 -0.817 0.538
                                            0.545 0.965
476130
      0.805 -0.533 2.201 0.616 0.033 0.265
                                            0.795 - 0.703
452438
       0.884 -0.616  0.531 -0.625 -0.643  0.197
                                            0.276 1.346
460517
       0.237  0.914 -1.190  1.043  0.969  0.954  0.714 -0.087
444896 -0.666 -1.792 0.751 0.747 -0.960 0.309
                                            1.116 - 1.477
448722
      1.140 2.446 -1.407 1.397 -0.440 -0.821 0.243 -1.319
477856
      1.331 -0.350 -0.163 -0.635   0.681 -0.617 -2.004 -0.534
617721 -0.730 -0.597 0.582 0.591 -0.185 -0.353 -0.022 1.612
454176 0.414 -0.478 1.018 -1.457 0.061 0.772 0.988 0.057
441923 -1.334 -1.432 1.990 -1.261 0.441 1.705 -0.539 -1.231
604279
      1.109 -0.402 0.059 1.289 0.605 0.898 0.686 1.655
440833 -2.522 1.066 -1.434 0.972 0.462 0.245 -0.162 0.035
451550 0.999 0.348 -0.042 0.569 -0.528 -1.304 -1.657 -0.412
```

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431853 0.631 1.642 -0.248 -0.867 -1.012 -0.494 0.561 -1.471
456781 -1.551 1.970 0.841 1.283 -1.197 0.421 -0.827 -0.631
434293 2.610 1.522 0.519 -0.137 -0.659 0.657 0.084 -0.300
460895 0.140 -0.406 -1.131 -2.617 -0.899 0.705 0.827 -0.257
      1.014 1.078 0.149 1.933 0.152 0.611 -0.432 0.302
465440 -0.363 -0.748 -1.605 0.501 0.854 -0.759 -1.952 -0.710
455482 1.143 2.574 0.065 -0.536 0.651 -2.416 -0.638 -1.584
438877 -0.275 -2.540 0.805 0.773 -0.491 -1.455 -0.128 0.866
479824 -1.538 -0.488 3.603 -0.820 -1.001 0.071 0.444 -0.239
477415 0.857 0.279 2.242 0.185 1.778 0.934 0.017 -0.667
614372
      1.557 -0.522 -0.341 1.746 -1.012 1.347 1.063 0.617
465248 -0.962 -0.797 0.700 1.492 -0.077 -0.287 -0.331
                                                 0.431
449421 -0.155 3.595 0.446 1.245 -0.780 1.820 -0.563 0.881
445856 1.943 1.759 -1.136 0.536 0.068 -0.470 -0.266 0.740
608525  0.541  -0.817  1.123  0.677  -0.742  -0.173  0.486
                                                 1.287
608813 -0.487 -0.486 -1.055 0.686 0.181 -0.978 -1.144 0.709
459295 2.091 3.030 -0.266 -0.220 -1.567 1.024 0.554 -0.879
606144 -2.068 1.326 -0.234 0.277 1.511 0.024 -0.552 -0.337
476315 -2.904 0.316 0.413 0.213 -1.103 1.883 -0.092 0.271
475891 -2.807 0.752 0.326 1.028 -0.836 -0.070 0.043 -0.607
462525 0.499 -1.138 1.434 -0.647 -0.249 1.412 -0.074 -1.584
606283 -1.415 2.318 -0.162 -0.585 -0.015 0.216 0.523 -1.180
465252 0.577 -1.232 -0.842 0.148 2.030 0.721 0.290 1.415
449979 -0.619 1.374 -0.598 1.061 -0.780 1.915 -0.265 0.620
604681 -2.530 0.888 0.821 -0.013 1.699 -0.056 0.427 -1.491
466390 -1.203 -1.016  0.329  0.146 -1.111 -1.023  2.093 -2.463
612316 -2.762 -1.231 0.784 2.211 -0.876 0.349 0.023 -0.386
474731 -1.106 -1.581 1.205 1.793 0.380 -0.900 0.471 -0.535
603260 -0.248 -1.103 -0.510 0.248 1.887 -0.312 -0.722 -0.765
434370 -0.349 -1.904 -1.270 -0.627 0.445 1.081 -0.308 0.801
478388 -0.084 -1.346  0.756 -0.188 -0.784 -0.544 -1.188 -0.495
617883 0.553 -0.321 0.170 0.232 1.011 -0.037 0.087 0.871
464808 3.750 0.572 -2.183 0.142 -1.212 -0.737 0.956 -0.087
609458 -1.107 2.334 0.878 0.673 -1.456 -1.722 -0.599 1.498
432405 -0.722 0.751 -2.038 -1.450 -0.771 1.543 0.718 1.199
457875 -0.397
            1.533 0.222 -2.033 1.560 0.104 1.728 0.307
477268 -0.094 -1.966 0.353 0.097 -1.112 -1.279 0.165 1.113
437580 -0.444 -0.450 -1.391 -0.384 2.049 -0.553 -0.914 -0.313
457121 1.131 0.234 0.339 -0.140 -1.037 -0.367 0.196 -0.327
436364 1.003 -2.118 3.315 0.032 -0.898 -1.335 1.532 0.298
```

