Customer Segmentation Analysis

Wangechi Mungai

25/03/2022

1.Defining the Question

a) Specifying the Question Creating models using K-Means and Hierarchical to create clusters according to customers segmentation

b) Defining the Metric for Success The model will be appraised successful if it will be able to cluster the customer segmentation clearly/best.

c) Understanding the context

Kira Plastinina is a Russian brand that is sold through a defunct chain of retail stores in Russia, Ukraine, Kazakhstan, Belarus, China, Philippines, and Armenia. The brand's Sales and Marketing team would like to understand their customer's behavior from data that they have collected over the past year. More specifically, they would like to learn the characteristics of customer groups.

d) Recording the Experimental Design

The following are the experimental design i took in order to complete this project:

1.Importing all the necessary libraries

2.Loading the dataset

3.Reading, cleaning the dataset

4.Performing Exploratory Data Analysis

5.Performing data modelling using K-Means and Hierachical clustering

6.Giving conclusions and recommendations.

e)Reading the Data

```
library(magrittr)
library(dplyr)
```

```
##
## Attaching package: 'dplyr'

## The following objects are masked from 'package:stats':
##
##     filter, lag

## The following objects are masked from 'package:base':
##
##     intersect, setdiff, setequal, union
```

```
shop <- read.csv("http://bit.ly/EcommerceCustomersDataset")
head(shop)
```

```
##   Administrative Administrative_Duration Informational Informational_Duration
## 1              0                       0             0                      0
## 2              0                       0             0                      0
## 3              0                      -1             0                     -1
## 4              0                       0             0                      0
## 5              0                       0             0                      0
## 6              0                       0             0                      0
##   ProductRelated ProductRelated_Duration BounceRates ExitRates PageValues
## 1              1                0.000000  0.20000000 0.2000000          0
## 2              2               64.000000  0.00000000 0.1000000          0
## 3              1               -1.000000  0.20000000 0.2000000          0
## 4              2                2.666667  0.05000000 0.1400000          0
## 5             10              627.500000  0.02000000 0.0500000          0
## 6             19              154.216667  0.01578947 0.0245614          0
##   SpecialDay Month OperatingSystems Browser Region TrafficType
## 1          0   Feb                1       1      1           1
## 2          0   Feb                2       2      1           2
## 3          0   Feb                4       1      9           3
## 4          0   Feb                3       2      2           4
## 5          0   Feb                3       3      1           4
## 6          0   Feb                2       2      1           3
##         VisitorType Weekend Revenue
## 1 Returning_Visitor   FALSE   FALSE
## 2 Returning_Visitor   FALSE   FALSE
## 3 Returning_Visitor   FALSE   FALSE
## 4 Returning_Visitor   FALSE   FALSE
## 5 Returning_Visitor    TRUE   FALSE
## 6 Returning_Visitor   FALSE   FALSE
```

f) Checking the Data

```
#previewing tail of dataset
tail(shop)
```

```
##       Administrative Administrative_Duration Informational
## 12325              0                       0             1
## 12326              3                     145             0
## 12327              0                       0             0
## 12328              0                       0             0
## 12329              4                      75             0
## 12330              0                       0             0
##       Informational_Duration ProductRelated ProductRelated_Duration BounceRates
## 12325                      0             16                503.000 0.000000000
## 12326                      0             53               1783.792 0.007142857
## 12327                      0              5                465.750 0.000000000
## 12328                      0              6                184.250 0.083333333
## 12329                      0             15                346.000 0.000000000
## 12330                      0              3                 21.250 0.000000000
##        ExitRates PageValues SpecialDay Month OperatingSystems Browser Region
```

```
## 12325 0.03764706    0.00000          0   Nov               2       2      1
## 12326 0.02903061   12.24172          0   Dec               4       6      1
## 12327 0.02133333    0.00000          0   Nov               3       2      1
## 12328 0.08666667    0.00000          0   Nov               3       2      1
## 12329 0.02105263    0.00000          0   Nov               2       2      3
## 12330 0.06666667    0.00000          0   Nov               3       2      1
##       TrafficType       VisitorType Weekend Revenue
## 12325           1 Returning_Visitor   FALSE   FALSE
## 12326           1 Returning_Visitor    TRUE   FALSE
## 12327           8 Returning_Visitor    TRUE   FALSE
## 12328          13 Returning_Visitor    TRUE   FALSE
## 12329          11 Returning_Visitor   FALSE   FALSE
## 12330           2       New_Visitor    TRUE   FALSE
```

```
#previewing the shape of the dataset
dim(shop)
```

```
## [1] 12330    18
```

The dataset contains 12330 rows and 18 columns

```
#previewing the descriptive statistics of dataset
summary(shop)
```

```
##  Administrative   Administrative_Duration Informational
##  Min.   : 0.000   Min.   :  -1.00         Min.   : 0.000
##  1st Qu.: 0.000   1st Qu.:   0.00         1st Qu.: 0.000
##  Median : 1.000   Median :   8.00         Median : 0.000
##  Mean   : 2.318   Mean   :  80.91         Mean   : 0.504
##  3rd Qu.: 4.000   3rd Qu.:  93.50         3rd Qu.: 0.000
##  Max.   :27.000   Max.   :3398.75         Max.   :24.000
##  NA's   :14       NA's   :14              NA's   :14
##  Informational_Duration ProductRelated   ProductRelated_Duration
##  Min.   :  -1.00        Min.   :  0.00   Min.   :   -1.0
##  1st Qu.:   0.00        1st Qu.:  7.00   1st Qu.:  185.0
##  Median :   0.00        Median : 18.00   Median :  599.8
##  Mean   :  34.51        Mean   : 31.76   Mean   : 1196.0
##  3rd Qu.:   0.00        3rd Qu.: 38.00   3rd Qu.: 1466.5
##  Max.   :2549.38        Max.   :705.00   Max.   :63973.5
##  NA's   :14             NA's   :14       NA's   :14
##   BounceRates         ExitRates         PageValues        SpecialDay
##  Min.   :0.000000   Min.   :0.00000   Min.   :  0.000   Min.   :0.00000
##  1st Qu.:0.000000   1st Qu.:0.01429   1st Qu.:  0.000   1st Qu.:0.00000
##  Median :0.003119   Median :0.02512   Median :  0.000   Median :0.00000
##  Mean   :0.022152   Mean   :0.04300   Mean   :  5.889   Mean   :0.06143
##  3rd Qu.:0.016684   3rd Qu.:0.05000   3rd Qu.:  0.000   3rd Qu.:0.00000
##  Max.   :0.200000   Max.   :0.20000   Max.   :361.764   Max.   :1.00000
##  NA's   :14         NA's   :14
##     Month           OperatingSystems    Browser           Region
##  Length:12330       Min.   :1.000    Min.   : 1.000   Min.   :1.000
##  Class :character   1st Qu.:2.000    1st Qu.: 2.000   1st Qu.:1.000
##  Mode  :character   Median :2.000    Median : 2.000   Median :3.000
##                     Mean   :2.124    Mean   : 2.357   Mean   :3.147
```

```
##                    3rd Qu.:3.000    3rd Qu.: 2.000   3rd Qu.:4.000
##                    Max.   :8.000    Max.   :13.000   Max.   :9.000
##
##   TrafficType    VisitorType         Weekend         Revenue
##  Min.   : 1.00   Length:12330       Mode :logical   Mode :logical
##  1st Qu.: 2.00   Class :character   FALSE:9462      FALSE:10422
##  Median : 2.00   Mode  :character   TRUE :2868      TRUE :1908
##  Mean   : 4.07
##  3rd Qu.: 4.00
##  Max.   :20.00
##
```

```
#checking the datatypes of the columns
sapply(shop, class)
```

```
##          Administrative Administrative_Duration           Informational
##               "integer"               "numeric"               "integer"
##  Informational_Duration          ProductRelated ProductRelated_Duration
##               "numeric"               "integer"               "numeric"
##             BounceRates              ExitRates              PageValues
##               "numeric"               "numeric"               "numeric"
##              SpecialDay                  Month        OperatingSystems
##               "numeric"             "character"               "integer"
##                 Browser                 Region             TrafficType
##               "integer"               "integer"               "integer"
##             VisitorType                 Weekend                 Revenue
##             "character"               "logical"               "logical"
```

```
# information about the dataset
str(shop)
```

```
## 'data.frame':    12330 obs. of  18 variables:
##  $ Administrative         : int  0 0 0 0 0 0 0 1 0 0 ...
##  $ Administrative_Duration: num  0 0 -1 0 0 0 -1 -1 0 0 ...
##  $ Informational          : int  0 0 0 0 0 0 0 0 0 0 ...
##  $ Informational_Duration : num  0 0 -1 0 0 0 -1 -1 0 0 ...
##  $ ProductRelated         : int  1 2 1 2 10 19 1 1 2 3 ...
##  $ ProductRelated_Duration: num  0 64 -1 2.67 627.5 ...
##  $ BounceRates            : num  0.2 0 0.2 0.05 0.02 ...
##  $ ExitRates              : num  0.2 0.1 0.2 0.14 0.05 ...
##  $ PageValues             : num  0 0 0 0 0 0 0 0 0 0 ...
##  $ SpecialDay             : num  0 0 0 0 0 0 0.4 0 0.8 0.4 ...
##  $ Month                  : chr  "Feb" "Feb" "Feb" "Feb" ...
##  $ OperatingSystems       : int  1 2 4 3 3 2 2 1 2 2 ...
##  $ Browser                : int  1 2 1 2 3 2 4 2 2 4 ...
##  $ Region                 : int  1 1 9 2 1 1 3 1 2 1 ...
##  $ TrafficType            : int  1 2 3 4 4 3 3 5 3 2 ...
##  $ VisitorType            : chr  "Returning_Visitor" "Returning_Visitor" "Returning_Visitor" "Returni
##  $ Weekend                : logi  FALSE FALSE FALSE FALSE TRUE FALSE ...
##  $ Revenue                : logi  FALSE FALSE FALSE FALSE FALSE FALSE ...
```

```
#checking for percentage of any null values
colMeans(is.na(shop)) *100
```

```
##          Administrative Administrative_Duration           Informational
##               0.1135442                0.1135442               0.1135442
##  Informational_Duration          ProductRelated ProductRelated_Duration
##               0.1135442                0.1135442               0.1135442
##             BounceRates               ExitRates              PageValues
##               0.1135442                0.1135442               0.0000000
##              SpecialDay                   Month        OperatingSystems
##               0.0000000                0.0000000               0.0000000
##                 Browser                  Region             TrafficType
##               0.0000000                0.0000000               0.0000000
##             VisitorType                 Weekend                 Revenue
##               0.0000000                0.0000000               0.0000000
```

There are a number of missing values in some columns which will be solved during data cleaning

```
#checking for duplicate values
anyDuplicated(shop)
```

```
## [1] 159
```

There are 159 duplicates in the dataset

g)Data Cleaning

```
# dropping duplicates

shop = shop[!duplicated(shop), ]
```

```
anyDuplicated(shop)
```

```
## [1] 0
```

```
#fill the null values with mean
shop  = shop %>%

    mutate(Administrative =replace(Administrative,is.na(Administrative),mean(Administrative,na.rm=TRUE))
    mutate(Administrative_Duration =replace(Administrative_Duration,is.na(Administrative_Duration),mean
    mutate(Informational = replace(Informational, is.na(Informational), mean(Informational, na.rm = TRU
    mutate(Informational_Duration =replace(Informational_Duration,is.na(Informational_Duration),mean(In
    mutate(ProductRelated =replace(ProductRelated,is.na(ProductRelated),mean(ProductRelated,na.rm=TRUE))
    mutate(ProductRelated_Duration = replace(ProductRelated_Duration, is.na(ProductRelated_Duration), m
    mutate(BounceRates =replace(BounceRates, is.na(BounceRates),mean(BounceRates,na.rm=TRUE)))%>%
    mutate(ExitRates = replace(ExitRates, is.na(ExitRates), mean(ExitRates, na.rm = TRUE)))
```

```
colSums(is.na(shop))
```

```
##          Administrative Administrative_Duration           Informational
##                       0                        0                       0
##  Informational_Duration          ProductRelated ProductRelated_Duration
##                       0                        0                       0
##             BounceRates               ExitRates              PageValues
##                       0                        0                       0
##              SpecialDay                   Month        OperatingSystems
##                       0                        0                       0
##                 Browser                  Region             TrafficType
##                       0                        0                       0
##             VisitorType                 Weekend                 Revenue
##                       0                        0                       0
```

```
#checking for percentage of any null values
colMeans(is.na(shop)) *100
```

```
##          Administrative Administrative_Duration           Informational
##                       0                        0                       0
##  Informational_Duration          ProductRelated ProductRelated_Duration
##                       0                        0                       0
##             BounceRates               ExitRates              PageValues
##                       0                        0                       0
##              SpecialDay                   Month        OperatingSystems
##                       0                        0                       0
##                 Browser                  Region             TrafficType
##                       0                        0                       0
##             VisitorType                 Weekend                 Revenue
##                       0                        0                       0
```

```
#checking numerical cols
num_cols <- unlist(lapply(shop, is.numeric))
num_cols
```

```
##          Administrative Administrative_Duration           Informational
##                    TRUE                     TRUE                    TRUE
##  Informational_Duration          ProductRelated ProductRelated_Duration
##                    TRUE                     TRUE                    TRUE
##             BounceRates               ExitRates              PageValues
##                    TRUE                     TRUE                    TRUE
##              SpecialDay                   Month        OperatingSystems
##                    TRUE                    FALSE                    TRUE
##                 Browser                  Region             TrafficType
##                    TRUE                     TRUE                    TRUE
##             VisitorType                 Weekend                 Revenue
##                   FALSE                    FALSE                   FALSE
```

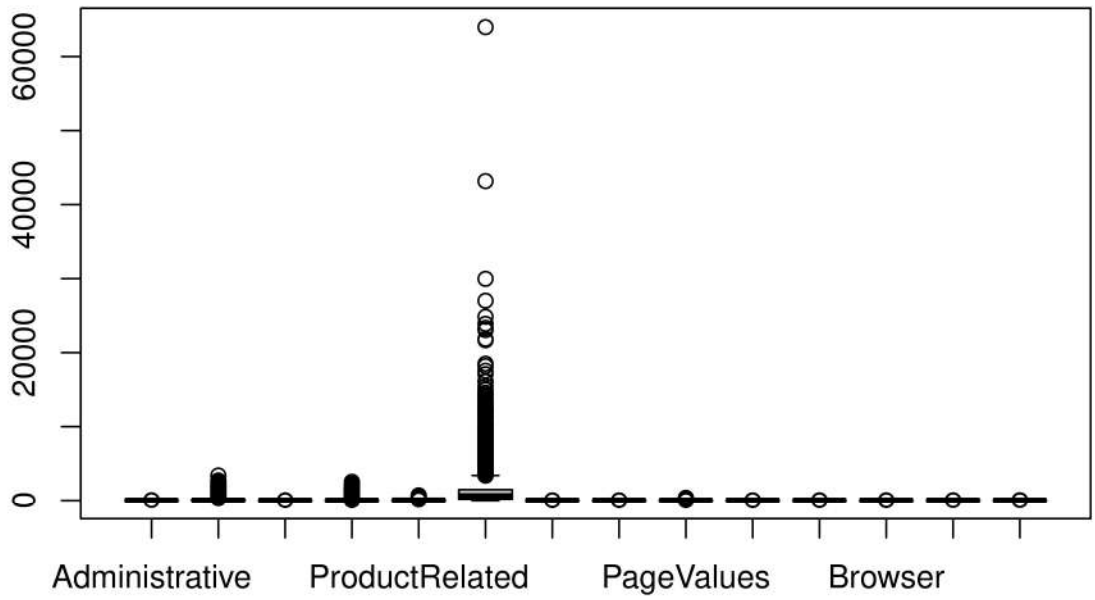
```
#displayig the numerical columns
df_num <- shop[ , num_cols]
head(df_num, 5)
```

```
##   Administrative Administrative_Duration Informational Informational_Duration
## 1              0                       0             0                      0
```

```
## 2              0                        0            0                      0
## 3              0                       -1            0                     -1
## 4              0                        0            0                      0
## 5              0                        0            0                      0
##   ProductRelated ProductRelated_Duration BounceRates ExitRates PageValues
## 1              1                0.000000        0.20      0.20          0
## 2              2               64.000000        0.00      0.10          0
## 3              1               -1.000000        0.20      0.20          0
## 4              2                2.666667        0.05      0.14          0
## 5             10              627.500000        0.02      0.05          0
##   SpecialDay OperatingSystems Browser Region TrafficType
## 1          0                1       1      1           1
## 2          0                2       2      1           2
## 3          0                4       1      9           3
## 4          0                3       2      2           4
## 5          0                3       3      1           4
```

```
outlier <- function(x){
  out <- boxplot.stats(x)$out
  return((length(out)/  12330)*100)
}
```

```
 #visualizing the outiers
   boxplot(df_num)
```



there are a number of outliers in the dataset but will not be removed since they are neccesary for our analysis

h) Exploratory Data Analysis Univariate Analysis

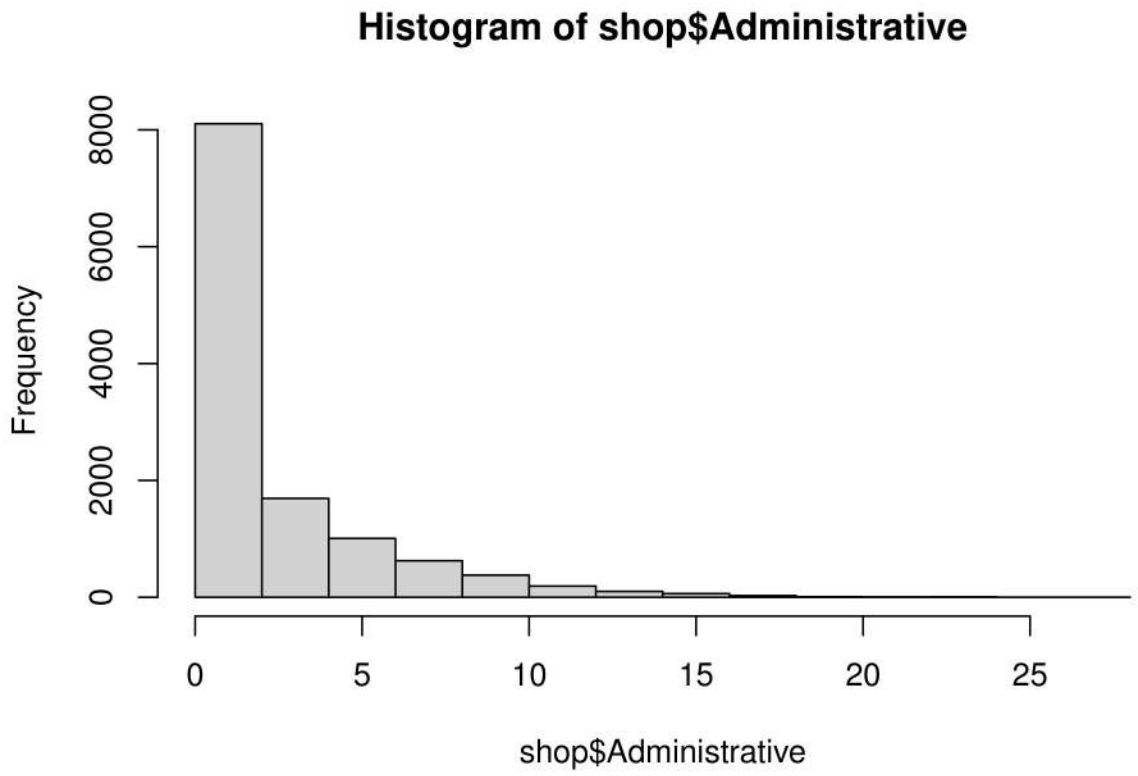
```
# describing our columns

psych::describe(shop)
```

```
## Warning in FUN(newX[, i], ...): no non-missing arguments to min; returning Inf

## Warning in FUN(newX[, i], ...): no non-missing arguments to min; returning Inf

## Warning in FUN(newX[, i], ...): no non-missing arguments to max; returning -Inf

## Warning in FUN(newX[, i], ...): no non-missing arguments to max; returning -Inf
```

	vars	n	mean	sd	median	trimmed	mad	min
Administrative	1	12211	2.34	3.33	1.00	1.66	1.48	0
Administrative_Duration	2	12211	81.68	177.44	9.00	42.89	13.34	-1
Informational	3	12211	0.51	1.28	0.00	0.18	0.00	0
Informational_Duration	4	12211	34.84	141.39	0.00	3.75	0.00	-1
ProductRelated	5	12211	32.06	44.58	18.00	23.06	19.27	0
ProductRelated_Duration	6	12211	1207.51	1918.98	611.00	832.56	747.53	-1
BounceRates	7	12211	0.02	0.05	0.00	0.01	0.00	0
ExitRates	8	12211	0.04	0.05	0.03	0.03	0.02	0
PageValues	9	12211	5.95	18.65	0.00	1.33	0.00	0
SpecialDay	10	12211	0.06	0.20	0.00	0.00	0.00	0
Month*	11	12211	6.17	2.37	7.00	6.36	1.48	1
OperatingSystems	12	12211	2.12	0.91	2.00	2.06	0.00	1
Browser	13	12211	2.36	1.71	2.00	2.00	0.00	1
Region	14	12211	3.15	2.40	3.00	2.79	2.97	1
TrafficType	15	12211	4.07	4.02	2.00	3.22	1.48	1
VisitorType*	16	12211	2.72	0.69	3.00	2.90	0.00	1
Weekend	17	12211	NaN	NA	NA	NaN	NA	Inf
Revenue	18	12211	NaN	NA	NA	NaN	NA	Inf

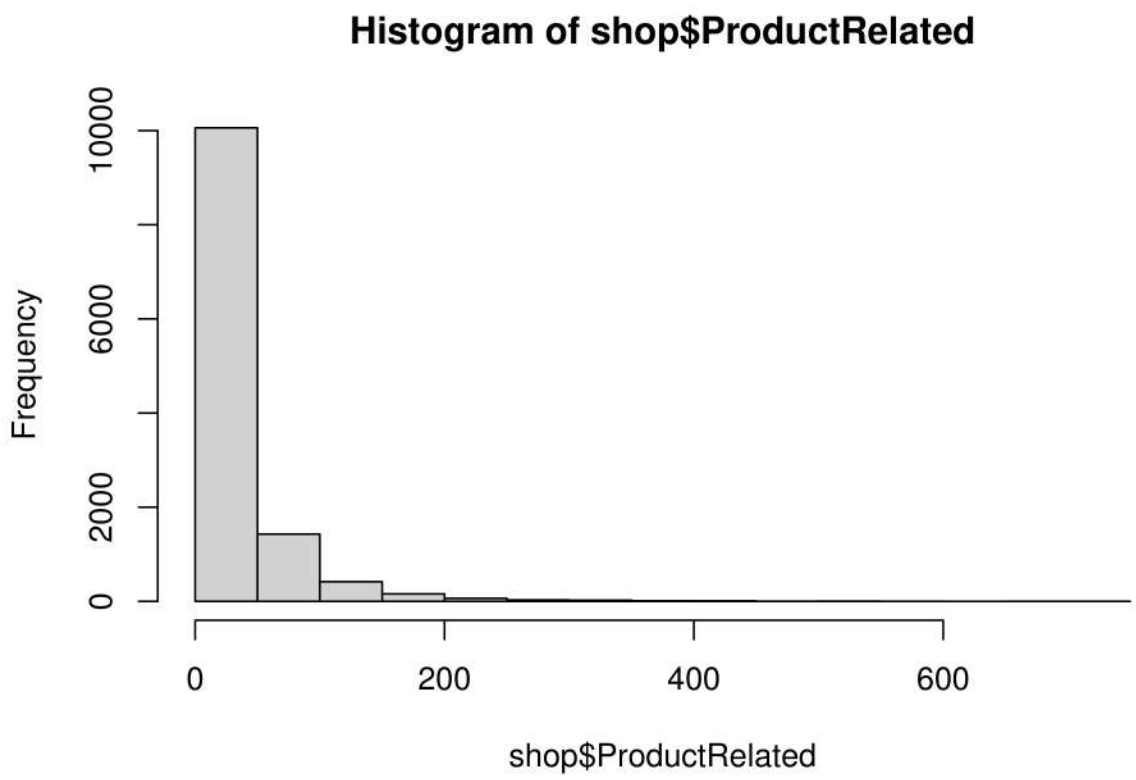
	max	range	skew	kurtosis	se
Administrative	27.00	27.00	1.95	4.64	0.03
Administrative_Duration	3398.75	3399.75	5.59	50.14	1.61
Informational	24.00	24.00	4.01	26.67	0.01
Informational_Duration	2549.38	2550.38	7.54	75.53	1.28
ProductRelated	705.00	705.00	4.33	31.08	0.40
ProductRelated_Duration	63973.52	63974.52	7.25	136.71	17.37
BounceRates	0.20	0.20	3.15	9.27	0.00
ExitRates	0.20	0.20	2.23	4.63	0.00
PageValues	361.76	361.76	6.35	64.99	0.17
SpecialDay	1.00	1.00	3.29	9.80	0.00
Month*	10.00	9.00	-0.83	-0.37	0.02
OperatingSystems	8.00	7.00	2.03	10.27	0.01
Browser	13.00	12.00	3.22	12.54	0.02
Region	9.00	8.00	0.98	-0.16	0.02
TrafficType	20.00	19.00	1.96	3.46	0.04
VisitorType*	3.00	2.00	-2.05	2.24	0.01
Weekend	-Inf	-Inf	NA	NA	NA
Revenue	-Inf	-Inf	NA	NA	NA

```
hist(shop$Administrative)
```

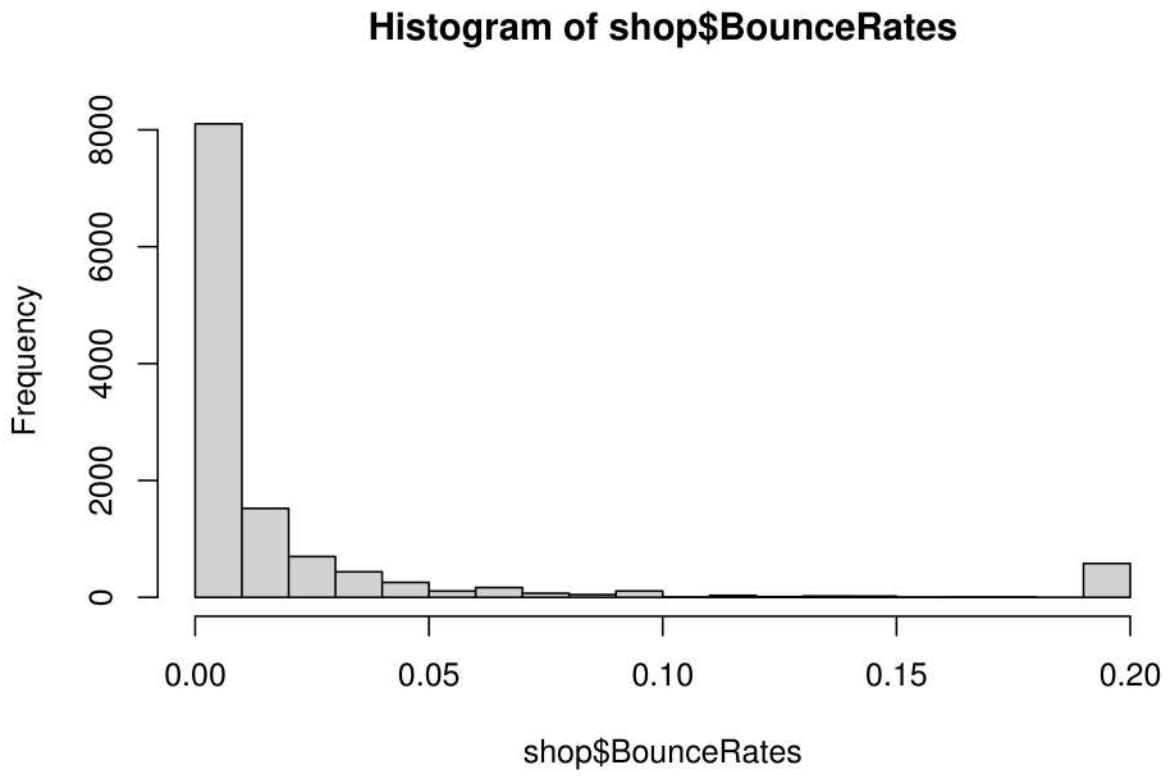



```
hist(shop$Informational)
```

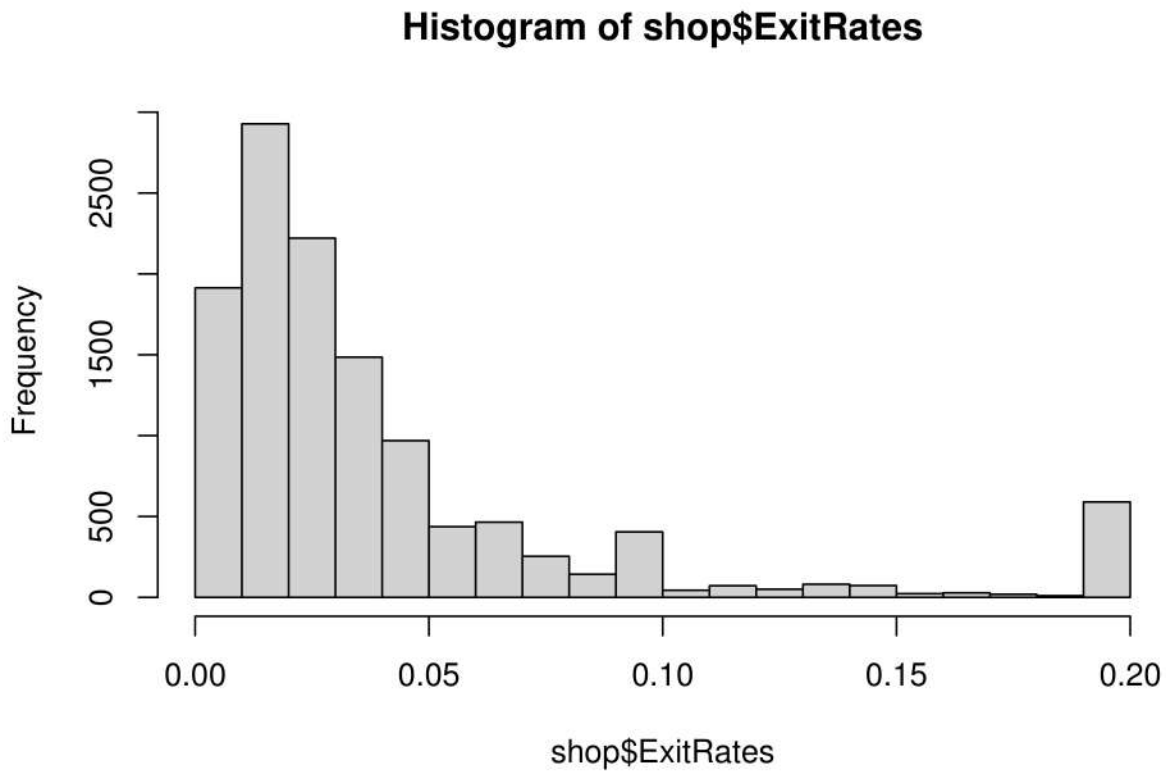

```
hist(shop$ProductRelated)
```



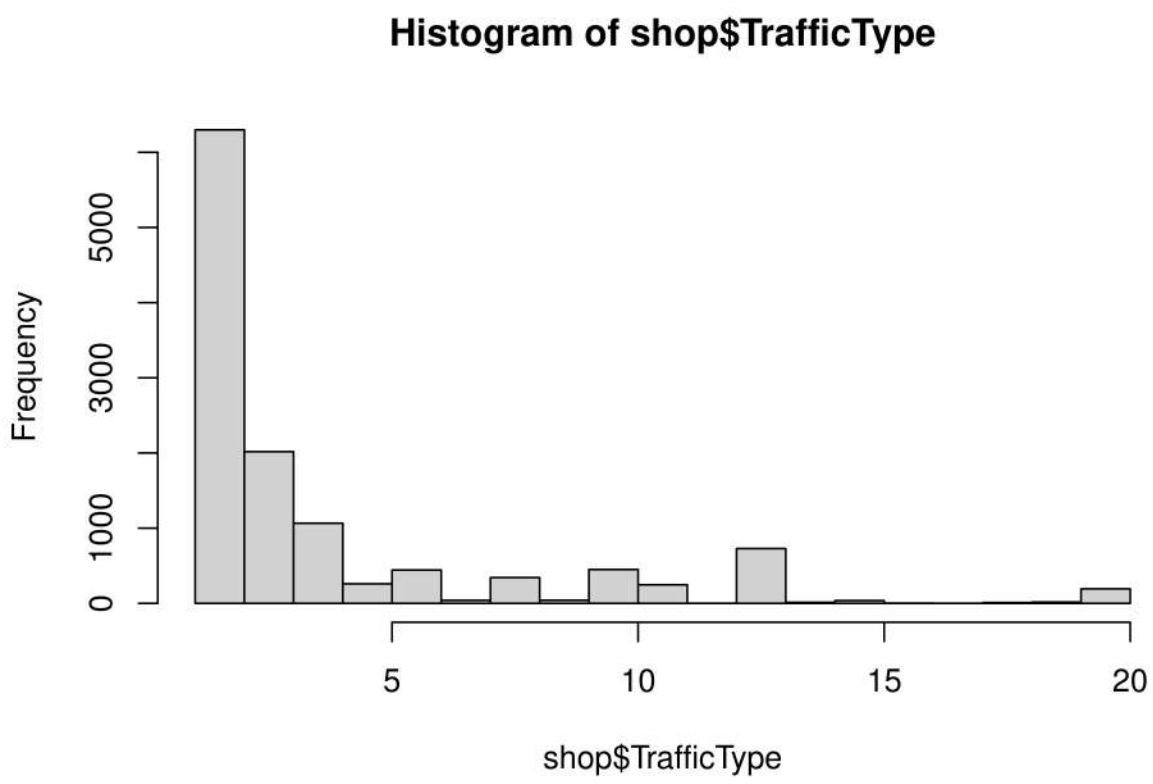

```
hist(shop$BounceRates)
```




```
hist(shop$ExitRates)
```

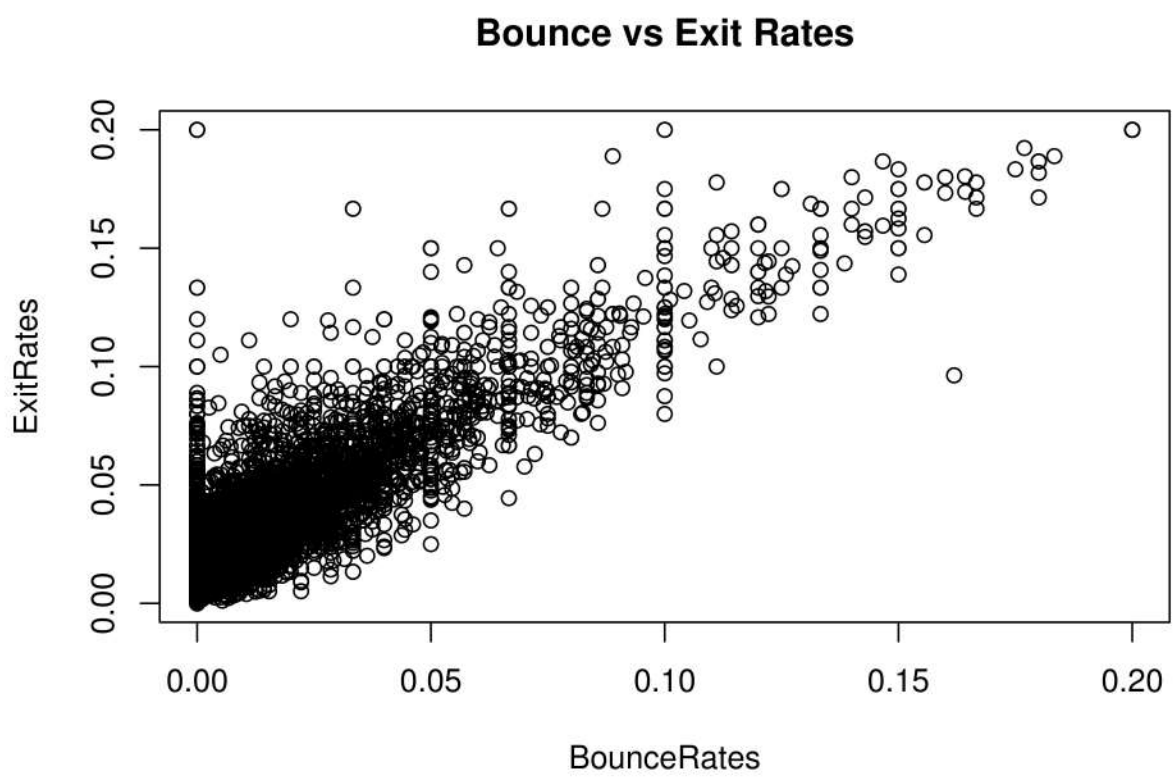



```
hist(shop$TrafficType)
```



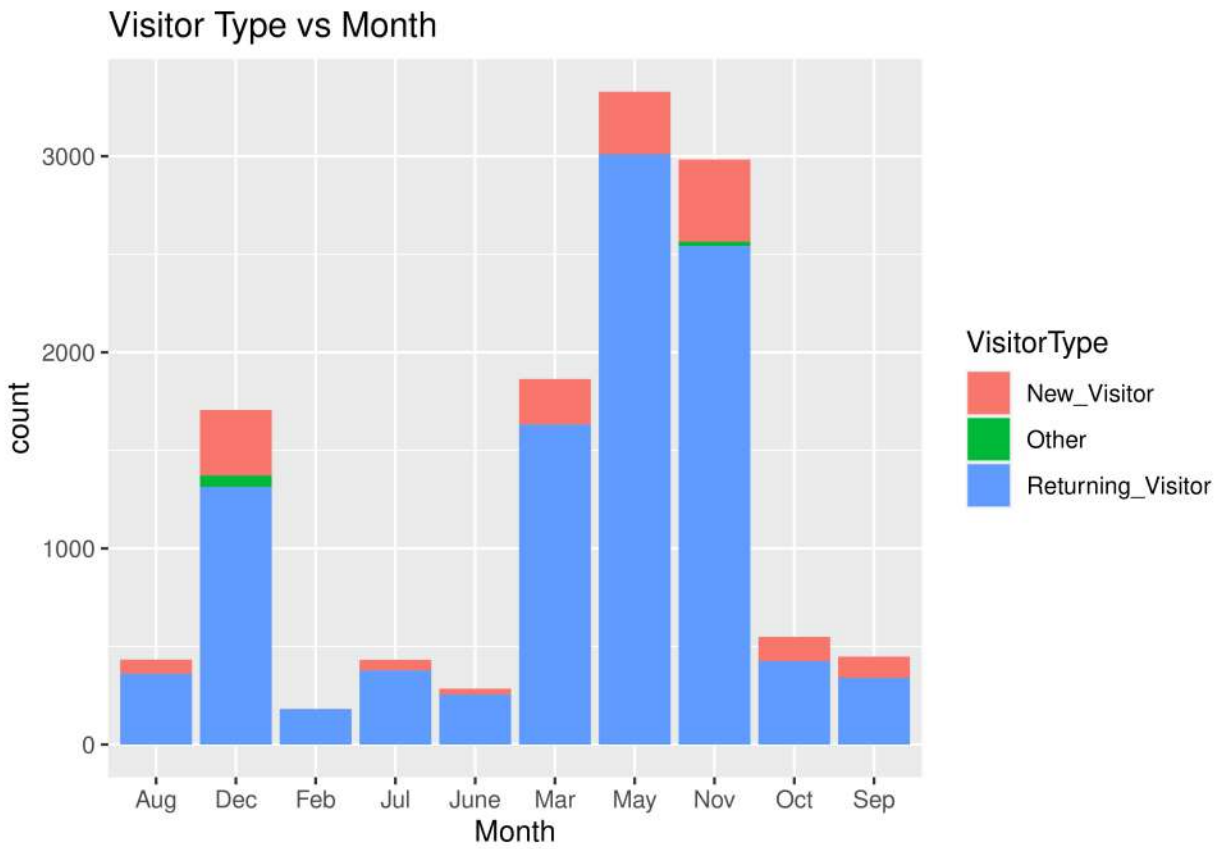
Bivariate analysis

```
# Plotting a scatter plot using the plot() method

plot(ExitRates ~ BounceRates, data = shop,
      col = "black",
      main = "Bounce vs Exit Rates")
```



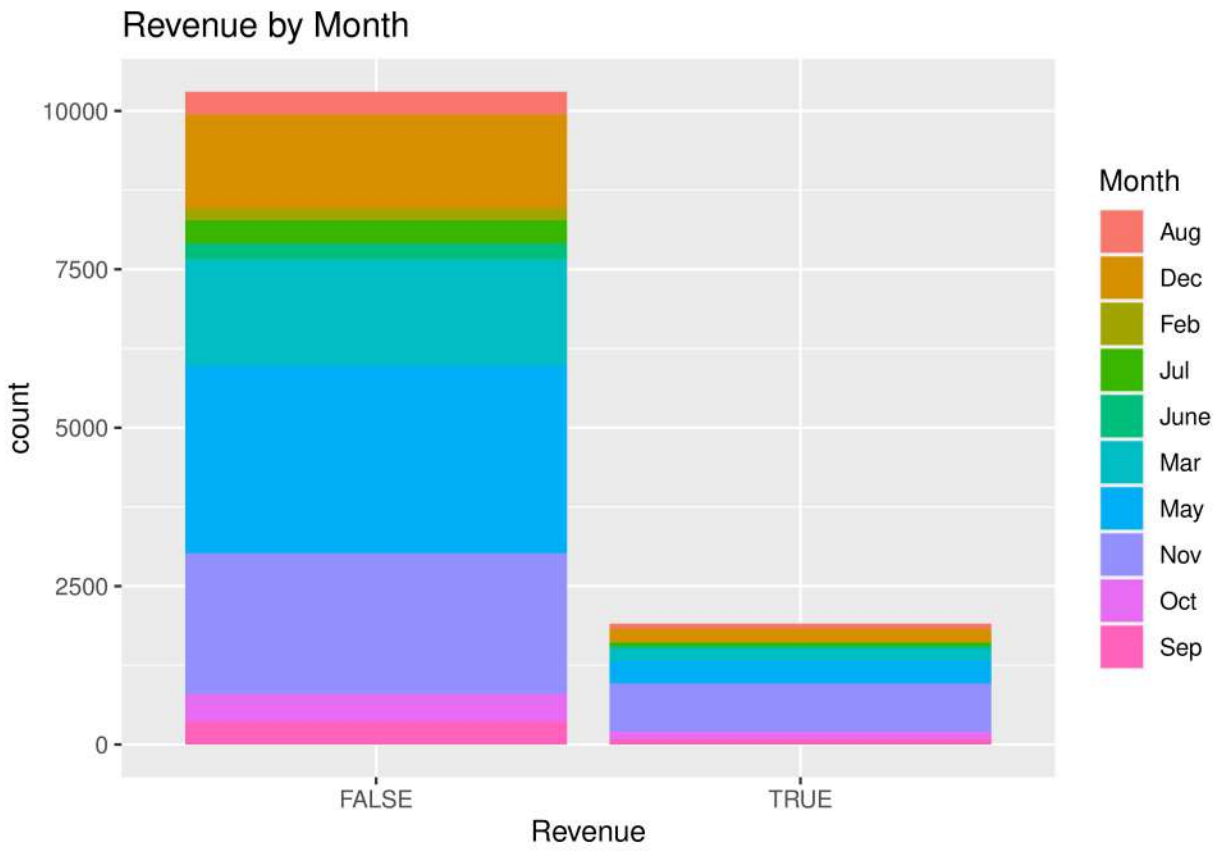
There is a high correlation between the two variables

```
library(ggplot2)
shop %>%
    ggplot(aes(Month)) +
    geom_bar(aes(fill = VisitorType))+
    labs(title =  "Visitor Type vs Month")
```