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468202
       0.536   0.306   -0.581   -0.814   -0.789   -0.488   1.272   -2.045
456959
       0.521 -1.657  0.358  0.518  2.791  1.233  0.943  1.086
447274
       1.058 -2.126  0.835  1.331  1.119 -1.570 -0.892  0.212
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scoruri_principale

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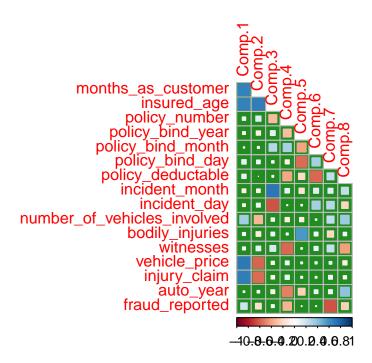
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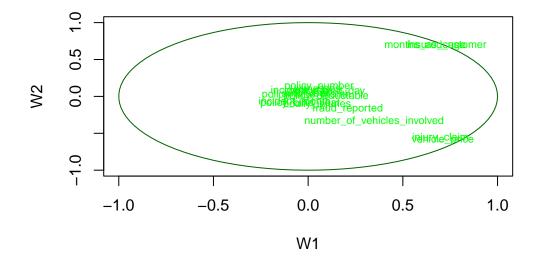
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```
433974 -0.7930242439 -0.4756260752 0.568255332
604833 1.0283529060 1.2981825425 -0.925420415
447469 -0.9449360994 0.8043948526 -0.138676856
451529 -1.3378453986 -0.2528938561 0.428516400
431202 1.6649025009 -0.3177104785 -0.007451705
448190 0.9736415203 -0.6039095345 1.937177495
453713 -0.7021272979 0.5447653009 -0.949607561
440153 2.4822351430 -1.5735806096 -0.400120889
619570 -0.4010505714 0.5006023722 -0.553185606
478947 -0.0493936614 -0.0783647362 0.461589963
443550 0.4040414188 1.6275507213 1.126114176
477644 0.0111335493 0.3004908477 0.494224260
433696 1.6512563426 0.4711325730 -0.447956435
443567 0.2449842541 1.6702433438 0.606889487
430665 0.7397578264 -0.5272900590 -0.376408144
431289 -0.3368119381 0.5272619254 0.143641659
608177 1.0444403762 1.2365761142 -0.320415534
442797 0.9217805892 0.1773755418 0.166422346
441714 0.7520693634 1.4105076780 -1.022164528
612260 0.2926545948 1.4140456808 -1.018551343
  # Matrice de corelatie
  #intre variabilele initiale si cele 8 componente
  matrice_corel_comp_principale<-cor(date_standardizate1, scoruri_principale)</pre>
  View(matrice_corel_comp_principale)
  corrplot(matrice_corel_comp_principale,method="square",
  type="lower",bg="forestgreen")
```

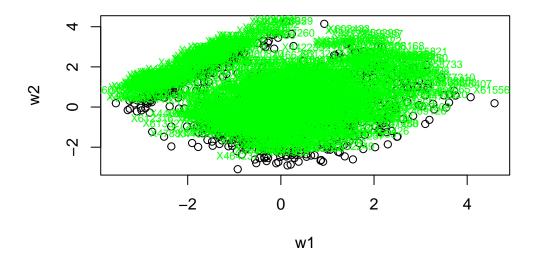