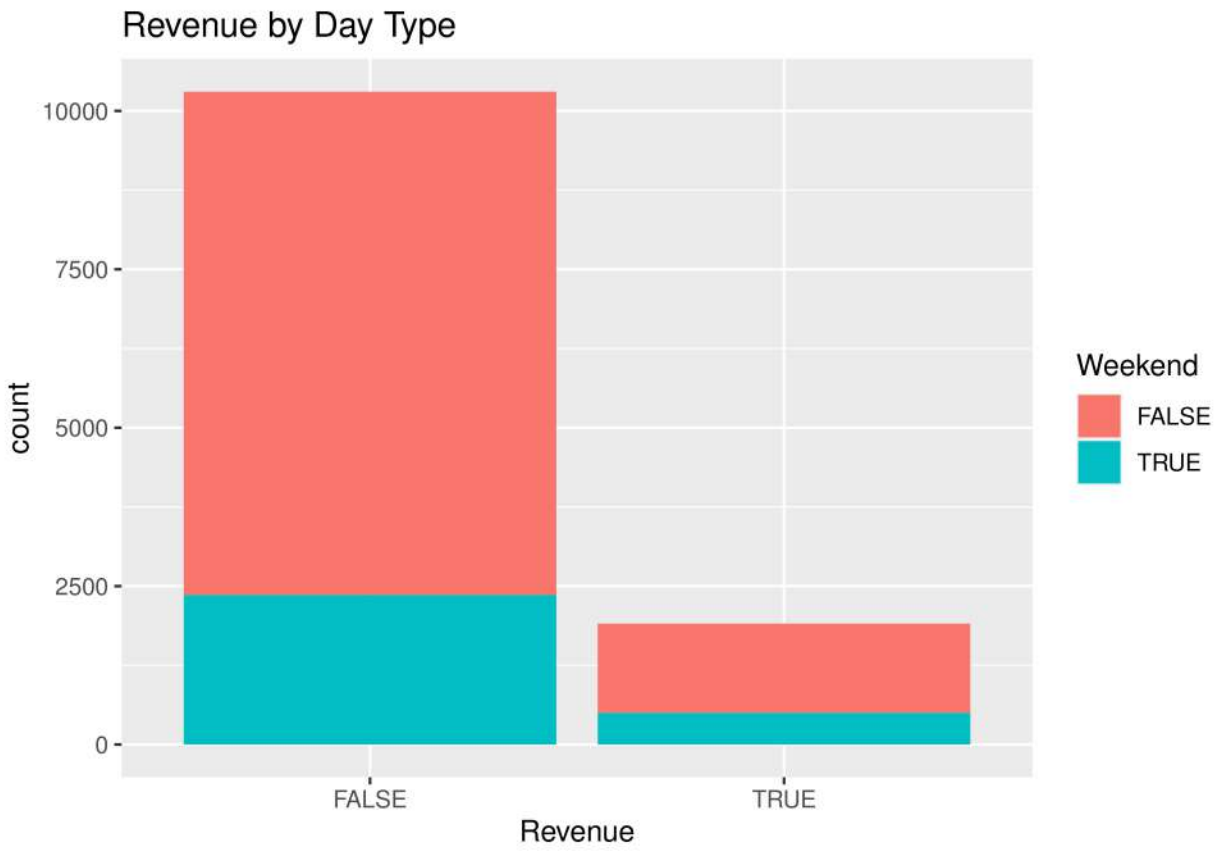
the months of May, November, March, and December have the highest number of visitors especially the new ones. February and June have the least no of visitors

```
#Revenue vs Month
shop %>%
    ggplot(aes(Revenue)) +
    geom_bar(aes(fill = Month))+
    labs(title = "Revenue by Month")
```



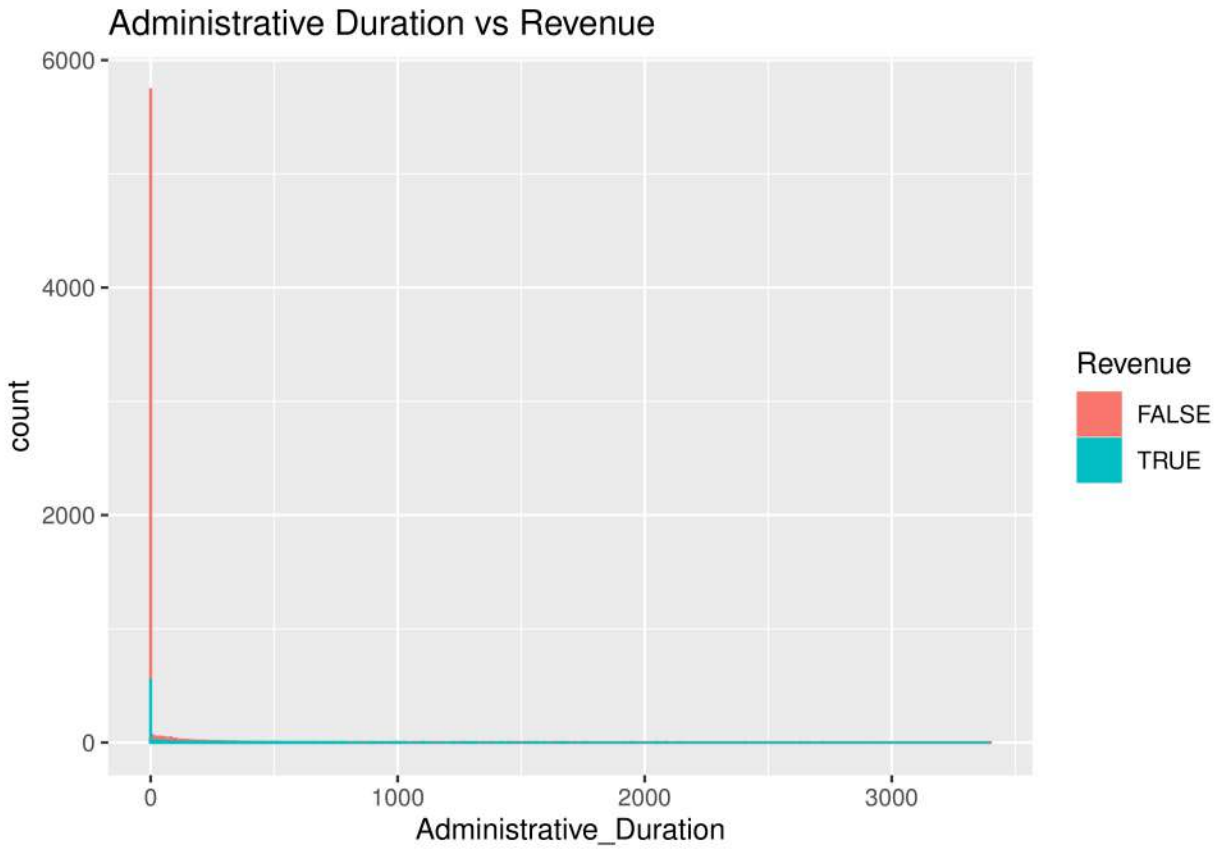
the months of May, November, March have the highest amount of revenue collected

```
#Revenue vs Day Type
shop %>%
    ggplot(aes(Revenue)) +
    geom_bar(aes(fill = Weekend))+
    labs(title = "Revenue by Day Type")
```



From the output, most revenue was collected during weekdays

```
ggplot(shop, aes(x = Administrative_Duration, fill = Revenue, color = Revenue)) +
geom_histogram(binwidth = 1) +
labs(title = "Administrative Duration vs Revenue")
```

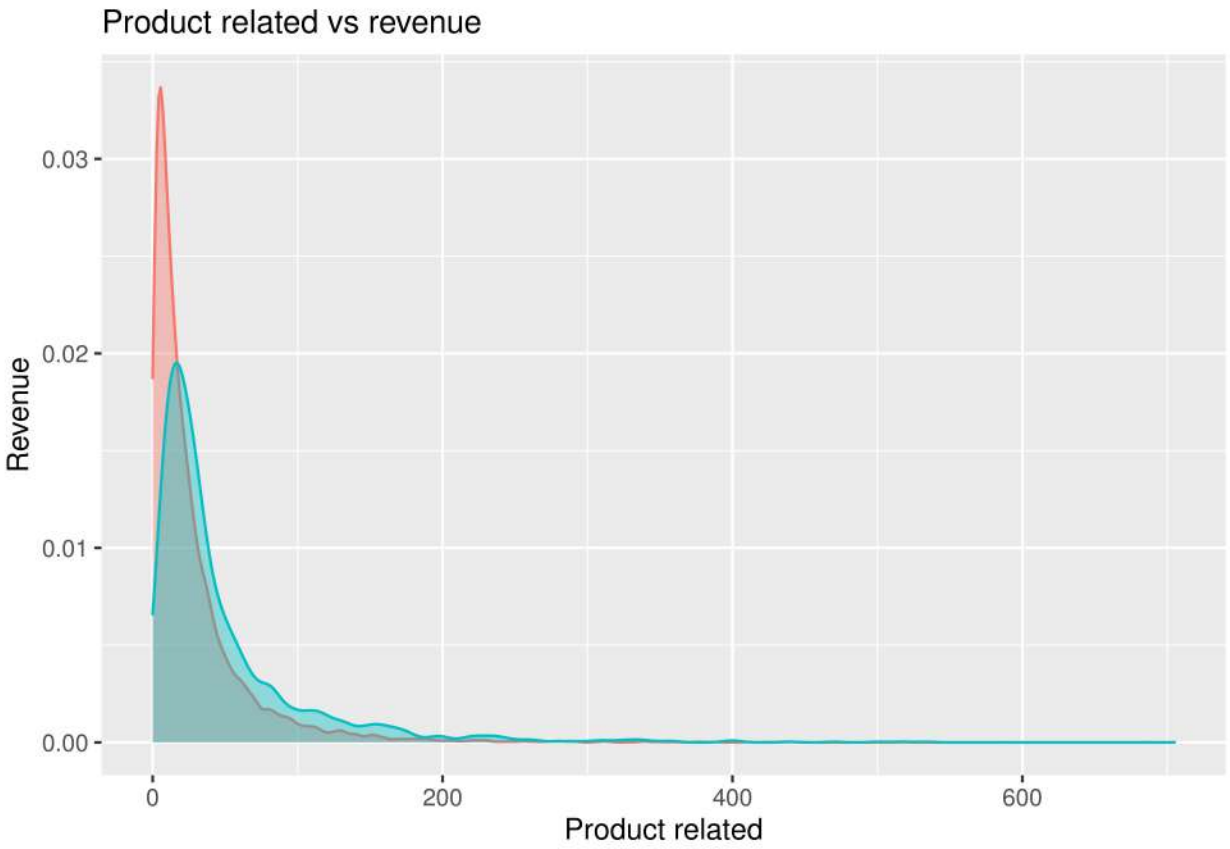



```
head(shop,1)
```

```
##   Administrative Administrative_Duration Informational Informational_Duration
## 1              0                       0             0                      0
##   ProductRelated ProductRelated_Duration BounceRates ExitRates PageValues
## 1              1                       0         0.2       0.2          0
##   SpecialDay Month OperatingSystems Browser Region TrafficType
## 1          0   Feb                1       1      1           1
##         VisitorType Weekend Revenue
## 1 Returning_Visitor   FALSE   FALSE
```

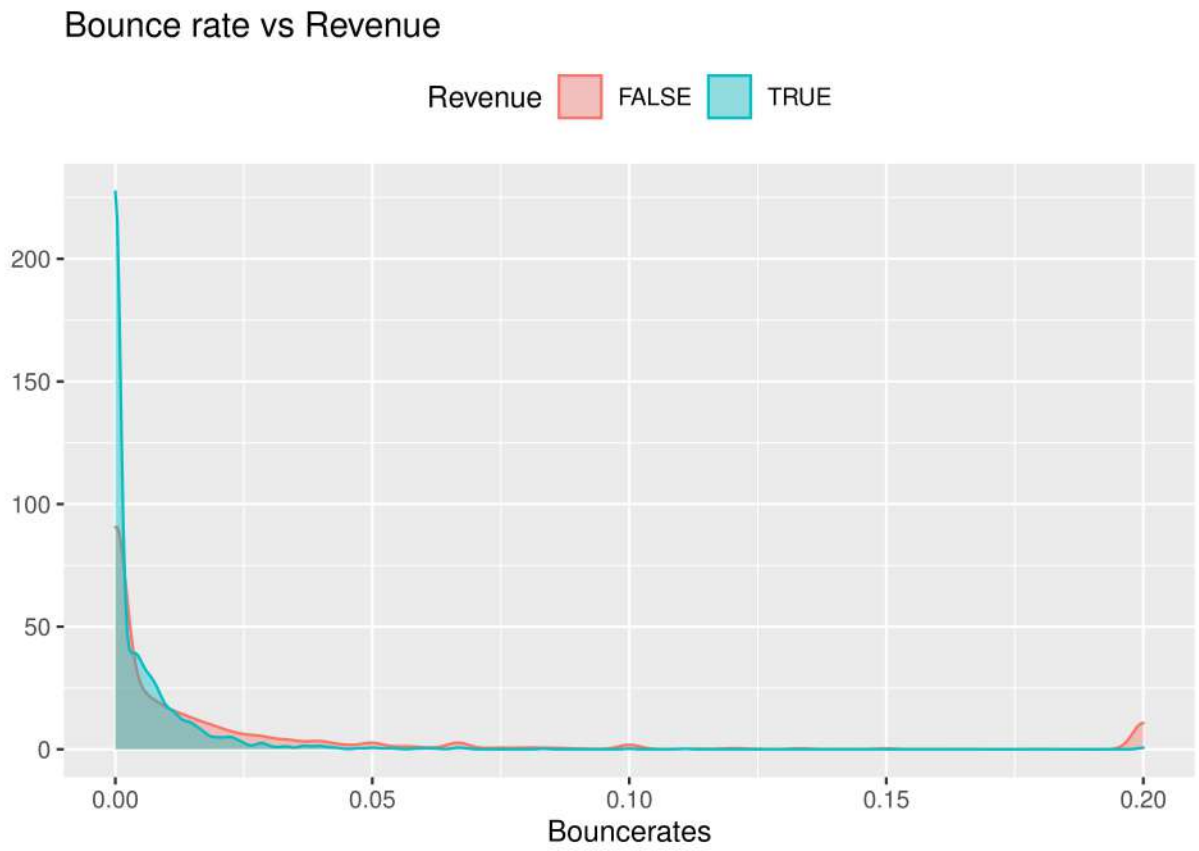
There is no much relationship between revenue and admin duration

```
ggplot(shop, aes(ProductRelated, col = Revenue)) +
  geom_density(aes(fill = Revenue), alpha = 0.4) +
  labs(x = 'Product related', y = 'Revenue', title = 'Product related vs revenue') +
  theme(legend.position = 'none',
        plot.title = element_text(size = 12))
```



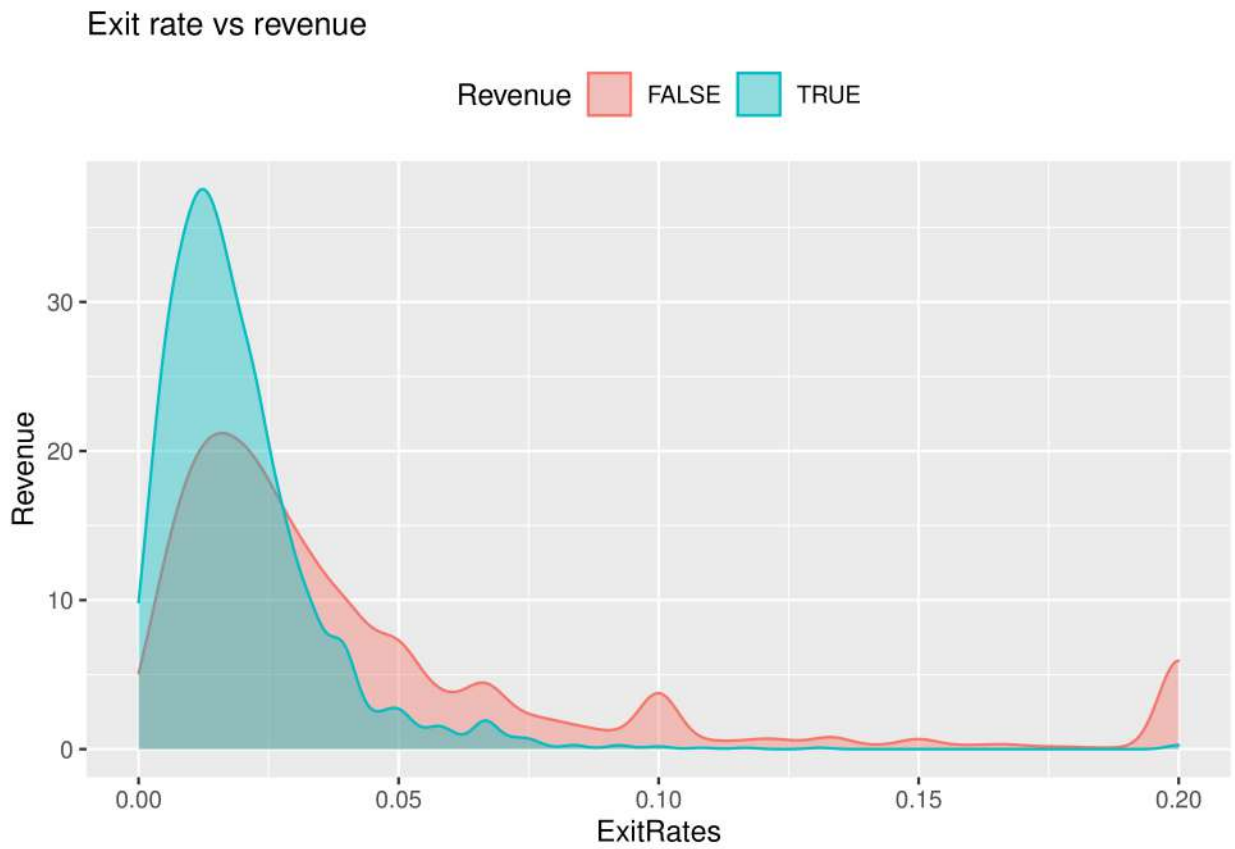
Revenue is still low even when product related increases

```
ggplot(shop, aes(BounceRates, col = Revenue)) +
  geom_density(aes(fill = Revenue), alpha = 0.4) +
  labs(x = 'Bouncerates', y = '', title = 'Bounce rate vs Revenue') +
  theme(legend.position = 'top')
```



false revenue is increased by the bounce rates extremely as compared to the true revenue

```
ggplot(shop, aes(ExitRates, col = Revenue)) +
  geom_density(aes(fill = Revenue), alpha = 0.4) +
  labs(x = 'ExitRates', y = 'Revenue', title = 'Exit rate vs revenue') +
  theme(legend.position = 'top',
        plot.title = element_text(size = 12))
```

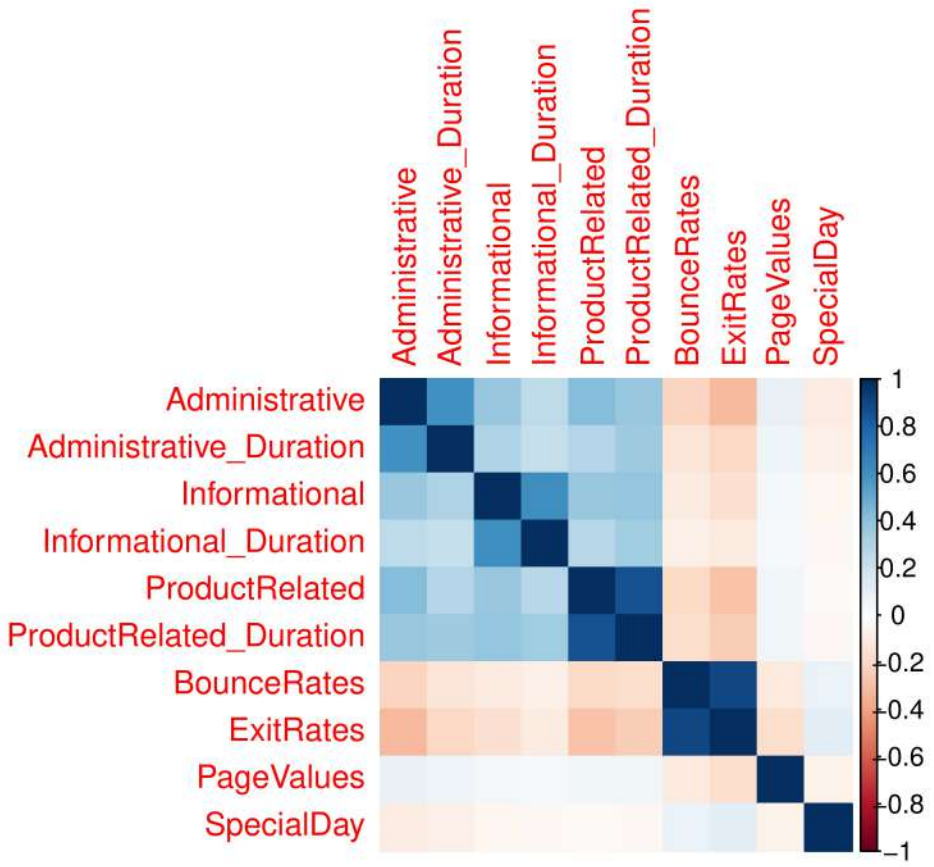


true revenue is increased extremely as compared to the false revenue by the exit rate variable

```
#checking for correlation of the data and visualizing data
library("corrplot")
```

```
## corrplot 0.92 loaded
```

```
correlation <- cor(shop[,1:10])
corrplot(correlation, method="color")
```



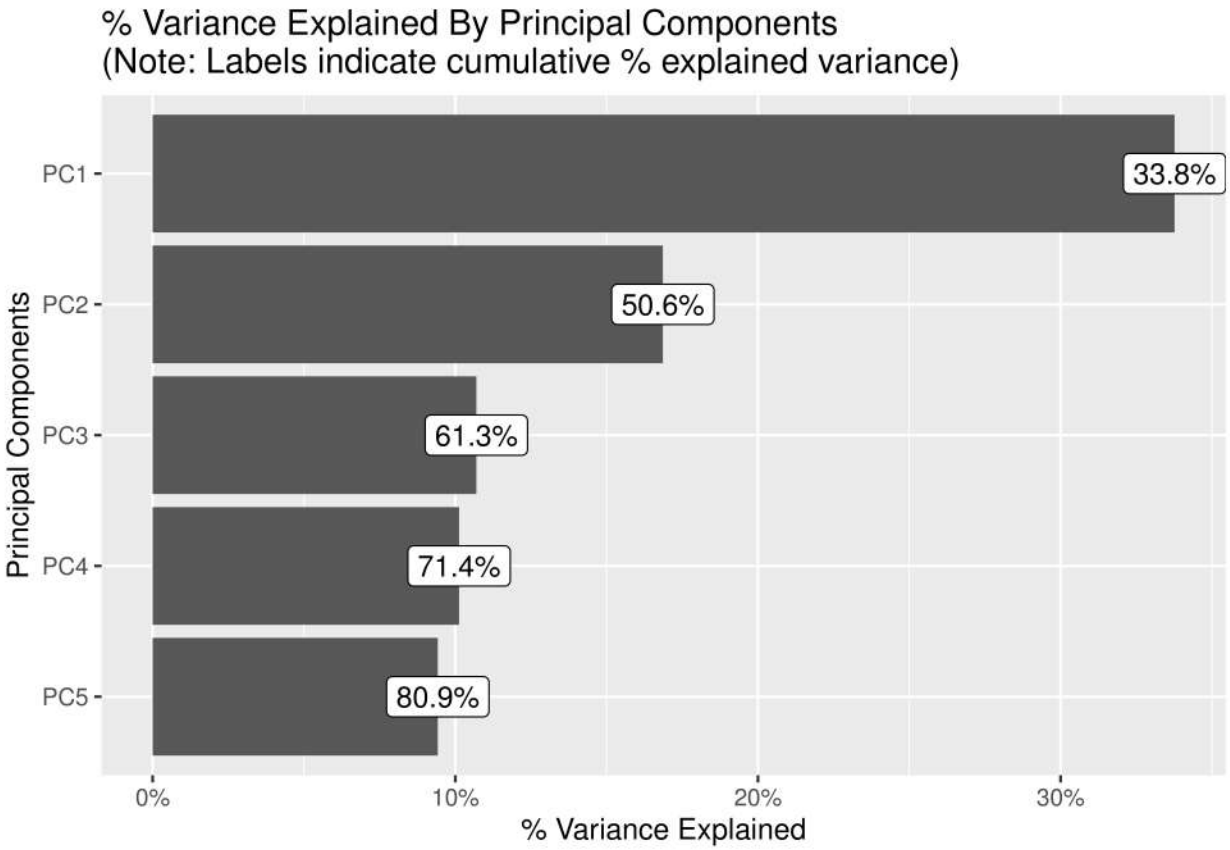
There is a high correlation among administrative ,informational, informational duration, product related, product duration, bounce rates and exit rates variables

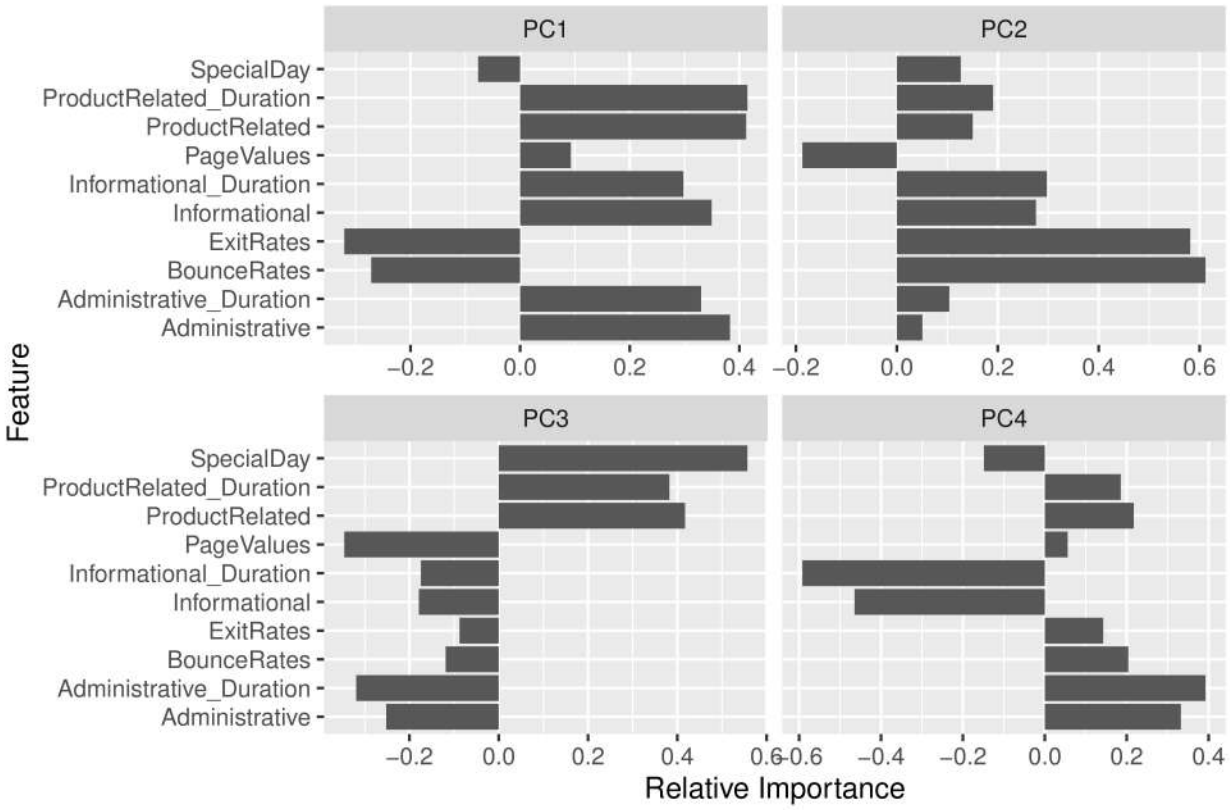
Multivariate analysis

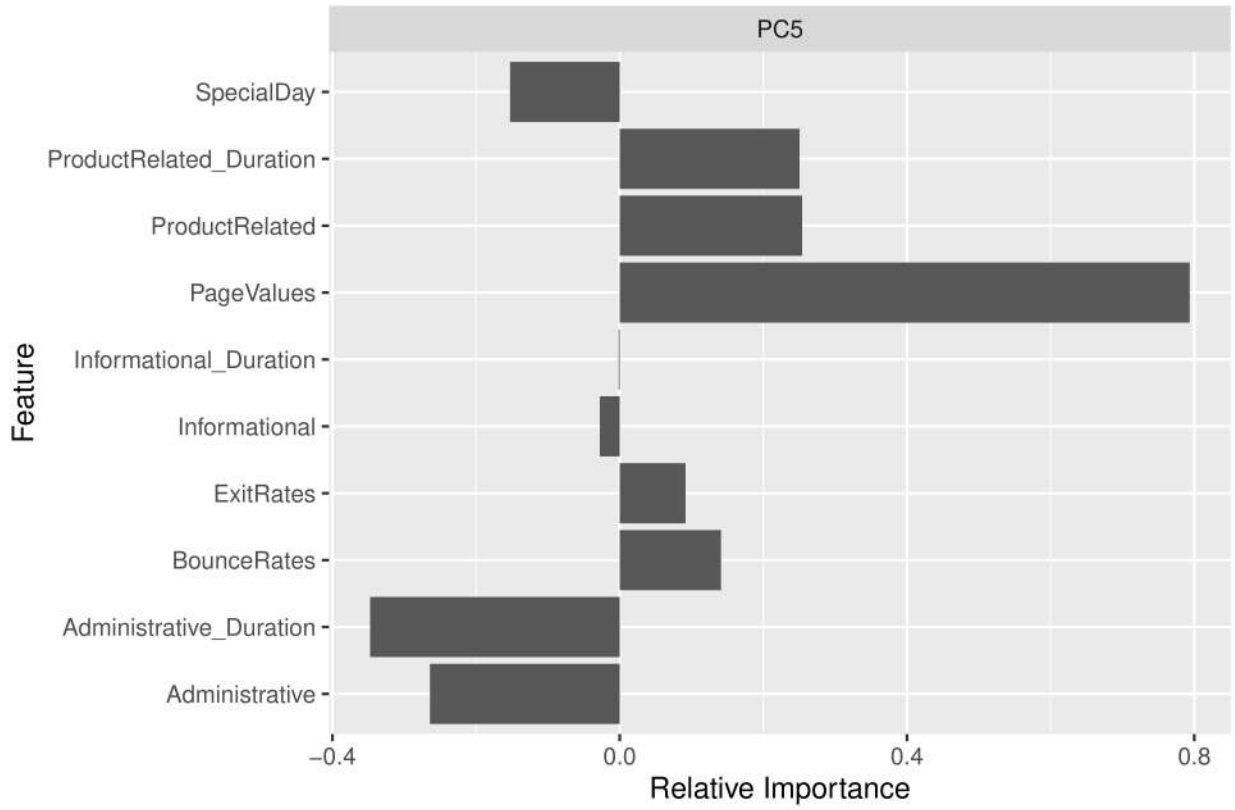
```
#we will use pca
shop.pca <- prcomp(shop[,c(1,2,3,4,5,6,7,8,9,10)], center = TRUE,scale. = TRUE)

summary(shop.pca)
```

```
## Importance of components:
##                           PC1    PC2    PC3    PC4     PC5     PC6     PC7
## Standard deviation     1.8376 1.2984 1.0342 1.0062 0.97065 0.96317 0.65070
## Proportion of Variance 0.3377 0.1686 0.1070 0.1013 0.09422 0.09277 0.04234
## Cumulative Proportion  0.3377 0.5062 0.6132 0.7145 0.80867 0.90144 0.94378
##                           PC8     PC9   PC10
## Standard deviation     0.59361 0.35198 0.2932
## Proportion of Variance 0.03524 0.01239 0.0086
## Cumulative Proportion  0.97902 0.99140 1.0000
```

```
# Visualization
library(DataExplorer)
numeric <- shop[, c(1,2,3,4,5,6,7,8,9,10)]
plot_prcomp(numeric, variance_cap = 0.9, nrow = 2L, ncol = 2L)
```


% Variance Explained By Principal Components
(Note: Labels indicate cumulative % explained variance)
Principal Components
PC1
PC2
PC3
PC4
PC5
33.8%
50.6%
61.3%
71.4%
80.9%
0%
10%
20%
30%
% Variance Explained


PC1
PC2
PC3
PC4
SpecialDay
ProductRelated_Duration
ProductRelated
PageValues
Informational_Duration
Informational
ExitRates
BounceRates
Administrative_Duration
Administrative
Feature
−0.2
0.0
0.2
0.4
0.6
−0.6
−0.4
Relative Importance
Page 1



Implementing the solution kmeans clustering

```
# converting the columns to numerical datatype
factt = c(gsub('VisitorType', 'Weekend', 'Region', 'TrafficType',"OperatingSystems", "Browser"))
```

```
for (i in factt){
    shop[,i] = as.numeric(shop[,i])
}
```

```
factdata<- shop[, c(1,2,3,4,5,6,7,8,9,10,12,13,14,15,17)]
shop.class<- shop[, "Revenue"]
head(factdata)
```

```
##   Administrative Administrative_Duration Informational Informational_Duration
## 1              0                       0             0                      0
## 2              0                       0             0                      0
## 3              0                      -1             0                     -1
## 4              0                       0             0                      0
## 5              0                       0             0                      0
## 6              0                       0             0                      0
##   ProductRelated ProductRelated_Duration BounceRates ExitRates PageValues
## 1              1                0.000000  0.20000000 0.2000000          0
## 2              2               64.000000  0.00000000 0.1000000          0
## 3              1               -1.000000  0.20000000 0.2000000          0
## 4              2                2.666667  0.05000000 0.1400000          0
```

```
## 5             10              627.500000  0.02000000 0.0500000          0
## 6             19              154.216667  0.01578947 0.0245614          0
##   SpecialDay OperatingSystems Browser Region TrafficType Weekend
## 1          0                1       1      1           1   FALSE
## 2          0                2       2      1           2   FALSE
## 3          0                4       1      9           3   FALSE
## 4          0                3       2      2           4   FALSE
## 5          0                3       3      1           4    TRUE
## 6          0                2       2      1           3   FALSE
```

```
# Normalizing the data
normalize <- function(x){
  return ((x-min(x)) / (max(x)-min(x)))
}

num = c(1,2,3,4,5,6,7,8,9,10)
for (i in num){
  factdata[,i] = normalize(factdata[,i])
}

head(factdata)
```

```
##   Administrative Administrative_Duration Informational Informational_Duration
## 1              0            0.0002941393             0           0.0003920992
## 2              0            0.0002941393             0           0.0003920992
## 3              0            0.0000000000             0           0.0000000000
## 4              0            0.0002941393             0           0.0003920992
## 5              0            0.0002941393             0           0.0003920992
## 6              0            0.0002941393             0           0.0003920992
##   ProductRelated ProductRelated_Duration BounceRates ExitRates PageValues
## 1    0.001418440            1.563122e-05  1.00000000  1.000000          0
## 2    0.002836879            1.016029e-03  0.00000000  0.500000          0
## 3    0.001418440            0.000000e+00  1.00000000  1.000000          0
## 4    0.002836879            5.731448e-05  0.25000000  0.700000          0
## 5    0.014184397            9.824223e-03  0.10000000  0.250000          0
## 6    0.026950355            2.426226e-03  0.07894737  0.122807          0
##   SpecialDay OperatingSystems Browser Region TrafficType Weekend
## 1          0                1       1      1           1   FALSE
## 2          0                2       2      1           2   FALSE
## 3          0                4       1      9           3   FALSE
## 4          0                3       2      2           4   FALSE
## 5          0                3       3      1           4    TRUE
## 6          0                2       2      1           3   FALSE
```

```
# Applying the K-means clustering algorithm
# ---
#
res <- kmeans(factdata,3)
```

```
colSums(is.na(factdata))
```

```
##          Administrative Administrative_Duration           Informational
##                       0                       0                       0
```

```
##  Informational_Duration          ProductRelated ProductRelated_Duration
##                       0                       0                      0
##             BounceRates               ExitRates             PageValues
##                       0                       0                      0
##              SpecialDay        OperatingSystems                Browser
##                       0                       0                      0
##                  Region            TrafficType                Weekend
##                       0                       0                      0
```

```
# Previewing the no. of records for each cluster
#
res$size
```

```
## [1] 2362 2031 7818
```