```
# Cercul corelatiilor
cerc<-seq(0,2*pi,length=100)
plot(cos(cerc),sin(cerc),type="l",col="darkgreen",xlab="W1",ylab="W2")
text(matrice_corel_comp_principale[,1],matrice_corel_comp_principale[,2],rownames(matrice_</pre>
```

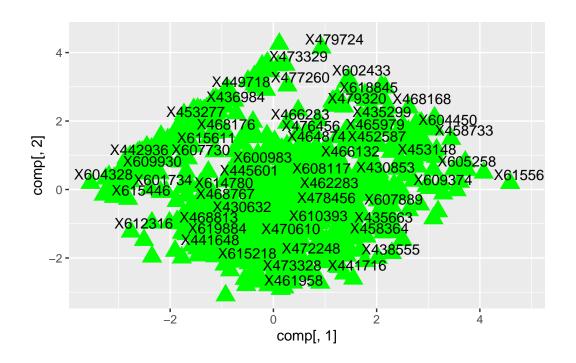


```
# Plot componente
comp<-data.frame(scoruri_principale)
plot(comp[,1],comp[,2],main="Plot componente",xlab="w1",ylab="w2")
text(comp[,1],comp[,2],labels=rownames(comp),col="green",cex = 0.7,pos=3)</pre>
```

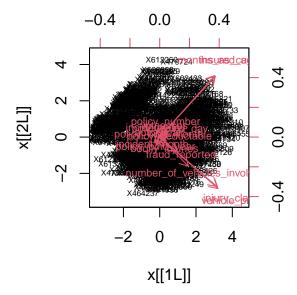
Plot componente



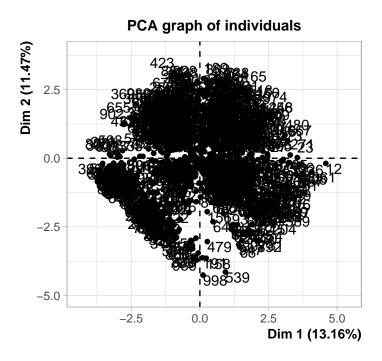
```
# GGPLOT componente
ggplot(comp, aes(x=comp[,1], y=comp[,2])) +
geom_point(shape=17,size=5,col="green") +
geom_text(
label=rownames(comp),
nudge_x = 0.25, nudge_y = 0.25,
check_overlap = T,
)
```



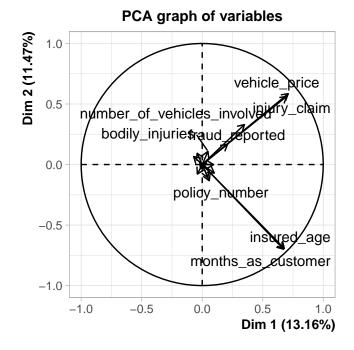
Biplot
biplot(comp[,1:2],comp_principale\$loadings[,1:2],cex = c(0.5,0.7))



PCA
#install.packages("FactoMineR")
library(FactoMineR)
functia_PCA<-PCA(date_standardizate1)</pre>



Warning: ggrepel: 8 unlabeled data points (too many overlaps). Consider increasing max.overlaps



summary(functia_PCA)

Call:
PCA(X = date_standardizate1)

Eigenvalues

	Dim.1	Dim.2	Dim.3	Dim.4	Dim.5	Dim.6	Dim.7
Variance	2.106	1.835	1.179	1.131	1.087	1.069	1.030
% of var.	13.163	11.467	7.368	7.070	6.791	6.680	6.434
Cumulative $\%$ of var.	13.163	24.630	31.998	39.068	45.859	52.540	58.974
	Dim.8	Dim.9	Dim.10	Dim.11	Dim.12	Dim.13	Dim.14
Variance	1.013	0.976	0.942	0.906	0.863	0.821	0.778
% of var.	6.331	6.097	5.885	5.661	5.392	5.131	4.861
Cumulative % of var.	65.305	71.402	77.287	82.948	88.340	93.471	98.332
	Dim.15	Dim.16					
Variance	0.189	0.078					
% of var.	1.183	0.485					
Cumulative % of var.	99.515	100.000					

Individuals (the 10 first)

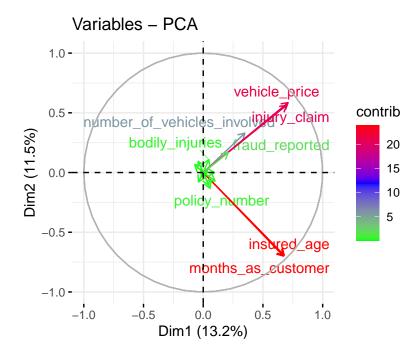
```
Dist
                                        Dim.1
                                                 ctr
                                                       cos2
                                                               Dim.2
                                                                        ctr
                               3.576 |
                                        1.242
                                               0.073
1
                                                      0.121 | -0.866
                                                                      0.041
2
                               4.301 | -1.167
                                               0.065
                                                      0.074 \mid -1.650
                                                                      0.149
3
                               3.561 | -0.859
                                               0.035
                                                      0.058 | 0.756
                                                                      0.031
4
                               3.898 I
                                        0.683
                                               0.022
                                                      0.031 | -0.378
                                                                      0.008
5
                               3.699 | -1.674
                                               0.133
                                                      0.205 | -1.749
                                                                      0.167
6
                               3.769 | 0.776
                                               0.029
                                                      0.042 |
                                                               0.483
                                                                      0.013
                                        1.372
7
                               4.367 l
                                               0.090
                                                      0.099 I
                                                               2.457
                                                                      0.330
8
                               3.957 | -0.021
                                               0.000
                                                      0.000 |
                                                               0.653
                                                                      0.023
                                                      0.364 | -0.034
                               3.958 | -2.387
                                               0.271
9
                                                                      0.000
10
                               3.444 | -0.458
                                              0.010 0.018 | -0.698
                                                                      0.027
                              cos2
                                      Dim.3
                                               ctr
                                                     cos2
1
                             0.059 | -0.615 0.032
                                                  0.030 |
2
                             0.147 \mid -0.917
                                             0.071 0.045 |
3
                             0.045 | 0.398
                                             0.013 0.012 |