cluster 1 has 2362 data point,cluster 2 has 2031 data point and cluster 3 has 7818 data point

```
res$centers
```

```
##   Administrative Administrative_Duration Informational Informational_Duration
## 1     0.08661335              0.02365648    0.01945769             0.01219026
## 2     0.07782483              0.02295527    0.01795129             0.01188871
## 3     0.08898136              0.02487511    0.02257115             0.01517614
##   ProductRelated ProductRelated_Duration BounceRates ExitRates PageValues
## 1     0.04271961              0.01786465  0.09189927 0.1937336 0.01697413
## 2     0.04219849              0.01793239  0.14549224 0.2504396 0.01647393
## 3     0.04715549              0.01944927  0.09411801 0.2004790 0.01626660
##   SpecialDay OperatingSystems  Browser   Region TrafficType   Weekend
## 1 0.05546147         2.071550 2.371296 6.964437    2.553345 0.2358171
## 2 0.06331856         2.398326 2.544559 3.143772   12.088626 0.2466765
## 3 0.06349450         2.068943 2.305065 2.003837    2.451394 0.2303658
```

```
res$cluster
```

```
##    1    2    3    4    5    6    7    8    9   10   11   12   13
##    3    3    1    3    3    3    3    3    3    3    3    3    3
##   14   15   16   17   18   19   20   21   22   23   24   25   26
##    3    3    1    3    3    3    3    1    3    3    3    3    1
##   27   28   29   30   31   32   33   34   35   36   37   38   39
##    3    3    3    3    1    1    3    3    3    1    3    1    3
##   40   41   42   43   44   45   46   47   48   49   50   51   52
##    3    1    3    3    3    3    3    3    3    3    3    3    3
##   53   54   55   56   57   58   59   60   61   62   63   64   65
##    3    3    3    3    3    3    1    3    3    3    3    1    3
##   66   67   68   69   70   71   72   73   74   75   76   77   78
##    3    3    1    3    3    3    1    3    3    3    3    3    3
##   79   80   81   82   83   84   85   86   87   88   89   90   91
##    3    3    3    3    3    3    3    3    3    3    3    3    3
##   92   93   94   95   96   97   98   99  100  101  102  103  104
##    3    3    3    3    3    3    3    3    3    3    1    3    3
##  105  106  107  108  109  110  111  112  113  114  115  116  117
##    3    1    3    3    3    3    3    3    3    3    3    3    3
```

```
##   118 119 120 121 122 123 124 125 126 127 128 129 130
##     3   3   1   3   3   3   3   3   3   3   1   1   3
##   131 132 133 134 135 136 137 138 139 140 141 142 143
##     3   3   3   3   3   3   1   3   3   3   1   1   3
##   144 145 146 147 148 149 150 151 152 153 154 155 156
##     3   3   3   3   3   3   3   3   3   1   3   3   3
##   157 158 160 161 162 163 164 165 166 167 168 169 170
##     3   3   3   3   3   3   3   3   3   3   3   1   1
##   171 172 173 174 175 176 177 178 180 181 182 183 184
##     3   3   3   3   1   3   1   3   1   1   3   3   3
##   185 186 187 188 189 190 191 192 193 194 195 196 197
##     2   3   3   1   1   3   3   3   3   3   1   3   3
##   198 199 200 201 202 203 204 205 206 207 208 209 210
##     3   1   3   1   2   3   2   2   1   3   1   1   3
##   211 212 213 214 215 216 217 218 219 220 221 222 223
##     3   3   2   1   3   3   1   3   3   2   1   3   3
##   224 225 226 227 228 229 230 231 232 233 234 235 236
##     2   3   2   3   3   3   3   2   3   3   3   3   3
##   237 238 239 240 241 242 243 244 245 246 247 248 249
##     2   3   3   3   3   3   1   3   3   3   1   3   3
##   250 251 252 253 254 255 256 257 258 259 260 261 262
##     3   1   3   3   3   1   3   3   1   3   2   1   1
##   263 264 265 266 267 268 269 270 271 272 273 274 275
##     3   3   1   3   1   2   3   3   3   3   2   3   2
##   276 277 278 279 280 281 282 283 284 285 286 287 288
##     1   3   1   3   3   3   2   3   3   1   3   3   3
##   289 290 291 292 293 294 295 296 297 298 299 300 301
##     1   2   1   3   3   3   3   3   3   3   1   3   2
##   302 303 304 305 306 307 308 309 310 311 312 313 314
##     3   3   1   3   3   3   3   2   2   2   3   3   3
##   315 316 317 318 319 320 321 322 323 324 325 326 327
##     1   3   3   2   3   3   1   3   1   3   1   3   3
##   328 329 330 331 332 333 334 335 336 337 338 339 340
##     3   2   1   3   3   3   3   3   3   3   3   3   3
##   341 342 343 344 345 346 347 348 349 350 351 352 353
##     3   3   3   1   1   2   3   3   3   3   3   1   3
##   354 355 356 357 358 359 360 361 362 363 364 365 366
##     1   3   3   3   3   3   3   3   3   3   3   3   1
##   367 368 369 370 371 372 373 374 375 376 377 378 379
##     3   1   3   3   3   1   2   3   3   3   1   3   2
##   380 381 382 383 384 385 386 387 388 389 390 391 392
##     3   1   3   1   3   3   3   3   1   3   3   3   1
##   393 394 395 396 397 398 399 400 401 402 403 404 405
##     3   3   3   3   2   3   3   1   3   3   3   1   3
##   406 407 408 409 410 411 412 413 414 415 416 417 418
##     1   3   3   2   1   1   1   2   2   1   2   3   3
##   420 421 422 423 424 425 426 427 428 429 430 431 432
##     1   3   3   3   1   3   3   3   3   3   2   3   3
##   433 434 435 436 437 438 439 440 441 442 443 444 445
##     3   3   2   3   3   3   3   1   3   3   3   2   2
##   446 447 448 449 450 451 452 453 454 455 456 458 459
##     2   3   1   3   3   3   3   1   3   3   2   3   1
##   460 461 462 463 464 465 466 467 468 469 470 471 472
##     3   2   3   2   3   3   3   3   1   3   3   1   3
```

```
##  473 474 475 476 477 478 479 480 481 482 483 485 486
##    1   3   3   3   3   3   3   3   3   3   1   1   3
##  487 488 489 490 491 492 493 494 495 496 497 498 499
##    3   1   1   2   3   2   3   1   3   3   2   3   1
##  500 501 502 503 504 505 506 507 508 509 510 511 512
##    3   3   3   3   3   2   1   2   3   3   3   1   3
##  514 515 516 517 518 519 520 521 522 523 524 525 526
##    3   1   3   3   3   2   3   2   3   3   3   3   2
##  527 528 529 530 531 532 533 534 535 536 537 538 539
##    1   1   3   3   3   3   1   3   1   3   3   2   2
##  540 541 542 543 544 545 546 547 548 549 550 551 552
##    3   3   1   1   3   3   1   3   2   3   3   3   3
##  553 554 556 557 558 559 560 561 562 563 564 565 566
##    3   3   3   1   3   3   3   1   2   1   2   3   3
##  567 568 569 570 571 572 573 574 575 576 577 578 579
##    3   3   2   3   2   3   3   3   3   3   3   1   1
##  580 581 582 583 584 585 586 587 588 589 591 592 593
##    3   1   3   2   3   3   2   2   2   3   1   3   3
##  594 595 596 597 598 599 600 601 602 603 604 605 606
##    1   3   1   3   1   3   3   1   3   3   3   1   3
##  607 608 609 610 611 612 613 614 615 616 617 618 619
##    3   2   3   2   3   3   3   3   3   2   3   3   3
##  620 621 622 623 624 625 626 627 628 629 630 631 632
##    3   3   3   1   3   1   3   1   3   3   1   3   3
##  633 634 635 636 637 638 639 640 641 642 643 644 645
##    1   3   1   1   3   3   3   1   3   3   1   3   1
##  646 647 648 649 650 651 652 653 654 655 656 657 658
##    3   2   3   3   3   2   3   3   3   3   3   3   1
##  659 661 662 663 664 665 666 667 668 669 670 671 672
##    1   3   3   2   1   3   1   3   2   1   3   1   3
##  673 674 675 676 677 678 679 680 681 682 683 684 685
##    3   3   1   3   3   2   3   1   3   1   3   3   1
##  686 687 688 689 690 691 692 693 694 695 696 697 698
##    3   3   2   2   3   3   3   2   3   3   3   3   2
##  699 700 701 702 703 704 705 706 707 708 709 710 711
##    3   2   2   1   2   3   3   3   1   3   3   2   3
##  712 713 714 715 716 717 718 719 720 721 722 723 724
##    2   3   3   2   3   3   3   3   1   3   3   3   1
##  725 726 727 728 729 730 731 732 733 734 735 736 737
##    3   1   2   3   1   3   2   1   3   3   3   2   3
##  738 739 740 741 742 743 744 745 746 747 748 749 750
##    3   2   2   3   3   2   3   1   3   3   3   2   3
##  751 752 753 754 755 756 757 758 759 760 761 762 763
##    1   3   3   3   3   3   3   1   3   3   3   3   3
##  764 765 766 767 768 769 770 771 772 773 774 776 777
##    3   3   3   3   3   3   3   3   3   3   3   3   3
##  778 779 780 781 782 783 784 785 786 787 788 789 790
##    2   3   3   1   2   3   2   3   3   3   3   3   3
##  791 792 793 794 795 796 797 798 799 800 801 802 803
##    3   3   2   1   3   3   2   1   2   2   2   2   2
##  804 805 806 807 808 809 810 811 812 813 814 815 816
##    3   3   1   3   3   3   3   3   3   1   3   3   1
##  817 818 819 820 821 822 823 824 825 826 827 828 829
##    1   2   3   3   1   3   3   3   3   3   3   3   3
```

```
##  830  831  832  833  834  835  836  837  838  839  840  841  842
##    3    3    3    3    3    2    2    3    3    1    2    2    1
##  843  844  845  846  847  848  849  850  851  852  853  854  855
##    3    3    3    2    3    2    3    3    1    3    3    3    3
##  856  857  858  859  860  861  862  863  864  865  866  867  868
##    3    3    3    2    2    3    3    2    2    3    3    1    2
##  869  870  871  872  874  875  876  877  878  879  880  881  882
##    1    3    3    2    3    3    3    2    3    2    3    3    3
##  883  884  885  886  887  888  889  891  892  893  894  895  896
##    3    3    1    1    3    3    3    3    1    3    1    3    3
##  897  898  899  900  901  902  903  904  905  906  907  908  909
##    1    2    3    1    3    3    3    3    2    3    3    2    1
##  910  911  912  913  914  915  916  917  918  919  920  921  922
##    2    1    1    3    3    3    1    3    3    3    3    3    2
##  924  925  926  927  928  929  930  931  932  933  934  935  936
##    3    3    1    3    1    3    2    2    3    3    2    3    3
##  937  938  939  940  941  942  943  944  945  946  947  949  950
##    3    2    1    2    3    3    1    1    3    2    3    3    2
##  951  952  953  954  955  956  957  958  959  960  961  962  963
##    3    3    3    2    2    1    3    3    3    2    1    3    3
##  964  965  966  967  968  969  970  971  972  973  974  976  977
##    3    3    3    1    3    3    3    2    3    1    1    3    1
##  978  979  980  981  982  983  984  985  986  987  988  989  990
##    3    3    2    3    3    3    3    3    3    3    3    1    3
##  991  992  993  994  995  996  997  998  999 1000 1001 1002 1003
##    3    3    3    2    3    3    3    3    3    3    1    2    3
## 1004 1005 1006 1007 1008 1009 1010 1011 1012 1013 1014 1015 1016
##    2    2    3    3    3    3    3    3    3    1    2    2    2
## 1017 1018 1019 1020 1021 1022 1023 1024 1025 1026 1027 1028 1029
##    3    1    1    2    3    2    3    3    3    2    3    3    1
## 1030 1031 1032 1033 1034 1036 1037 1038 1039 1040 1041 1042 1043
##    2    2    3    3    2    3    3    2    2    1    3    3    3
## 1044 1045 1046 1047 1048 1049 1050 1051 1052 1053 1054 1055 1056
##    3    3    3    3    1    1    3    1    2    3    3    3    2
## 1057 1058 1059 1060 1061 1062 1063 1064 1065 1066 1067 1068 1069
##    3    3    2    3    3    3    1    3    3    3    1    3    3
## 1070 1071 1072 1073 1074 1075 1076 1077 1078 1079 1080 1081 1082
##    2    3    3    3    3    1    3    3    3    3    3    3    2
## 1083 1084 1085 1086 1087 1088 1089 1090 1091 1092 1093 1094 1095
##    3    2    3    3    3    3    2    1    1    3    1    1    3
## 1096 1097 1098 1099 1100 1101 1102 1103 1104 1105 1106 1107 1108
##    2    2    3    1    1    3    3    3    3    3    3    2    3
## 1109 1110 1111 1112 1113 1114 1115 1116 1117 1118 1119 1121 1122
##    3    3    1    3    3    2    3    1    3    2    1    3    3
## 1123 1124 1125 1126 1127 1128 1129 1130 1131 1132 1133 1134 1135
##    2    3    3    3    3    2    1    2    3    3    3    1    3
## 1136 1138 1139 1140 1141 1142 1143 1144 1145 1146 1147 1148 1149
##    3    3    3    3    1    2    3    3    3    3    2    1    1
## 1150 1151 1152 1153 1154 1155 1156 1157 1158 1159 1160 1161 1162
##    3    1    1    2    3    2    3    3    3    1    2    2    3
## 1163 1164 1165 1166 1167 1168 1169 1170 1172 1173 1174 1175 1176
##    3    3    3    3    3    2    2    3    1    2    3    3    3
## 1178 1179 1180 1181 1182 1183 1184 1185 1186 1187 1188 1189 1190
##    3    3    2    3    3    1    1    3    3    1    3    2    3
```

```
##  1191  1192  1193  1194  1195  1196  1197  1198  1199  1200  1201  1202  1203
##     1     3     1     1     3     3     3     3     2     3     2     3     1
##  1204  1205  1206  1207  1208  1209  1210  1211  1212  1213  1216  1217  1218
##     3     1     3     3     3     3     1     3     3     3     3     3     3
##  1219  1220  1221  1222  1223  1224  1225  1226  1227  1228  1229  1230  1231
##     2     1     1     3     1     3     3     3     3     1     3     1     1
##  1232  1233  1234  1235  1236  1237  1238  1239  1240  1241  1242  1243  1244
##     1     3     2     3     3     3     3     3     3     1     1     3     3
##  1245  1246  1247  1248  1249  1250  1251  1252  1253  1254  1255  1256  1257
##     3     3     1     3     3     1     3     2     3     2     3     2     2
##  1258  1259  1260  1261  1262  1263  1264  1265  1266  1267  1268  1269  1270
##     2     3     3     3     3     3     3     3     3     3     2     3     2
##  1271  1272  1273  1274  1275  1276  1277  1278  1279  1280  1281  1282  1283
##     3     3     3     3     3     3     1     3     1     3     3     1     3
##  1284  1285  1286  1287  1288  1289  1290  1291  1293  1294  1295  1296  1297
##     3     3     3     2     3     1     1     3     1     1     3     3     2
##  1298  1299  1300  1301  1302  1303  1304  1305  1306  1307  1308  1309  1310
##     2     3     1     3     3     1     3     3     3     3     3     1     3
##  1311  1312  1313  1314  1315  1316  1317  1318  1319  1320  1321  1322  1323
##     1     3     3     1     2     3     2     1     3     3     1     3     1
##  1324  1325  1327  1328  1329  1330  1331  1332  1333  1334  1335  1336  1337
##     2     1     3     3     2     3     1     1     3     1     3     2     2
##  1338  1339  1340  1341  1342  1343  1344  1345  1346  1347  1348  1349  1350
##     3     3     3     2     3     2     3     3     3     1     3     3     3
##  1351  1352  1353  1354  1355  1356  1358  1359  1360  1361  1362  1363  1364
##     1     3     1     3     3     3     3     3     2     3     3     2     3
##  1365  1366  1368  1369  1370  1371  1372  1373  1374  1375  1376  1377  1378
##     3     3     3     3     3     3     1     2     1     2     3     3     3
##  1379  1380  1381  1383  1384  1385  1386  1387  1388  1389  1390  1392  1393
##     1     3     3     1     3     1     3     3     1     3     3     3     3
##  1394  1396  1397  1398  1399  1400  1401  1402  1403  1404  1405  1406  1407
##     2     2     1     1     3     3     1     3     3     2     2     3     1
##  1408  1409  1410  1411  1412  1413  1414  1415  1416  1417  1418  1419  1420
##     3     3     3     3     3     3     3     2     2     3     2     2     3
##  1421  1422  1423  1424  1425  1426  1427  1428  1429  1430  1431  1432  1433
##     3     3     3     1     3     3     3     1     3     3     3     1     3
##  1434  1435  1436  1438  1439  1440  1441  1442  1443  1444  1445  1446  1447
##     3     3     3     3     3     3     3     2     2     3     3     2     3
##  1448  1449  1450  1451  1452  1453  1455  1456  1457  1458  1459  1460  1461
##     1     1     3     3     1     3     1     3     3     3     2     1     3
##  1462  1463  1464  1465  1466  1467  1468  1469  1470  1471  1472  1473  1474
##     3     3     3     1     3     1     1     2     3     3     3     3     3
##  1475  1476  1477  1478  1479  1480  1481  1482  1483  1484  1485  1486  1487
##     1     3     3     2     1     1     3     2     3     3     3     3     2
##  1488  1489  1490  1491  1492  1493  1494  1495  1496  1497  1498  1499  1500
##     3     3     3     1     2     1     3     1     3     1     2     1     1
##  1501  1502  1503  1504  1505  1506  1507  1508  1509  1510  1511  1512  1513
##     3     3     1     1     2     2     3     1     3     1     3     2     3
##  1514  1515  1517  1518  1519  1520  1521  1522  1523  1524  1525  1526  1527
##     1     2     3     3     3     1     1     1     2     3     2     1     3
##  1528  1529  1530  1531  1532  1533  1534  1535  1536  1537  1538  1539  1540
##     1     3     2     2     1     3     3     3     3     3     3     2     3
##  1541  1542  1543  1544  1545  1546  1547  1548  1549  1550  1551  1552  1553
##     2     1     3     3     3     3     3     3     3     2     3     3     3
```

```
##  1554  1555  1556  1557  1558  1559  1560  1561  1562  1563  1564  1565  1566
##     3     3     3     3     3     3     3     3     1     3     3     3     3
##  1567  1568  1569  1570  1571  1572  1573  1575  1576  1577  1578  1579  1580
##     3     1     1     3     3     1     3     3     3     1     3     3     3
##  1581  1582  1583  1584  1585  1586  1587  1588  1589  1590  1591  1592  1593
##     2     3     2     3     1     3     3     3     3     1     3     1     2
##  1594  1595  1596  1597  1598  1599  1600  1601  1602  1603  1604  1605  1606
##     1     3     3     3     3     2     3     3     3     2     3     1     3
##  1607  1608  1610  1611  1612  1613  1614  1615  1616  1617  1618  1619  1620
##     3     3     3     1     3     1     3     3     1     3     1     2     3
##  1621  1622  1623  1624  1625  1626  1627  1628  1629  1630  1631  1632  1633
##     3     3     3     3     3     2     3     3     3     3     3     3     3
##  1634  1635  1636  1637  1638  1639  1640  1641  1642  1643  1644  1645  1646
##     3     3     3     3     2     2     3     2     3     3     3     3     3
##  1647  1648  1649  1650  1651  1652  1653  1654  1655  1656  1657  1658  1659
##     3     2     3     3     3     1     3     3     1     3     3     3     2
##  1660  1661  1662  1663  1664  1665  1666  1667  1668  1669  1670  1671  1672
##     2     3     1     3     3     2     3     3     3     3     3     1     3
##  1673  1674  1675  1676  1677  1678  1679  1680  1681  1682  1683  1684  1685
##     3     3     3     3     3     2     3     3     3     2     1     1     1
##  1686  1687  1688  1689  1690  1691  1692  1693  1694  1695  1696  1697  1699
##     2     3     3     3     3     3     1     1     3     3     3     2     3
##  1700  1701  1702  1703  1704  1705  1706  1707  1708  1709  1710  1711  1712
##     3     1     3     3     2     2     3     1     3     3     3     1     1
##  1713  1714  1715  1716  1717  1718  1719  1720  1721  1722  1723  1724  1725
##     3     3     3     1     3     3     1     2     3     2     1     2     2
##  1726  1727  1728  1729  1730  1731  1732  1733  1734  1735  1736  1737  1738
##     2     3     1     3     2     3     3     1     3     3     1     3     2
##  1739  1740  1741  1742  1743  1744  1745  1746  1747  1748  1749  1750  1751
##     3     3     2     2     3     3     2     1     1     2     3     1     1
##  1752  1753  1754  1755  1756  1757  1758  1759  1760  1761  1762  1763  1764
##     3     3     3     3     2     1     2     1     3     3     3     3     3
##  1765  1766  1767  1768  1769  1770  1771  1772  1773  1774  1775  1777  1778
##     3     3     3     1     3     3     1     3     3     1     3     2     1
##  1779  1780  1781  1782  1783  1784  1785  1786  1787  1788  1789  1790  1791
##     3     3     3     3     3     3     1     3     2     3     2     3     3
##  1792  1793  1794  1795  1796  1797  1798  1799  1800  1801  1802  1803  1804
##     3     1     1     3     2     3     3     3     1     3     3     3     3
##  1806  1807  1808  1809  1810  1811  1812  1813  1814  1815  1816  1817  1818
##     3     3     1     1     2     3     2     3     3     3     1     2     3
##  1819  1820  1821  1822  1823  1824  1825  1826  1827  1828  1829  1830  1831
##     3     3     3     1     3     1     3     1     2     3     3     3     3
##  1832  1833  1834  1835  1836  1837  1838  1839  1841  1842  1843  1844  1845
##     3     2     3     3     1     3     3     2     1     3     3     3     3
##  1846  1847  1848  1849  1850  1851  1852  1853  1854  1855  1856  1857  1858
##     3     1     3     3     3     3     1     3     1     3     3     3     2
##  1859  1860  1861  1862  1863  1864  1865  1866  1868  1869  1870  1871  1872
##     3     3     2     3     1     2     1     3     2     1     3     2     3
##  1873  1874  1875  1876  1877  1878  1879  1880  1881  1882  1883  1884  1885
##     3     3     3     2     3     3     3     3     3     3     3     3     1
##  1886  1887  1888  1889  1890  1891  1892  1893  1894  1895  1896  1897  1898
##     3     3     1     1     1     3     1     3     3     1     3     1     3
##  1899  1900  1901  1902  1903  1904  1905  1906  1907  1908  1909  1910  1911
##     3     3     3     3     2     2     3     1     3     3     2     2     2
```

```
##  1912 1913 1914 1915 1916 1917 1918 1919 1920 1921 1922 1923 1924
##     3    1    1    3    3    3    3    3    2    2    2    3    3
##  1925 1927 1928 1929 1930 1931 1932 1933 1935 1936 1937 1938 1939
##     3    3    2    3    1    3    3    3    1    3    3    3    3
##  1940 1941 1942 1943 1944 1945 1946 1947 1948 1949 1951 1952 1953
##     1    3    3    3    2    1    1    1    3    2    3    1    1
##  1954 1955 1956 1957 1958 1959 1960 1961 1962 1963 1964 1965 1966
##     1    3    3    2    2    3    3    3    3    3    1    3    1
##  1967 1968 1969 1970 1971 1972 1973 1974 1975 1976 1977 1978 1979
##     3    3    3    3    3    3    1    3    3    3    3    1    3
##  1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992
##     3    2    3    3    2    3    3    3    3    3    3    3    3
##  1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005
##     3    2    3    1    3    3    2    3    3    3    3    1    3
##  2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018
##     3    3    3    3    3    3    3    3    3    3    3    3    3
##  2019 2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030 2031
##     3    2    2    3    1    3    3    3    1    3    3    3    3
##  2032 2033 2034 2035 2036 2037 2038 2040 2041 2042 2043 2044 2045
##     1    1    3    1    3    3    3    2    1    1    3    2    3
##  2046 2047 2048 2049 2050 2051 2052 2053 2054 2055 2056 2059 2060
##     3    3    1    1    2    3    1    3    3    3    2    3    3
##  2061 2062 2063 2064 2065 2066 2067 2068 2069 2070 2071 2072 2073
##     3    3    3    3    3    1    3    1    3    3    3    1    3
##  2074 2075 2076 2077 2078 2079 2080 2081 2082 2083 2084 2085 2086
##     1    3    3    3    2    3    3    1    3    3    2    3    3
##  2087 2088 2089 2090 2091 2092 2093 2094 2095 2096 2097 2098 2099
##     3    3    1    3    3    3    3    3    2    3    2    3    3
##  2100 2101 2102 2103 2104 2105 2106 2107 2108 2109 2110 2111 2112
##     3    1    2    3    3    3    3    3    2    3    2    1    3
##  2113 2114 2115 2116 2117 2118 2119 2120 2121 2122 2123 2124 2125
##     3    3    3    3    2    3    3    3    3    3    3    2    3
##  2126 2127 2128 2129 2130 2131 2132 2133 2134 2135 2136 2137 2138
##     3    3    3    2    3    3    3    3    3    3    3    1    3
##  2139 2140 2141 2142 2143 2144 2145 2146 2147 2148 2149 2150 2151
##     3    1    1    2    3    3    3    3    3    1    3    3    3
##  2152 2153 2154 2155 2156 2157 2158 2159 2160 2161 2162 2163 2164
##     3    3    1    3    3    3    3    3    1    3    2    3    3
##  2165 2166 2167 2168 2169 2170 2171 2172 2173 2174 2175 2176 2177
##     3    3    1    3    3    1    3    3    3    1    3    3    3
##  2178 2179 2180 2181 2182 2183 2184 2185 2186 2187 2188 2189 2190
##     3    3    3    3    3    3    1    3    3    3    3    3    2
##  2191 2192 2193 2194 2195 2196 2197 2198 2199 2200 2201 2202 2203
##     2    3    1    3    1    3    3    3    3    2    2    3    3
##  2204 2205 2206 2207 2208 2209 2210 2211 2212 2213 2214 2215 2216
##     3    2    3    3    3    3    1    1    2    3    1    3    3
##  2217 2218 2219 2220 2221 2222 2223 2224 2225 2226 2227 2228 2229
##     3    3    3    1    1    3    3    3    1    3    3    3    3
##  2230 2231 2232 2233 2234 2235 2237 2238 2239 2240 2241 2242 2243
##     1    3    3    3    3    3    3    3    3    3    2    3    3
##  2244 2245 2246 2247 2248 2249 2250 2251 2252 2253 2254 2255 2256
##     3    3    1    3    1    3    3    1    1    3    2    3    3
##  2257 2258 2259 2260 2261 2262 2263 2264 2265 2266 2267 2268 2269
##     3    3    3    3    3    3    3    1    3    3    2    1    2
```

```
##  2270 2271 2272 2273 2274 2275 2276 2277 2278 2279 2280 2281 2282
##     1    3    3    3    3    3    3    2    1    3    3    2    3
##  2283 2284 2285 2286 2287 2288 2289 2290 2291 2292 2293 2294 2295
##     1    2    3    2    3    3    3    3    2    3    3    3    3
##  2296 2297 2298 2299 2300 2301 2302 2303 2304 2305 2306 2307 2308
##     1    3    3    2    1    3    3    3    1    3    3    2    1
##  2309 2310 2311 2312 2313 2314 2315 2316 2317 2318 2319 2320 2321
##     1    3    2    3    3    3    3    1    3    3    3    3    3
##  2322 2323 2324 2325 2326 2327 2328 2329 2330 2331 2332 2333 2334
##     1    2    3    2    3    2    3    3    1    3    3    1    3
##  2335 2336 2337 2338 2339 2340 2341 2342 2343 2344 2345 2346 2347
##     3    3    3    3    3    3    2    1    3    2    3    2    1
##  2348 2349 2350 2351 2352 2353 2354 2355 2356 2357 2358 2359 2360
##     3    2    3    3    3    2    2    3    3    3    3    3    1
##  2361 2362 2363 2364 2365 2366 2367 2368 2369 2370 2371 2372 2373
##     1    3    3    3    1    1    3    3    2    3    1    3    2
##  2374 2375 2376 2377 2378 2379 2380 2381 2382 2383 2384 2385 2386
##     3    3    3    3    3    1    1    3    3    3    3    3    1
##  2387 2388 2389 2390 2391 2392 2393 2394 2395 2396 2397 2398 2399
##     3    3    3    3    3    3    2    2    3    2    3    3    3
##  2400 2401 2402 2403 2404 2405 2406 2407 2408 2409 2410 2411 2412
##     3    1    2    3    3    3    3    1    1    1    1    3    3
##  2413 2414 2415 2416 2417 2418 2419 2420 2421 2422 2423 2424 2425
##     1    1    3    2    3    1    3    3    2    1    3    3    2
##  2426 2427 2428 2429 2430 2431 2432 2433 2434 2435 2436 2437 2438
##     1    3    1    3    2    3    3    2    3    3    2    3    3
##  2439 2440 2441 2442 2443 2444 2445 2446 2447 2448 2449 2450 2451
##     1    3    3    3    3    3    1    3    1    3    1    3    2
##  2452 2453 2454 2455 2456 2457 2458 2459 2460 2461 2462 2463 2464
##     1    3    3    2    3    1    3    2    3    3    3    3    1
##  2465 2466 2467 2468 2469 2470 2471 2472 2473 2474 2475 2476 2477
##     3    3    3    2    3    3    3    3    3    3    1    3    3
##  2478 2479 2480 2481 2482 2483 2484 2485 2486 2487 2488 2489 2490
##     3    3    1    3    3    1    3    3    3    2    1    3    1
##  2491 2492 2493 2494 2495 2496 2497 2498 2499 2500 2501 2502 2503
##     3    3    3    1    3    3    3    2    2    1    3    3    3
##  2504 2505 2506 2507 2508 2509 2510 2511 2512 2513 2514 2515 2516
##     1    2    3    3    3    3    1    3    3    3    3    1    3
##  2517 2518 2519 2520 2521 2522 2523 2524 2525 2526 2527 2528 2529
##     3    3    3    3    3    3    3    3    3    3    3    3    3
##  2530 2531 2532 2533 2534 2535 2536 2537 2538 2539 2540 2541 2542
##     1    3    2    3    3    2    2    3    2    3    3    3    3
##  2543 2544 2545 2546 2547 2548 2549 2550 2551 2552 2553 2554 2555
##     3    1    3    2    3    3    2    3    1    3    3    3    3
##  2556 2557 2558 2559 2560 2561 2562 2563 2564 2565 2566 2567 2568
##     3    1    3    3    2    3    3    2    3    1    2    1    3
##  2569 2570 2571 2572 2573 2574 2575 2576 2577 2578 2579 2580 2581
##     3    2    3    3    2    3    3    2    3    2    1    1    3
##  2582 2583 2584 2585 2586 2587 2588 2589 2590 2591 2592 2593 2594
##     2    3    3    1    3    3    3    3    1    3    3    1    3
##  2595 2596 2597 2598 2599 2600 2601 2602 2603 2604 2605 2606 2607
##     3    1    3    3    3    2    2    3    3    3    3    2    3
##  2608 2609 2610 2611 2612 2613 2614 2615 2616 2617 2618 2619 2620
##     2    3    3    3    3    3    1    3    3    2    3    3    1
```

```
##  2621 2623 2624 2625 2626 2627 2628 2629 2630 2631 2632 2633 2634
##     3    3    2    3    2    3    3    3    1    1    3    1    2
##  2635 2636 2637 2638 2639 2640 2641 2642 2643 2644 2645 2646 2647
##     1    3    1    2    3    3    2    3    1    3    1    3    3
##  2648 2649 2650 2651 2652 2653 2654 2655 2656 2657 2658 2659 2660
##     3    3    1    1    2    3    2    3    3    3    3    1    3
##  2661 2662 2663 2664 2665 2666 2667 2668 2669 2670 2671 2672 2673
##     1    3    3    2    3    3    3    1    3    1    3    1    2
##  2674 2675 2676 2677 2678 2679 2680 2681 2682 2683 2684 2685 2686
##     3    2    3    3    3    1    3    3    3    3    2    3    3
##  2687 2688 2689 2690 2691 2692 2693 2694 2695 2696 2697 2698 2699
##     3    3    3    3    3    3    1    3    3    2    3    1    3
##  2700 2701 2702 2703 2704 2705 2706 2707 2708 2709 2710 2711 2712
##     2    3    3    3    2    1    2    3    1    3    3    3    3
##  2713 2714 2715 2716 2717 2718 2719 2720 2721 2722 2723 2724 2725
##     3    3    3    2    2    3    3    3    3    3    1    1    1
##  2726 2727 2728 2729 2730 2731 2732 2733 2734 2735 2736 2737 2738
##     1    1    2    3    3    1    2    1    1    3    3    3    3
##  2739 2741 2742 2743 2744 2745 2746 2747 2748 2749 2750 2751 2752
##     3    3    3    3    2    1    1    3    1    1    3    3    3
##  2753 2754 2755 2756 2757 2758 2759 2760 2761 2762 2763 2764 2765
##     3    2    3    3    3    3    3    3    3    3    3    3    3
##  2766 2767 2768 2769 2770 2771 2772 2773 2774 2775 2776 2777 2778
##     1    2    2    3    3    3    3    3    3    3    2    2    3
##  2779 2780 2781 2782 2783 2784 2785 2786 2787 2788 2789 2790 2791
##     1    3    3    3    3    1    1    1    3    3    3    3    3
##  2792 2793 2794 2795 2796 2797 2798 2799 2800 2801 2802 2803 2804
##     2    3    3    3    1    3    3    2    3    3    3    1    1
##  2805 2806 2807 2808 2809 2810 2811 2812 2813 2814 2815 2816 2817
##     3    3    2    3    3    3    2    3    3    2    1    3    3
##  2818 2819 2820 2821 2822 2823 2824 2825 2826 2827 2828 2829 2830
##     2    3    1    3    3    1    3    3    3    3    3    3    3
##  2831 2832 2833 2834 2835 2836 2837 2838 2839 2840 2841 2842 2843
##     1    3    3    3    2    3    3    2    3    2    3    1    3
##  2844 2845 2846 2847 2848 2849 2850 2851 2852 2853 2854 2855 2856
##     1    3    3    3    3    2    3    3    3    1    3    3    2
##  2857 2858 2859 2860 2861 2862 2863 2864 2865 2866 2867 2868 2869
##     1    1    3    3    3    3    3    3    3    3    3    1    1
##  2870 2871 2872 2873 2874 2875 2876 2877 2878 2879 2880 2881 2882
##     3    2    3    3    3    2    1    3    2    3    3    2    3
##  2883 2884 2885 2886 2887 2888 2889 2890 2891 2892 2893 2894 2895
##     2    2    3    3    3    3    3    2    1    3    3    3    3
##  2896 2897 2898 2899 2900 2901 2902 2903 2904 2905 2906 2907 2908
##     1    2    1    3    3    1    3    3    1    3    3    3    3
##  2909 2910 2911 2912 2913 2914 2915 2916 2917 2918 2919 2920 2921
##     1    1    2    3    3    1    3    3    3    1    3    3    2
##  2922 2923 2924 2925 2926 2927 2928 2929 2930 2931 2932 2933 2934
##     2    3    3    3    3    3    3    1    3    3    3    3    3
##  2935 2936 2937 2938 2939 2940 2941 2942 2943 2944 2945 2946 2947
##     1    3    3    3    3    3    3    3    1    1    1    3    1
##  2948 2949 2950 2951 2952 2953 2954 2955 2956 2957 2958 2959 2960
##     3    3    3    3    3    3    3    3    3    1    1    3    3
##  2961 2962 2963 2964 2965 2966 2967 2968 2969 2970 2971 2972 2973
##     3    3    3    3    3    3    3    3    1    3    2    3    3
```

```
##  2974 2975 2976 2977 2978 2979 2980 2981 2982 2983 2984 2985 2986
##     3    3    3    2    2    3    1    3    2    3    1    3    1
##  2987 2988 2989 2990 2991 2992 2993 2994 2995 2996 2997 2998 2999
##     3    3    3    3    3    1    3    1    2    3    2    3    3
##  3000 3001 3002 3003 3004 3005 3006 3007 3008 3009 3010 3011 3012
##     3    3    3    2    3    1    3    1    3    1    3    3    1
##  3013 3014 3015 3016 3017 3018 3019 3020 3021 3022 3023 3024 3025
##     2    1    3    3    3    3    1    3    3    1    3    1    1
##  3026 3027 3028 3029 3030 3031 3032 3033 3034 3035 3036 3037 3038
##     3    3    3    1    3    3    1    2    3    3    2    1    3
##  3039 3040 3041 3042 3043 3044 3045 3046 3047 3048 3049 3050 3051
##     3    3    3    3    1    3    1    1    2    3    3    3    1
##  3052 3053 3054 3055 3056 3057 3058 3059 3060 3061 3062 3063 3064
##     3    1    3    3    3    3    3    3    3    3    3    3    3
##  3065 3066 3067 3068 3069 3070 3071 3072 3073 3074 3075 3076 3077
##     3    2    1    3    3    3    3    2    3    3    2    2    3
##  3078 3079 3080 3081 3082 3083 3084 3085 3086 3087 3088 3089 3090
##     3    1    3    3    3    3    3    3    3    2    1    2    1
##  3091 3092 3093 3094 3095 3096 3097 3098 3099 3100 3101 3102 3103
##     1    3    3    3    3    2    3    3    3    1    2    3    3
##  3104 3105 3106 3107 3108 3109 3110 3111 3112 3113 3114 3115 3116
##     3    3    1    3    3    3    1    1    2    1    3    3    1
##  3117 3118 3119 3120 3121 3122 3123 3124 3125 3126 3127 3128 3129
##     1    2    2    2    1    3    3    3    3    3    3    1    3
##  3130 3131 3132 3133 3134 3135 3136 3137 3138 3139 3140 3141 3142
##     3    3    3    3    1    3    3    3    2    3    1    3    2
##  3143 3144 3145 3146 3147 3148 3149 3150 3151 3152 3153 3154 3155
##     3    3    2    3    3    3    3    3    2    2    3    3    1
##  3156 3157 3158 3159 3160 3161 3162 3163 3164 3165 3166 3167 3168
##     3    2    3    3    2    2    3    3    3    3    1    2    3
##  3169 3170 3171 3172 3173 3174 3175 3176 3177 3178 3179 3180 3181
##     1    3    3    3    3    3    3    2    3    3    1    3    2
##  3182 3183 3184 3185 3186 3187 3188 3189 3190 3191 3192 3193 3194
##     3    2    3    3    3    1    1    3    3    3    3    3    3
##  3195 3196 3197 3198 3199 3200 3201 3202 3203 3204 3205 3206 3207
##     3    3    3    3    3    2    3    1    3    3    3    3    3
##  3208 3209 3210 3211 3212 3213 3214 3215 3216 3217 3218 3219 3220
##     3    1    1    1    3    3    3    1    3    3    3    3    3
##  3221 3222 3223 3224 3225 3226 3227 3228 3229 3230 3231 3233 3234
##     3    3    2    3    1    3    2    3    3    3    3    1    3
##  3235 3236 3237 3238 3239 3240 3241 3242 3243 3244 3245 3246 3247
##     1    3    3    1    3    3    1    3    3    1    3    3    1
##  3248 3249 3250 3251 3252 3253 3254 3255 3256 3257 3258 3259 3260
##     3    3    3    3    3    3    3    3    3    1    2    1    3
##  3261 3262 3263 3264 3265 3266 3267 3268 3269 3270 3271 3272 3274
##     3    3    3    1    3    3    3    3    3    3    2    3    3
##  3275 3276 3277 3278 3279 3280 3281 3283 3284 3285 3286 3287 3288
##     3    3    3    1    1    1    3    2    3    2    2    3    3
##  3289 3290 3291 3292 3293 3294 3295 3296 3297 3298 3299 3300 3301
##     3    1    3    3    3    1    3    2    3    3    1    3    3
##  3302 3303 3304 3305 3306 3307 3308 3309 3310 3311 3312 3313 3314
##     2    3    2    3    2    3    3    1    3    3    1    3    3
##  3315 3316 3317 3318 3319 3320 3321 3322 3323 3324 3325 3326 3327
##     3    1    3    1    3    3    1    3    3    3    2    3    3
```

```
##  3328 3329 3330 3331 3332 3333 3334 3335 3336 3337 3338 3339 3340
##     3    2    1    3    3    1    1    1    3    3    3    3    3
##  3341 3342 3343 3344 3345 3346 3347 3348 3349 3350 3351 3352 3353
##     1    1    2    3    3    1    3    3    2    2    3    3    3
##  3354 3355 3356 3357 3358 3359 3360 3361 3362 3363 3364 3365 3366
##     3    3    3    2    3    3    3    3    2    3    3    3    2
##  3367 3368 3369 3370 3371 3372 3373 3374 3375 3376 3377 3378 3379
##     3    3    3    1    1    1    3    1    3    3    2    1    3
##  3380 3381 3382 3383 3384 3385 3386 3387 3388 3389 3390 3391 3392
##     3    3    3    3    1    1    3    3    3    1    1    3    3
##  3393 3394 3395 3396 3397 3398 3399 3400 3401 3402 3403 3404 3405
##     3    3    1    3    3    3    1    3    3    3    3    3    3
##  3406 3407 3408 3409 3410 3411 3412 3413 3414 3415 3416 3417 3418
##     1    2    3    3    2    3    3    3    3    3    3    3    3
##  3419 3420 3421 3422 3423 3424 3425 3426 3427 3428 3429 3430 3431
##     3    3    3    3    3    3    3    3    3    3    1    3    3
##  3432 3433 3434 3435 3436 3437 3438 3439 3440 3441 3442 3443 3444
##     2    2    3    2    3    3    1    2    3    1    3    1    3
##  3445 3446 3447 3448 3449 3450 3451 3452 3453 3454 3455 3456 3457
##     1    1    1    2    3    1    1    3    3    1    3    2    2
##  3458 3459 3460 3461 3462 3463 3464 3465 3466 3467 3468 3469 3470
##     3    3    3    1    2    3    3    3    2    3    3    1    1
##  3471 3472 3473 3474 3475 3476 3477 3478 3479 3480 3481 3482 3483
##     3    3    1    3    1    3    1    3    1    3    2    3    3
##  3484 3485 3486 3487 3488 3489 3490 3491 3492 3493 3494 3495 3496
##     1    3    1    3    1    3    3    3    3    3    2    3    3
##  3497 3498 3499 3500 3501 3502 3503 3504 3505 3506 3507 3508 3509
##     3    2    2    2    3    3    2    3    3    3    3    3    3
##  3510 3511 3512 3513 3514 3515 3516 3517 3518 3519 3520 3521 3522
##     1    1    3    3    1    3    1    1    3    3    2    3    2
##  3523 3524 3525 3526 3527 3528 3529 3530 3531 3532 3533 3534 3535
##     3    1    3    3    3    3    3    3    3    1    1    3    3
##  3536 3537 3538 3539 3540 3541 3542 3543 3544 3545 3546 3547 3548
##     3    3    1    3    3    3    2    3    3    2    2    3    3
##  3549 3550 3551 3552 3553 3554 3555 3556 3557 3558 3559 3560 3561
##     3    3    2    1    3    3    3    3    3    1    2    3    1
##  3562 3563 3564 3565 3566 3567 3568 3569 3570 3571 3572 3573 3574
##     3    1    3    3    1    1    3    3    3    3    3    3    3
##  3575 3576 3577 3579 3580 3581 3582 3583 3584 3585 3586 3587 3588
##     1    3    3    3    2    2    2    3    1    3    3    3    3
##  3589 3590 3591 3592 3593 3594 3595 3596 3597 3598 3599 3600 3601
##     1    2    2    1    3    3    3    1    3    1    3    1    3
##  3602 3603 3604 3605 3606 3607 3608 3609 3610 3611 3612 3613 3614
##     3    2    1    3    2    3    3    3    2    3    3    3    3
##  3615 3616 3617 3618 3619 3620 3621 3622 3623 3624 3625 3626 3627
##     3    3    1    2    3    3    1    3    3    1    3    3    1
##  3628 3629 3630 3631 3632 3633 3634 3635 3636 3637 3638 3639 3640
##     3    3    3    3    1    2    1    3    3    3    3    3    2
##  3641 3642 3643 3644 3645 3646 3647 3648 3649 3650 3652 3653 3654
##     3    3    1    3    3    2    1    1    3    2    3    3    2
##  3655 3656 3657 3658 3659 3660 3661 3662 3663 3665 3666 3667 3668
##     3    3    3    3    3    1    3    3    3    3    2    3    3
##  3669 3670 3671 3672 3673 3674 3675 3676 3677 3678 3679 3680 3681
##     3    1    1    3    3    3    3    3    1    2    3    3    3
```

```
##  3682 3683 3684 3685 3686 3687 3688 3689 3690 3691 3692 3693 3694
##     3    3    2    1    3    3    3    3    1    3    3    3    3
##  3695 3696 3697 3698 3699 3700 3701 3702 3703 3704 3705 3706 3707
##     3    3    3    1    3    3    3    1    3    3    3    1    2
##  3708 3709 3710 3711 3712 3713 3714 3715 3716 3717 3718 3719 3720
##     3    3    3    3    3    3    1    3    1    3    3    3    2
##  3721 3723 3724 3725 3726 3727 3728 3729 3730 3731 3732 3733 3734
##     3    1    3    3    1    3    3    1    1    1    3    1    3
##  3735 3736 3737 3738 3739 3740 3741 3742 3743 3744 3745 3746 3747
##     3    3    1    3    3    2    3    3    3    2    1    1    2
##  3748 3749 3750 3751 3752 3753 3754 3755 3756 3757 3758 3759 3760
##     2    2    3    1    3    2    1    3    3    3    1    3    3
##  3761 3762 3763 3764 3765 3766 3767 3768 3769 3770 3771 3772 3773
##     3    1    3    3    3    3    3    3    1    1    3    1    3
##  3774 3775 3776 3777 3778 3779 3780 3781 3782 3783 3784 3785 3786
##     3    3    3    3    3    3    3    3    3    2    2    3    2
##  3787 3788 3789 3790 3791 3792 3793 3794 3795 3796 3797 3798 3799
##     1    3    1    3    2    3    3    1    2    3    3    3    3
##  3800 3801 3802 3803 3804 3805 3806 3807 3808 3809 3810 3811 3812
##     3    3    3    1    3    3    3    2    1    3    3    3    1
##  3813 3814 3815 3816 3817 3818 3819 3820 3821 3822 3823 3824 3825
##     3    3    3    1    2    1    3    3    3    3    3    3    3
##  3826 3827 3828 3829 3830 3831 3832 3833 3834 3835 3836 3837 3838
##     3    3    3    2    3    3    3    3    3    2    1    3    3
##  3839 3840 3841 3842 3843 3844 3845 3846 3847 3848 3849 3850 3851
##     3    1    2    2    3    3    3    3    3    3    3    3    2
##  3852 3853 3854 3855 3856 3857 3858 3859 3860 3861 3862 3863 3864
##     3    3    3    2    3    1    3    3    3    3    3    3    1
##  3865 3866 3867 3868 3869 3870 3871 3872 3873 3874 3875 3876 3877
##     1    3    2    3    3    3    3    3    2    3    3    1    3
##  3878 3879 3880 3881 3882 3883 3884 3885 3886 3887 3888 3889 3890
##     1    3    3    3    1    2    3    3    2    3    1    3    2
##  3891 3893 3894 3895 3896 3897 3898 3899 3900 3901 3902 3903 3904
##     3    3    3    2    1    1    3    3    1    1    3    1    3
##  3905 3906 3907 3908 3909 3910 3911 3912 3913 3914 3915 3916 3917
##     3    3    2    3    3    1    1    1    1    3    3    3    2
##  3918 3919 3920 3921 3922 3923 3924 3925 3926 3927 3928 3929 3930
##     1    1    1    3    3    1    3    1    3    3    3    3    3
##  3931 3932 3933 3934 3935 3936 3937 3938 3939 3940 3941 3942 3943
##     1    2    3    3    1    3    3    3    3    3    3    3    3
##  3944 3945 3946 3947 3948 3949 3950 3951 3952 3953 3954 3955 3956
##     3    3    3    3    3    3    2    1    3    3    3    3    3
##  3957 3958 3959 3960 3961 3962 3963 3964 3965 3966 3967 3968 3969
##     1    3    1    1    1    3    1    3    3    1    3    2    2
##  3970 3971 3972 3973 3974 3975 3976 3977 3978 3979 3980 3981 3982
##     1    1    3    3    3    2    3    3    3    3    1    3    1
##  3983 3984 3985 3986 3987 3988 3989 3990 3991 3992 3993 3994 3995
##     3    3    3    3    3    2    3    3    3    3    1    3    1
##  3996 3997 3998 3999 4000 4001 4002 4003 4004 4005 4006 4007 4008
##     3    1    3    3    1    3    3    1    3    1    3    3    3
##  4009 4010 4011 4012 4013 4014 4015 4016 4017 4018 4019 4020 4021
##     3    3    3    3    1    3    1    3    1    1    2    3    1
##  4022 4023 4024 4025 4026 4027 4028 4029 4030 4031 4032 4033 4034
##     1    2    1    2    3    1    3    3    3    2    3    1    3
```

```