4
                             0.009 | -0.236
                                             0.005 0.004 |
5
                             0.224 | 0.829
                                             0.058 0.050 |
6
                             0.016 | 1.255
                                             0.134 0.111 |
                                             0.083 0.051 |
7
                             0.317 | -0.990
8
                             0.027 | -0.489
                                             0.020
                                                   0.015 l
9
                             0.000 | -2.186
                                             0.406
                                                    0.305 l
10
                             0.041 | 0.237
                                             0.005
                                                    0.005 |
Variables (the 10 first)
                                                      Dim.2
                               Dim.1
                                        ctr
                                              cos2
                                                               ctr
                                                                     cos2
                               0.672 21.439
                                             0.452 | -0.700 26.692
                                                                    0.490 |
months_as_customer
                               0.678 21.845
                                             0.460 | -0.693 26.169
                                                                    0.480 |
insured_age
                               0.058 0.161
policy_number
                                             0.003 | -0.134 0.978
                                                                    0.018
                            -0.042
                                     0.083
                                             0.002 | 0.094
                                                             0.477
                                                                    0.009 |
policy_bind_year
policy_bind_month
                            | -0.009 0.004
                                             0.000 | -0.022 0.026
                                                                    0.000 |
policy_bind_day
                               0.100 0.474
                                             0.010 | -0.071
                                                            0.274
                                                                    0.005 I
                                                      0.000 0.000
policy_deductable
                               0.095
                                     0.428
                                             0.009 |
                                                                    0.000 |
                            | -0.071
incident_month
                                     0.240
                                             0.005 |
                                                      0.066
                                                             0.239
                                                                    0.004 |
incident_day
                            -0.040
                                     0.076
                                             0.002 | -0.079
                                                             0.341
                                                                    0.006 |
number of vehicles involved |
                               0.349
                                      5.772 0.122 |
                                                     0.330 5.943
                                                                    0.109 |
                             Dim.3
                                      ctr
                                            cos2
                             0.070
                                   0.421
                                           0.005 |
months_as_customer
insured_age
                             0.072 0.437
                                          0.005 l
policy_number
                            -0.314 8.390 0.099 |
policy_bind_year
                             0.117
                                    1.171 0.014 |
policy_bind_month
                             0.281 6.717
                                           0.079 |
policy_bind_day
                            -0.029
                                    0.074
                                           0.001
policy_deductable
                            -0.018 0.027
                                           0.000 |
```

```
# Factoextra
#install.packages("factoextra")
library(factoextra)
```

Welcome! Want to learn more? See two factoextra-related books at https://goo.gl/ve3WBa

```
fviz_pca_var(functia_PCA,col.var = "contrib",gradient.cols = c("green", "blue", "red")
,repel = TRUE)
```

Warning: ggrepel: 8 unlabeled data points (too many overlaps). Consider increasing max.overlaps



```
fviz_pca_ind(functia_PCA,col.ind = "cos2", gradient.cols = c("green", "blue", "red"),repel
```

Warning: ggrepel: 988 unlabeled data points (too many overlaps). Consider increasing max.overlaps