##  4035 4036 4037 4038 4039 4040 4041 4042 4043 4044 4045 4046 4047
##     3    2    3    1    1    2    3    2    1    2    3    1    3
##  4048 4049 4050 4051 4052 4053 4054 4055 4056 4057 4058 4059 4060
##     3    2    3    3    3    1    1    3    1    3    2    3    2
##  4061 4062 4063 4064 4065 4066 4067 4068 4069 4070 4071 4072 4073
##     3    2    3    3    1    3    3    1    1    1    3    1    2
##  4074 4075 4076 4077 4078 4079 4080 4081 4082 4083 4084 4085 4086
##     2    3    3    1    3    3    3    2    3    1    3    3    3
##  4087 4088 4089 4090 4091 4092 4093 4094 4095 4096 4097 4098 4099
##     1    2    3    3    2    3    3    3    3    2    3    1    3
##  4100 4101 4102 4103 4104 4105 4106 4107 4108 4109 4110 4111 4112
##     3    2    3    2    2    1    3    2    3    3    3    1    3
##  4113 4114 4115 4116 4117 4118 4119 4120 4121 4122 4123 4124 4125
##     3    3    3    3    3    3    2    1    3    1    1    3    3
##  4126 4127 4128 4129 4130 4131 4132 4133 4134 4135 4136 4137 4138
##     3    3    3    3    3    1    1    1    3    3    3    3    2
##  4139 4140 4141 4142 4143 4144 4145 4146 4147 4148 4149 4150 4151
##     3    3    2    3    3    1    3    3    3    3    3    3    3
##  4152 4153 4154 4155 4156 4157 4158 4159 4160 4161 4162 4163 4165
##     3    2    3    3    3    3    3    2    1    3    2    2    3
##  4166 4167 4168 4169 4170 4171 4172 4173 4174 4175 4176 4177 4178
##     2    3    2    3    3    2    3    3    3    3    3    2    1
##  4179 4180 4181 4182 4184 4185 4186 4187 4188 4189 4190 4191 4192
##     3    3    3    1    3    3    1    2    3    2    3    3    3
##  4193 4194 4195 4196 4197 4198 4199 4200 4201 4202 4203 4204 4205
##     3    3    3    1    1    1    3    3    1    2    3    3    3
##  4206 4207 4208 4209 4210 4211 4212 4213 4214 4215 4216 4217 4218
##     3    3    1    1    3    3    1    3    1    3    3    1    3
##  4219 4220 4221 4222 4223 4224 4225 4226 4227 4228 4229 4230 4231
##     3    3    1    3    3    3    1    2    3    3    3    3    3
##  4233 4234 4235 4236 4237 4238 4239 4240 4241 4242 4243 4244 4245
##     3    2    3    3    3    3    3    3    3    3    3    3    1
##  4246 4247 4248 4249 4250 4251 4252 4253 4254 4255 4256 4257 4258
##     3    3    3    1    1    2    1    2    2    2    2    1    2
##  4259 4260 4261 4262 4263 4264 4265 4266 4267 4268 4269 4270 4271
##     1    3    1    1    3    3    3    3    3    3    3    1    3
##  4272 4273 4274 4275 4276 4277 4278 4279 4280 4281 4282 4283 4284
##     3    1    2    2    3    2    3    3    3    1    2    3    1
##  4285 4286 4287 4288 4289 4290 4291 4292 4293 4294 4295 4296 4297
##     3    3    1    3    2    3    1    2    1    3    2    3    3
##  4298 4299 4300 4301 4302 4303 4304 4305 4306 4307 4308 4309 4310
##     3    3    3    1    3    3    3    3    2    1    3    1    3
##  4311 4312 4313 4314 4315 4316 4317 4318 4319 4320 4321 4322 4323
##     3    1    1    3    3    3    3    3    1    2    3    3    3
##  4324 4325 4326 4327 4328 4329 4330 4331 4332 4333 4334 4335 4336
##     1    3    1    2    3    2    2    3    2    3    1    2    3
##  4337 4338 4339 4340 4341 4342 4343 4345 4346 4347 4348 4349 4350
##     3    3    2    1    3    1    3    1    3    3    3    3    2
##  4351 4352 4353 4354 4355 4356 4357 4358 4359 4360 4361 4362 4363
##     3    3    3    3    1    3    3    3    3    3    3    1    3
##  4364 4365 4366 4367 4368 4369 4370 4371 4372 4373 4374 4376 4377
##     3    2    3    3    3    3    3    3    3    3    3    3    1
##  4378 4379 4380 4381 4382 4383 4384 4385 4386 4387 4388 4389 4390
##     2    3    3    3    3    3    1    1    1    3    2    3    3
```

```
##  4391  4392  4393  4394  4395  4396  4397  4398  4399  4400  4401  4402  4403
##     3     3     3     2     2     3     3     1     3     1     3     1     3
##  4405  4406  4407  4408  4409  4410  4411  4412  4413  4414  4415  4416  4417
##     3     3     3     2     3     2     2     1     3     3     3     3     3
##  4418  4419  4420  4421  4422  4423  4424  4425  4426  4428  4429  4430  4431
##     3     3     2     3     3     2     3     3     1     1     3     2     1
##  4432  4433  4434  4435  4436  4437  4438  4439  4440  4441  4442  4443  4444
##     3     2     3     3     2     3     3     3     3     2     2     3     3
##  4445  4446  4447  4448  4449  4450  4451  4452  4453  4454  4455  4456  4457
##     3     3     3     3     3     3     3     3     3     3     3     3     1
##  4458  4459  4460  4461  4462  4463  4465  4466  4467  4468  4469  4470  4471
##     3     3     2     2     3     3     3     3     3     3     3     3     3
##  4472  4473  4474  4475  4476  4477  4478  4479  4480  4481  4482  4483  4484
##     1     3     3     3     3     3     3     3     2     2     3     1     2
##  4485  4486  4487  4488  4489  4491  4492  4493  4494  4495  4496  4497  4498
##     3     3     3     1     3     1     1     3     3     3     3     1     3
##  4499  4500  4501  4502  4503  4504  4505  4506  4507  4508  4509  4510  4511
##     3     3     3     3     3     2     3     3     3     1     3     3     3
##  4512  4513  4514  4515  4516  4517  4518  4519  4520  4521  4522  4523  4524
##     1     1     1     3     2     2     3     2     1     3     3     3     1
##  4525  4526  4527  4528  4529  4530  4531  4532  4533  4534  4535  4536  4537
##     2     1     3     3     3     3     1     3     1     2     3     1     3
##  4538  4539  4540  4541  4542  4543  4544  4545  4546  4547  4548  4549  4550
##     3     3     3     3     3     2     3     3     3     3     3     3     3
##  4551  4552  4554  4555  4556  4557  4558  4559  4560  4561  4562  4563  4564
##     3     3     3     2     3     3     3     3     2     3     3     3     3
##  4565  4566  4567  4568  4569  4570  4571  4572  4573  4574  4575  4576  4577
##     3     3     3     3     3     1     1     1     1     3     1     2     1
##  4578  4579  4580  4581  4582  4583  4584  4585  4586  4587  4588  4589  4590
##     3     1     1     3     3     3     3     3     3     2     3     3     2
##  4591  4592  4593  4594  4595  4596  4597  4598  4599  4600  4601  4602  4603
##     3     3     1     3     1     3     3     3     3     3     1     3     1
##  4604  4605  4606  4607  4608  4609  4610  4611  4612  4613  4614  4615  4616
##     2     1     3     1     3     3     2     3     3     3     2     3     3
##  4617  4618  4619  4620  4621  4622  4623  4624  4625  4626  4627  4628  4629
##     1     3     3     2     2     3     3     3     3     2     3     3     3
##  4630  4631  4632  4633  4634  4635  4636  4637  4638  4639  4640  4641  4642
##     3     3     1     1     1     3     3     3     3     3     3     3     3
##  4643  4644  4645  4646  4647  4648  4649  4650  4651  4652  4653  4654  4655
##     3     2     3     3     3     1     1     3     1     3     3     2     2
##  4656  4657  4658  4659  4660  4661  4662  4663  4664  4665  4666  4667  4668
##     3     3     1     3     1     3     3     3     3     3     3     1     3
##  4669  4670  4671  4672  4673  4674  4675  4676  4677  4678  4679  4680  4681
##     1     1     3     1     2     1     2     1     3     3     3     3     3
##  4682  4683  4684  4685  4686  4687  4688  4689  4690  4691  4692  4693  4694
##     3     2     3     3     3     3     3     3     1     3     3     1     3
##  4695  4696  4697  4698  4699  4700  4701  4702  4703  4704  4705  4706  4707
##     3     3     1     3     3     2     2     3     3     3     3     3     3
##  4708  4709  4710  4711  4712  4713  4714  4715  4716  4717  4718  4719  4720
##     3     3     2     2     3     3     1     3     3     3     3     2     3
##  4721  4722  4723  4724  4725  4726  4727  4728  4729  4730  4731  4732  4733
##     3     1     1     3     1     3     3     1     1     3     1     3     1
##  4734  4735  4736  4737  4738  4739  4740  4741  4742  4743  4744  4745  4746
##     1     3     1     3     3     3     3     3     3     1     2     3     1
```

```
##  4747  4748  4749  4750  4751  4752  4753  4754  4755  4756  4757  4758  4759
##     1     1     3     3     3     2     3     3     3     3     3     3     3
##  4760  4761  4762  4763  4764  4765  4766  4767  4768  4769  4770  4771  4772
##     3     1     3     1     1     3     3     3     3     3     3     1     3
##  4773  4774  4775  4776  4777  4778  4779  4780  4781  4782  4783  4784  4785
##     3     1     3     3     3     3     3     3     3     3     3     3     1
##  4786  4787  4788  4789  4790  4791  4792  4793  4794  4795  4796  4797  4798
##     2     3     3     2     3     1     3     1     3     3     3     3     3
##  4799  4800  4801  4802  4803  4804  4805  4806  4807  4808  4809  4810  4811
##     3     1     3     3     2     2     2     3     1     3     1     1     3
##  4812  4813  4814  4815  4816  4817  4819  4820  4821  4822  4823  4824  4825
##     2     3     3     3     3     2     3     1     3     1     3     3     2
##  4826  4827  4828  4829  4830  4831  4832  4833  4834  4835  4836  4837  4838
##     2     3     3     2     2     3     3     3     3     3     2     1     3
##  4839  4840  4841  4842  4843  4844  4845  4846  4847  4848  4849  4850  4851
##     3     3     3     3     2     3     3     3     3     2     3     3     3
##  4852  4853  4854  4855  4856  4857  4858  4859  4860  4861  4862  4863  4864
##     3     1     3     3     3     3     1     2     3     3     3     1     2
##  4865  4866  4867  4868  4869  4870  4871  4872  4873  4874  4875  4876  4877
##     2     3     3     3     1     2     3     2     3     1     1     3     1
##  4878  4879  4880  4881  4882  4883  4885  4886  4887  4888  4889  4890  4891
##     2     1     3     3     2     1     3     3     3     1     3     1     1
##  4892  4893  4894  4895  4896  4897  4898  4899  4900  4901  4902  4903  4904
##     1     3     1     3     3     3     1     3     3     3     3     3     3
##  4905  4906  4907  4908  4909  4910  4911  4912  4913  4915  4916  4917  4918
##     3     2     3     1     3     3     3     3     3     3     1     1     1
##  4919  4920  4921  4922  4923  4924  4925  4926  4927  4928  4929  4930  4931
##     3     2     1     2     1     1     1     1     3     1     1     3     1
##  4932  4933  4934  4935  4936  4937  4938  4939  4940  4941  4942  4943  4944
##     3     3     3     3     3     3     3     3     3     3     1     3     3
##  4945  4946  4947  4948  4949  4950  4951  4952  4953  4954  4955  4956  4957
##     1     3     3     1     3     3     3     3     3     1     2     1     3
##  4958  4959  4960  4961  4962  4963  4964  4965  4966  4967  4968  4969  4970
##     2     3     3     3     3     3     2     3     1     3     3     3     1
##  4971  4972  4973  4974  4975  4976  4977  4978  4979  4980  4981  4982  4983
##     3     3     3     2     3     3     3     3     3     1     3     1     1
##  4984  4985  4986  4987  4988  4989  4990  4991  4992  4993  4994  4995  4996
##     3     3     3     3     3     1     3     3     2     3     3     3     3
##  4997  4998  4999  5000  5001  5002  5003  5004  5005  5006  5007  5008  5009
##     3     3     3     2     3     3     1     3     3     3     1     3     3
##  5010  5011  5012  5013  5014  5015  5016  5017  5018  5019  5020  5021  5022
##     1     2     2     3     3     3     2     3     3     3     3     3     3
##  5023  5024  5025  5026  5027  5028  5029  5030  5031  5032  5033  5034  5035
##     1     1     3     3     3     1     1     1     3     3     1     3     3
##  5036  5037  5038  5040  5041  5042  5043  5045  5046  5047  5048  5049  5050
##     3     1     1     3     3     3     3     3     1     3     3     3     2
##  5051  5052  5053  5054  5055  5056  5058  5059  5060  5061  5062  5063  5064
##     3     3     3     3     2     1     2     3     2     3     3     2     3
##  5065  5066  5067  5068  5069  5070  5071  5072  5073  5074  5075  5076  5077
##     3     3     3     3     2     3     3     3     3     2     3     1     3
##  5078  5079  5080  5081  5082  5083  5084  5085  5086  5087  5088  5089  5090
##     2     1     3     3     3     3     3     1     2     3     2     3     1
##  5091  5092  5093  5094  5095  5096  5097  5098  5099  5100  5101  5102  5103
##     3     2     2     3     3     2     3     3     3     3     3     3     3
```

```
##  5104  5105  5106  5107  5108  5109  5110  5111  5112  5113  5114  5115  5116
##     3     3     3     3     1     3     3     3     1     3     1     2     2
##  5117  5118  5120  5121  5122  5123  5124  5125  5126  5127  5128  5129  5130
##     3     3     1     2     2     1     3     3     3     3     3     3     2
##  5131  5132  5133  5134  5135  5136  5137  5138  5139  5140  5141  5142  5143
##     1     3     3     3     3     3     3     2     2     3     1     3     3
##  5144  5145  5146  5147  5148  5149  5150  5151  5152  5153  5154  5155  5156
##     3     3     1     3     1     3     3     3     3     2     3     3     3
##  5157  5158  5159  5160  5161  5162  5163  5164  5165  5166  5167  5168  5169
##     2     2     1     3     2     2     3     3     2     1     3     3     1
##  5170  5171  5172  5173  5174  5175  5176  5177  5178  5179  5180  5181  5182
##     2     3     3     3     3     3     3     3     2     3     3     3     3
##  5183  5184  5185  5186  5187  5188  5189  5190  5191  5192  5193  5194  5195
##     3     3     1     3     2     3     3     3     3     3     3     3     3
##  5196  5197  5198  5201  5202  5203  5204  5205  5206  5207  5208  5209  5210
##     3     1     3     3     3     3     3     1     1     3     3     3     2
##  5211  5212  5213  5214  5215  5216  5217  5218  5219  5220  5221  5222  5223
##     1     3     1     3     3     1     3     3     3     3     3     1     3
##  5224  5225  5226  5227  5228  5229  5230  5231  5232  5233  5234  5235  5236
##     3     3     2     3     3     3     3     3     3     3     3     3     3
##  5237  5238  5239  5240  5241  5242  5243  5244  5245  5246  5247  5248  5249
##     3     1     1     3     3     3     1     3     2     1     3     3     3
##  5250  5251  5252  5253  5254  5256  5257  5258  5259  5260  5261  5262  5263
##     3     1     1     3     3     1     3     3     2     1     3     3     3
##  5264  5265  5266  5267  5268  5269  5270  5271  5272  5273  5274  5275  5276
##     1     2     3     3     3     3     3     3     2     3     3     2     1
##  5278  5279  5280  5281  5282  5283  5284  5285  5286  5288  5289  5290  5291
##     1     3     3     3     2     1     3     3     3     3     1     3     1
##  5292  5293  5294  5295  5296  5297  5298  5299  5300  5301  5302  5303  5304
##     3     2     1     3     1     2     2     3     3     1     3     3     3
##  5305  5306  5307  5308  5309  5310  5311  5312  5313  5314  5315  5316  5317
##     3     3     3     2     2     3     3     3     3     3     3     3     3
##  5318  5319  5320  5321  5322  5323  5324  5325  5326  5327  5328  5329  5330
##     3     1     3     3     3     3     1     3     3     3     3     2     3
##  5331  5332  5333  5334  5335  5336  5337  5338  5339  5340  5341  5342  5343
##     2     3     1     3     2     2     3     3     3     3     2     3     3
##  5344  5345  5346  5347  5348  5349  5350  5351  5352  5353  5354  5355  5357
##     2     3     2     3     2     1     1     2     1     3     3     3     3
##  5358  5359  5360  5361  5362  5363  5364  5365  5366  5367  5368  5369  5370
##     3     3     2     1     3     3     2     3     3     3     3     3     3
##  5371  5372  5373  5374  5375  5376  5377  5378  5379  5380  5381  5382  5383
##     1     3     1     3     3     3     3     2     2     3     3     2     3
##  5384  5385  5386  5387  5388  5389  5390  5391  5392  5393  5394  5395  5396
##     3     3     3     2     1     3     3     3     3     3     3     3     3
##  5397  5398  5399  5400  5401  5402  5403  5404  5405  5406  5407  5409  5410
##     3     1     3     3     3     3     3     1     3     2     3     2     3
##  5411  5412  5413  5414  5415  5416  5417  5418  5419  5420  5421  5422  5423
##     1     3     3     3     2     3     2     1     3     1     1     3     3
##  5424  5425  5426  5427  5428  5429  5430  5431  5432  5433  5434  5435  5436
##     3     1     3     2     3     3     3     3     3     2     3     1     3
##  5437  5438  5439  5440  5441  5442  5443  5444  5445  5446  5447  5448  5449
##     3     1     3     3     3     1     3     3     1     3     3     1     3
##  5450  5451  5452  5453  5454  5455  5456  5457  5458  5459  5460  5461  5462
##     1     1     1     3     1     2     3     3     3     2     1     2     3
```

```
##  5463  5464  5465  5466  5467  5468  5469  5470  5471  5472  5473  5474  5475
##     3     3     3     3     1     1     3     1     3     3     3     1     3
##  5476  5477  5478  5479  5480  5481  5482  5483  5484  5485  5486  5487  5488
##     1     3     3     3     3     3     3     1     1     1     3     1     3
##  5489  5490  5491  5492  5493  5494  5495  5496  5497  5498  5499  5500  5501
##     3     3     3     1     3     1     1     2     3     1     3     3     1
##  5502  5503  5504  5505  5506  5507  5508  5509  5510  5511  5512  5513  5514
##     3     3     1     1     3     3     3     3     2     1     3     3     3
##  5515  5516  5517  5518  5519  5520  5521  5522  5523  5524  5525  5526  5527
##     3     1     3     1     3     3     1     1     3     3     3     3     2
##  5528  5529  5530  5531  5532  5533  5534  5535  5536  5537  5538  5539  5540
##     3     2     3     1     3     1     1     3     3     3     1     1     3
##  5541  5542  5543  5544  5545  5546  5547  5548  5549  5550  5551  5552  5553
##     3     3     1     3     2     1     1     1     2     1     3     3     3
##  5554  5555  5556  5557  5558  5559  5560  5561  5562  5563  5564  5565  5566
##     3     2     3     3     1     3     3     3     3     1     3     1     3
##  5567  5568  5569  5570  5571  5572  5573  5574  5575  5576  5577  5578  5579
##     3     3     3     2     3     3     3     3     3     3     3     3     3
##  5580  5581  5582  5583  5584  5585  5586  5587  5588  5589  5590  5591  5592
##     3     3     1     2     3     3     3     3     3     1     2     3     3
##  5593  5594  5595  5596  5597  5598  5599  5600  5601  5602  5603  5604  5605
##     2     2     3     3     3     3     1     2     3     2     3     3     3
##  5606  5607  5608  5609  5610  5611  5612  5613  5614  5615  5616  5617  5618
##     3     1     3     2     3     1     3     3     3     3     1     1     2
##  5619  5620  5621  5622  5623  5624  5625  5626  5627  5628  5629  5630  5631
##     3     3     3     3     1     1     1     2     3     3     3     3     1
##  5632  5633  5634  5635  5636  5637  5638  5639  5640  5641  5642  5643  5644
##     1     3     3     1     3     3     3     3     3     3     2     3     3
##  5645  5646  5647  5648  5649  5650  5651  5652  5653  5654  5655  5656  5657
##     3     1     3     3     3     3     3     1     1     3     3     1     3
##  5658  5659  5660  5661  5662  5663  5664  5665  5666  5667  5668  5669  5670
##     2     3     3     3     1     3     3     2     3     3     3     3     3
##  5671  5672  5673  5674  5675  5676  5677  5678  5679  5680  5681  5682  5683
##     3     3     3     3     3     3     2     1     3     1     1     3     3
##  5684  5685  5686  5687  5688  5689  5690  5691  5692  5693  5694  5695  5696
##     3     3     3     3     3     3     3     2     2     3     3     2     3
##  5697  5698  5699  5700  5701  5702  5703  5704  5705  5706  5707  5708  5709
##     3     3     3     2     3     1     1     3     1     3     3     3     2
##  5710  5711  5712  5713  5714  5715  5716  5717  5718  5719  5720  5721  5722
##     1     3     3     3     3     2     3     3     1     1     1     3     3
##  5723  5724  5725  5726  5727  5728  5729  5730  5731  5732  5733  5734  5735
##     3     3     3     3     2     1     3     1     3     3     1     3     3
##  5736  5737  5738  5739  5740  5741  5742  5743  5744  5745  5746  5747  5748
##     3     3     2     3     3     3     1     3     3     1     3     2     3
##  5749  5750  5751  5752  5753  5754  5755  5756  5757  5758  5759  5760  5761
##     3     3     3     3     3     3     3     1     3     3     3     3     3
##  5762  5763  5764  5765  5766  5767  5768  5769  5770  5771  5772  5773  5774
##     3     3     3     1     3     3     1     1     3     3     2     1     1
##  5775  5776  5777  5778  5779  5780  5781  5782  5783  5784  5785  5786  5787
##     1     3     2     3     1     3     2     3     3     3     2     3     2
##  5788  5789  5790  5791  5792  5793  5794  5795  5796  5797  5798  5799  5800
##     3     3     3     3     3     1     3     3     1     3     3     3     1
##  5801  5802  5803  5804  5805  5806  5807  5808  5809  5810  5811  5812  5813
##     1     1     3     3     3     1     3     1     3     1     1     3     3
```

```
##  5814  5815  5816  5817  5818  5819  5820  5821  5822  5823  5824  5825  5826
##     3     3     1     3     1     2     3     3     1     1     1     1     1
##  5827  5828  5829  5830  5831  5832  5833  5834  5835  5836  5837  5838  5839
##     2     1     3     1     3     1     2     3     3     3     1     1     3
##  5840  5841  5842  5843  5844  5845  5846  5847  5848  5849  5850  5851  5852
##     2     3     1     2     3     1     1     3     1     3     1     3     3
##  5853  5854  5855  5856  5857  5858  5859  5860  5861  5862  5863  5864  5865
##     3     3     3     1     3     3     3     2     3     3     3     3     3
##  5866  5867  5868  5869  5870  5871  5872  5873  5874  5875  5876  5877  5878
##     3     1     1     3     3     2     3     3     3     1     3     3     3
##  5879  5880  5881  5882  5883  5884  5885  5886  5887  5888  5889  5890  5891
##     2     3     3     3     3     3     3     1     3     3     3     3     1
##  5892  5893  5894  5895  5896  5897  5898  5899  5900  5901  5902  5903  5904
##     2     3     3     1     3     2     3     3     3     3     1     1     2
##  5905  5906  5907  5908  5909  5910  5911  5912  5913  5914  5915  5916  5917
##     3     3     3     3     3     3     3     3     1     3     1     3     2
##  5918  5919  5920  5921  5922  5923  5924  5925  5926  5927  5928  5929  5930
##     1     1     3     3     3     3     3     3     1     2     3     3     1
##  5931  5932  5933  5934  5935  5936  5937  5938  5939  5940  5941  5942  5943
##     1     3     1     3     3     2     1     3     3     1     1     2     3
##  5944  5945  5946  5947  5948  5949  5950  5951  5952  5953  5954  5955  5956
##     1     3     1     3     3     3     2     3     3     3     3     3     2
##  5957  5958  5959  5960  5961  5962  5963  5964  5965  5966  5967  5968  5969
##     3     3     3     2     3     3     3     3     3     3     1     3     3
##  5970  5971  5972  5973  5974  5975  5976  5977  5978  5979  5980  5981  5982
##     1     1     3     3     3     3     3     1     3     1     3     3     3
##  5983  5984  5985  5986  5987  5988  5989  5990  5991  5992  5993  5994  5995
##     3     3     1     3     1     3     3     1     1     3     1     3     3
##  5996  5997  5998  5999  6000  6001  6002  6003  6004  6005  6006  6007  6008
##     2     2     3     1     1     3     1     3     3     2     3     1     1
##  6009  6010  6011  6012  6013  6014  6015  6016  6017  6018  6019  6020  6021
##     3     3     2     1     2     3     3     2     1     3     3     2     3
##  6022  6023  6024  6025  6026  6027  6028  6029  6030  6031  6032  6033  6034
##     3     3     1     1     1     3     3     3     2     3     1     3     3
##  6035  6036  6037  6038  6039  6040  6041  6042  6043  6044  6045  6046  6047
##     3     3     3     3     3     3     3     2     1     3     3     3     1
##  6048  6049  6050  6051  6052  6053  6054  6055  6056  6057  6058  6059  6060
##     3     2     2     3     3     1     3     3     3     3     3     3     3
##  6061  6062  6063  6064  6065  6066  6067  6068  6069  6070  6071  6072  6073
##     1     2     1     3     1     3     3     3     3     1     3     3     2
##  6074  6075  6076  6077  6078  6079  6080  6081  6082  6083  6084  6085  6086
##     2     3     3     3     3     2     3     3     3     3     1     3     1
##  6087  6088  6089  6090  6091  6092  6093  6094  6095  6096  6097  6098  6099
##     3     3     3     3     3     3     3     3     3     1     1     3     2
##  6100  6101  6102  6103  6104  6105  6106  6107  6108  6109  6110  6111  6112
##     3     3     3     1     3     3     1     2     3     3     3     3     3
##  6113  6114  6115  6116  6117  6118  6119  6120  6121  6122  6123  6124  6125
##     3     1     2     2     3     3     3     3     3     3     1     2     2
##  6126  6127  6128  6129  6130  6131  6132  6133  6134  6135  6136  6137  6138
##     2     1     1     3     3     3     3     3     3     2     3     1     3
##  6139  6140  6141  6142  6143  6144  6145  6146  6147  6148  6149  6150  6151
##     3     2     3     3     3     3     3     3     3     3     2     3     3
##  6152  6153  6154  6155  6156  6157  6158  6159  6160  6161  6162  6163  6164
##     1     1     2     3     1     1     3     3     3     1     3     1     3
```

```
##  6165 6166 6167 6168 6169 6170 6171 6172 6173 6174 6175 6176 6177
##     3    3    3    1    3    1    1    3    3    3    3    3    1
##  6178 6179 6180 6181 6182 6183 6184 6185 6186 6187 6188 6189 6190
##     1    3    1    3    3    3    3    3    1    1    1    1    1
##  6191 6192 6193 6194 6195 6196 6197 6198 6199 6200 6201 6202 6203
##     1    3    3    1    3    3    3    1    3    2    3    3    3
##  6204 6205 6206 6207 6208 6209 6210 6211 6212 6213 6214 6215 6216
##     2    3    1    3    3    3    1    3    3    3    3    1    1
##  6217 6218 6219 6220 6221 6222 6223 6224 6225 6226 6227 6228 6229
##     3    2    1    1    3    2    3    3    2    1    3    3    3
##  6230 6231 6232 6233 6234 6235 6236 6237 6238 6239 6240 6241 6242
##     3    3    1    3    1    2    1    1    2    3    2    2    3
##  6243 6244 6245 6246 6247 6248 6249 6250 6251 6252 6253 6254 6255
##     3    2    2    3    3    3    2    3    3    1    3    3    3
##  6256 6257 6258 6259 6260 6261 6262 6263 6264 6265 6266 6267 6268
##     2    3    3    3    3    2    3    2    3    1    3    3    3
##  6269 6270 6271 6272 6273 6274 6275 6276 6277 6278 6279 6280 6281
##     3    3    1    3    3    3    3    3    3    3    2    3    3
##  6282 6283 6284 6285 6286 6287 6288 6289 6290 6291 6292 6293 6294
##     3    1    3    1    3    3    1    1    3    3    3    1    3
##  6295 6296 6297 6298 6299 6300 6301 6302 6303 6304 6305 6306 6307
##     3    3    3    3    1    2    3    3    2    3    3    3    3
##  6308 6309 6310 6311 6312 6313 6314 6315 6316 6317 6318 6319 6320
##     2    3    3    3    1    3    1    1    3    2    3    2    1
##  6321 6322 6323 6324 6325 6326 6327 6328 6329 6330 6331 6332 6333
##     1    3    3    1    3    3    1    2    3    3    3    3    3
##  6334 6335 6336 6337 6338 6339 6340 6341 6342 6343 6344 6345 6346
##     2    3    1    3    3    1    3    1    3    3    3    3    3
##  6347 6348 6349 6350 6351 6352 6353 6354 6355 6356 6357 6358 6359
##     3    3    2    1    3    3    3    3    3    1    3    3    3
##  6360 6361 6362 6363 6364 6365 6366 6367 6368 6369 6370 6371 6372
##     1    1    1    1    3    1    3    3    3    3    3    3    3
##  6373 6374 6375 6376 6377 6378 6379 6380 6381 6382 6383 6384 6385
##     3    3    1    2    3    1    3    3    3    3    2    3    3
##  6386 6387 6388 6389 6390 6391 6392 6393 6394 6395 6396 6397 6398
##     1    3    3    3    3    1    3    2    3    2    1    3    3
##  6399 6400 6401 6402 6403 6404 6405 6406 6407 6408 6409 6410 6411
##     1    3    3    3    3    1    3    1    3    1    3    3    3
##  6412 6413 6414 6415 6416 6417 6418 6419 6420 6421 6422 6423 6424
##     3    1    3    3    1    3    3    3    1    1    1    3    2
##  6425 6426 6427 6428 6429 6430 6431 6432 6433 6434 6435 6436 6437
##     1    1    1    3    3    3    1    3    2    3    3    1    3
##  6438 6439 6440 6441 6442 6443 6444 6445 6446 6447 6448 6449 6450
##     3    3    3    2    2    3    3    1    3    3    3    3    3
##  6451 6452 6453 6454 6455 6456 6457 6458 6459 6460 6461 6462 6463
##     1    1    3    3    3    3    1    2    3    3    3    3    1
##  6464 6465 6466 6467 6468 6469 6470 6471 6472 6473 6474 6475 6476
##     3    3    3    3    2    3    3    1    2    3    3    1    2
##  6477 6478 6479 6480 6481 6482 6483 6484 6485 6486 6487 6488 6489
##     1    1    2    3    1    3    3    3    1    1    3    3    3
##  6490 6491 6492 6493 6494 6495 6496 6497 6498 6499 6500 6501 6502
##     3    3    3    3    3    2    3    3    1    3    3    3    1
##  6503 6504 6505 6506 6507 6508 6509 6510 6511 6512 6513 6514 6515
##     3    3    3    3    3    1    3    3    1    3    1    3    3
```

```
##  6516 6517 6518 6519 6520 6521 6522 6523 6524 6525 6526 6527 6528
##     3    2    3    3    3    1    3    3    3    1    3    2    3
##  6529 6530 6531 6532 6533 6534 6535 6536 6537 6538 6539 6540 6541
##     3    1    3    3    3    3    3    3    3    2    2    1    3
##  6542 6543 6544 6545 6546 6547 6548 6549 6550 6551 6552 6553 6554
##     3    3    3    1    3    3    3    3    2    2    3    1    1
##  6555 6556 6557 6558 6559 6560 6561 6562 6563 6564 6565 6566 6567
##     3    3    3    1    3    2    3    3    3    3    3    3    3
##  6568 6569 6570 6571 6572 6573 6574 6575 6576 6577 6578 6579 6580
##     3    1    3    3    3    1    1    3    3    2    3    3    2
##  6581 6582 6583 6584 6585 6586 6587 6588 6589 6590 6591 6592 6593
##     3    3    3    3    1    3    2    3    3    3    3    1    3
##  6594 6595 6596 6597 6598 6599 6600 6601 6602 6603 6604 6605 6606
##     3    2    2    3    1    3    3    3    3    2    3    2    2
##  6607 6608 6609 6610 6611 6612 6613 6614 6615 6616 6617 6618 6619
##     3    3    3    3    3    3    3    3    3    3    3    3    3
##  6620 6621 6622 6623 6624 6625 6626 6627 6628 6629 6630 6631 6632
##     3    3    3    3    3    2    3    3    3    3    3    3    3
##  6633 6634 6635 6636 6637 6638 6639 6640 6641 6642 6643 6644 6645
##     3    3    3    3    2    2    1    2    1    3    3    1    3
##  6646 6647 6648 6649 6650 6651 6652 6653 6654 6655 6656 6657 6658
##     3    3    3    3    1    1    2    3    1    3    3    3    2
##  6659 6660 6661 6662 6663 6664 6665 6666 6667 6668 6669 6670 6671
##     3    2    3    3    3    3    3    3    1    3    3    3    3
##  6672 6673 6674 6675 6676 6677 6678 6679 6680 6681 6682 6683 6684
##     1    3    3    1    2    3    3    3    1    1    3    3    3
##  6685 6686 6687 6688 6689 6690 6691 6692 6693 6694 6695 6696 6697
##     3    2    3    3    3    3    3    3    3    3    3    3    3
##  6698 6699 6700 6701 6702 6703 6704 6705 6706 6707 6708 6709 6710
##     3    3    1    2    1    3    3    3    2    3    3    3    1
##  6711 6712 6713 6714 6715 6716 6717 6718 6719 6720 6721 6722 6723
##     3    3    3    2    2    3    2    3    1    3    3    3    1
##  6724 6725 6726 6727 6728 6729 6730 6731 6732 6733 6734 6735 6736
##     3    3    1    3    1    3    3    3    3    3    1    3    2
##  6737 6738 6739 6740 6741 6742 6743 6744 6745 6746 6747 6748 6749
##     2    1    1    3    3    3    1    3    3    3    3    1    1
##  6750 6751 6752 6753 6754 6755 6756 6757 6758 6759 6760 6761 6762
##     3    3    3    3    1    3    3    3    3    3    3    1    2
##  6763 6764 6765 6766 6767 6768 6769 6770 6771 6772 6773 6774 6775
##     3    3    2    3    3    3    3    3    3    3    3    3    2
##  6776 6777 6778 6779 6780 6781 6782 6783 6784 6785 6786 6787 6788
##     3    3    2    1    3    3    3    3    3    3    3    2    1
##  6789 6790 6791 6792 6793 6794 6795 6796 6797 6798 6799 6800 6801
##     2    3    3    3    1    3    3    3    3    3    1    3    3
##  6802 6803 6804 6805 6806 6807 6808 6809 6810 6811 6812 6813 6814
##     3    3    3    3    3    3    2    3    3    1    3    2    3
##  6815 6816 6817 6818 6819 6820 6821 6822 6823 6824 6825 6826 6827
##     2    1    1    3    3    3    3    1    3    3    3    3    2
##  6828 6829 6830 6831 6832 6833 6834 6835 6836 6837 6838 6839 6840
##     3    3    3    2    3    2    3    3    1    1    3    3    3
##  6841 6842 6843 6844 6845 6846 6847 6848 6849 6850 6851 6852 6853
##     1    3    3    1    3    2    3    2    3    3    3    3    2
##  6854 6855 6856 6857 6858 6859 6860 6861 6862 6863 6864 6865 6866
##     2    3    3    3    3    3    3    3    1    3    3    3    2
```

```
##  6867  6868  6869  6870  6871  6872  6873  6874  6875  6876  6877  6878  6879
##     3     2     1     3     3     3     3     3     1     1     2     3     2
##  6880  6881  6882  6883  6884  6885  6886  6887  6888  6889  6890  6891  6892
##     3     3     3     3     1     3     2     3     3     3     1     3     1
##  6893  6894  6895  6896  6897  6898  6899  6900  6901  6902  6903  6904  6905
##     3     3     3     1     3     3     3     3     3     1     3     3     2
##  6906  6907  6908  6909  6910  6911  6912  6913  6914  6915  6916  6917  6918
##     3     3     3     1     3     3     3     3     2     3     3     2     3
##  6919  6920  6921  6922  6923  6924  6925  6926  6927  6928  6929  6931  6932
##     3     1     3     3     3     3     1     1     2     3     3     3     3
##  6933  6934  6935  6936  6937  6938  6939  6940  6941  6942  6943  6944  6945
##     3     3     3     3     3     1     3     3     3     3     2     3     3
##  6946  6947  6948  6949  6950  6951  6952  6953  6954  6955  6956  6957  6958
##     3     3     2     3     3     1     2     3     3     1     3     1     1
##  6959  6960  6961  6962  6963  6964  6965  6966  6967  6968  6969  6970  6971
##     3     3     1     3     1     3     1     1     2     2     1     1     3
##  6972  6973  6974  6975  6976  6977  6978  6979  6980  6981  6982  6983  6984
##     3     1     3     3     3     3     1     3     1     3     3     1     3
##  6985  6986  6987  6988  6989  6990  6991  6992  6993  6994  6995  6996  6997
##     3     3     2     3     3     3     3     1     1     1     2     3     1
##  6998  6999  7000  7001  7002  7003  7004  7005  7006  7007  7008  7009  7010
##     3     3     3     3     1     3     3     3     3     3     1     3     2
##  7011  7012  7013  7014  7015  7016  7017  7018  7019  7020  7021  7022  7023
##     3     3     3     3     3     3     3     3     1     1     1     3     3
##  7024  7025  7026  7027  7028  7029  7030  7031  7032  7033  7034  7035  7036
##     3     1     3     3     3     3     3     3     2     1     3     3     3
##  7037  7038  7039  7040  7041  7042  7043  7044  7045  7046  7047  7048  7049
##     3     1     1     1     3     1     2     3     1     3     1     1     3
##  7050  7051  7052  7053  7054  7055  7056  7057  7058  7059  7060  7061  7062
##     3     3     3     3     1     1     3     1     1     1     3     1     1
##  7063  7064  7065  7066  7067  7068  7069  7070  7071  7072  7073  7074  7075
##     3     3     3     3     2     1     3     3     3     3     1     3     1
##  7076  7077  7078  7079  7080  7081  7082  7083  7084  7085  7086  7087  7088
##     3     3     3     3     1     3     3     3     1     1     3     3     2
##  7089  7090  7091  7092  7093  7094  7095  7096  7097  7098  7099  7100  7101
##     3     3     1     3     1     3     1     2     1     2     3     3     1
##  7102  7103  7104  7105  7106  7107  7108  7109  7110  7111  7112  7113  7114
##     2     3     3     3     3     1     3     3     3     3     3     1     1
##  7115  7116  7117  7118  7119  7120  7121  7122  7123  7124  7125  7126  7127
##     3     3     1     3     3     1     3     3     2     1     3     3     1
##  7128  7129  7130  7131  7132  7133  7134  7135  7136  7137  7138  7139  7140
##     2     2     1     3     2     1     3     3     3     3     1     3     2
##  7141  7142  7143  7144  7145  7146  7147  7148  7149  7150  7151  7153  7154
##     2     3     1     3     1     2     3     3     3     3     3     3     1
##  7155  7156  7157  7158  7159  7160  7161  7162  7163  7164  7165  7166  7167
##     3     1     1     3     1     3     2     3     3     1     3     3     3
##  7168  7169  7170  7171  7172  7173  7174  7175  7176  7177  7178  7179  7180
##     3     3     3     3     3     3     1     1     1     3     3     3     1
##  7181  7182  7183  7184  7185  7186  7187  7188  7189  7190  7191  7192  7193
##     2     3     1     3     3     3     3     3     3     1     3     3     3
##  7194  7195  7196  7197  7198  7199  7200  7201  7202  7203  7204  7205  7206
##     3     3     2     3     2     3     3     3     1     3     3     1     3
##  7207  7208  7209  7210  7211  7212  7213  7214  7215  7216  7217  7218  7219
##     2     1     3     1     3     1     2     3     3     1     3     3     3
```

```
##  7220 7221 7222 7223 7224 7225 7226 7227 7228 7229 7230 7231 7232
##     3    2    1    3    3    1    3    3    3    3    1    2    1
##  7233 7234 7235 7236 7237 7238 7239 7240 7241 7242 7243 7244 7245
##     3    3    1    3    3    1    2    3    3    3    3    3    1
##  7246 7247 7248 7249 7250 7251 7252 7253 7254 7255 7256 7257 7258
##     3    3    3    3    3    1    3    2    3    1    3    1    3
##  7259 7260 7261 7262 7263 7264 7265 7266 7267 7268 7269 7270 7271
##     1    1    1    2    3    3    3    3    1    1    3    3    1
##  7272 7273 7274 7275 7276 7277 7278 7279 7280 7281 7282 7283 7284
##     3    3    3    1    2    3    3    3    3    3    3    1    3
##  7285 7286 7287 7288 7289 7290 7291 7292 7293 7294 7295 7296 7297
##     3    3    1    1    2    3    3    1    3    3    3    3    1
##  7298 7299 7300 7301 7302 7303 7304 7305 7306 7307 7308 7309 7310
##     1    3    3    2    1    3    3    3    3    3    1    1    3
##  7311 7312 7313 7314 7315 7316 7317 7318 7319 7320 7321 7322 7323
##     3    3    3    3    2    3    3    3    3    1    3    3    3
##  7324 7325 7326 7327 7328 7329 7330 7331 7332 7333 7334 7335 7336
##     3    3    1    3    1    3    3    3    1    1    1    3    3
##  7337 7338 7339 7340 7341 7342 7343 7344 7345 7346 7347 7348 7349
##     3    3    3    1    1    1    3    1    2    3    3    3    2
##  7350 7351 7352 7353 7354 7355 7356 7357 7358 7359 7360 7361 7362
##     1    2    1    1    2    3    3    3    3    3    3    1    3
##  7363 7364 7365 7366 7367 7368 7369 7370 7371 7372 7373 7374 7375
##     3    3    3    3    3    2    3    3    2    3    3    3    3
##  7376 7377 7378 7379 7380 7381 7382 7383 7384 7385 7386 7387 7388
##     3    1    1    1    2    3    3    2    3    3    3    1    1
##  7389 7390 7391 7392 7393 7394 7395 7396 7397 7398 7399 7400 7401
##     3    3    3    3    1    3    3    3    3    3    1    3    3
##  7402 7403 7404 7405 7406 7407 7408 7409 7410 7411 7412 7413 7414
##     3    1    3    3    3    3    3    3    3    1    3    3    1
##  7415 7416 7417 7418 7419 7420 7421 7422 7423 7424 7425 7426 7427
##     1    3    3    3    3    3    3    3    1    1    1    3    3
##  7428 7429 7430 7431 7432 7433 7434 7435 7436 7437 7438 7439 7440
##     3    1    2    3    3    3    3    2    3    3    3    3    3
##  7441 7442 7443 7444 7445 7446 7447 7448 7449 7450 7451 7452 7453
##     3    2    3    3    3    3    3    1    3    3    3    1    3
##  7454 7455 7456 7457 7458 7459 7460 7461 7462 7463 7464 7465 7466
##     3    3    3    1    2    1    3    3    1    3    3    3    3
##  7467 7468 7469 7470 7471 7472 7473 7474 7475 7476 7477 7478 7479
##     3    1    3    1    3    3    3    1    3    1    3    1    2
##  7480 7481 7482 7483 7484 7485 7486 7487 7488 7489 7490 7491 7492
##     3    1    3    1    3    3    1    3    3    2    1    3    1
##  7493 7494 7495 7496 7497 7498 7499 7500 7501 7502 7503 7504 7505
##     3    3    1    1    1    1    3    1    2    1    2    3    3
##  7506 7507 7508 7509 7510 7511 7512 7513 7514 7515 7516 7517 7518
##     1    1    1    3    3    3    3    3    2    3    3    3    3
##  7519 7520 7521 7522 7523 7524 7525 7526 7527 7528 7529 7530 7531
##     3    3    1    3    3    3    1    2    2    2    3    1    3
##  7532 7533 7534 7535 7536 7537 7538 7539 7540 7541 7542 7543 7544
##     3    1    3    3    1    3    3    1    1    2    3    3    1
##  7545 7546 7547 7548 7549 7550 7551 7552 7553 7554 7555 7556 7557
##     1    1    3    3    3    3    2    1    2    1    3    3    1
##  7558 7559 7560 7561 7562 7563 7564 7565 7566 7567 7568 7569 7570
##     1    3    3    2    3    3    1    3    3    1    1    3    1
```

```
##  7571  7572  7573  7574  7575  7576  7577  7578  7579  7580  7581  7582  7583
##     3     3     3     3     3     3     3     3     3     3     3     1     3
##  7584  7585  7586  7587  7588  7589  7590  7591  7592  7593  7594  7595  7596
##     3     3     3     1     3     1     3     2     3     2     3     3     3
##  7597  7598  7599  7600  7601  7602  7603  7604  7605  7606  7607  7608  7609
##     3     3     3     3     2     2     3     3     1     1     3     3     3
##  7610  7611  7612  7613  7614  7615  7616  7617  7618  7619  7620  7621  7622
##     3     1     3     3     3     3     3     2     3     3     3     3     1
##  7623  7624  7625  7626  7627  7628  7629  7630  7631  7632  7633  7634  7635
##     3     1     3     3     3     3     3     1     3     3     3     3     1
##  7637  7638  7639  7640  7641  7642  7643  7644  7645  7646  7647  7648  7649
##     1     3     3     1     3     3     2     3     3     3     3     3     3
##  7650  7651  7652  7653  7654  7655  7656  7657  7658  7659  7660  7661  7662
##     3     3     3     1     3     3     3     3     3     3     3     3     3
##  7663  7664  7665  7666  7667  7668  7669  7670  7671  7672  7673  7674  7675
##     2     3     3     3     1     3     1     1     3     1     1     3     1
##  7676  7677  7678  7679  7680  7681  7682  7683  7684  7685  7686  7687  7688
##     3     3     3     3     3     3     1     3     3     3     3     1     3
##  7689  7690  7691  7692  7693  7694  7695  7696  7697  7698  7699  7700  7701
##     3     3     3     3     3     1     3     3     3     2     2     3     3
##  7702  7703  7704  7705  7706  7707  7708  7709  7710  7711  7712  7713  7714
##     3     2     3     3     3     1     3     1     3     3     3     3     3
##  7715  7716  7717  7718  7719  7720  7721  7722  7723  7724  7725  7726  7727
##     3     1     2     3     3     3     3     3     2     1     3     3     3
##  7728  7729  7730  7731  7732  7733  7734  7735  7736  7737  7738  7739  7740
##     3     3     3     3     3     1     3     3     3     3     3     3     3
##  7741  7742  7743  7744  7745  7746  7747  7748  7749  7750  7751  7752  7753
##     3     3     3     3     1     3     3     3     3     3     3     2     3
##  7754  7755  7756  7757  7758  7759  7760  7761  7762  7763  7764  7765  7766
##     3     3     1     3     3     3     3     1     3     1     1     3     3
##  7767  7768  7769  7770  7771  7772  7773  7774  7775  7776  7777  7778  7779
##     3     3     1     1     1     3     3     3     1     3     3     3     3
##  7780  7781  7782  7783  7784  7785  7786  7787  7788  7789  7790  7791  7792
##     3     3     3     3     3     3     3     2     1     3     3     1     2
##  7793  7794  7795  7796  7797  7798  7799  7800  7801  7802  7803  7804  7805
##     2     1     1     3     3     3     3     3     3     3     2     3     3
##  7806  7807  7808  7809  7810  7811  7812  7813  7814  7815  7816  7817  7818
##     3     3     3     3     3     3     3     1     3     3     3     2     1
##  7819  7820  7821  7822  7823  7824  7825  7826  7827  7828  7829  7830  7831
##     3     3     3     3     3     3     1     3     3     3     2     3     1
##  7832  7833  7834  7835  7836  7837  7838  7839  7840  7841  7842  7843  7844
##     3     3     3     1     3     3     3     3     3     3     3     3     2
##  7845  7846  7847  7848  7849  7850  7851  7852  7853  7854  7855  7856  7857
##     3     3     3     2     3     1     2     3     1     1     3     1     3
##  7858  7859  7860  7861  7862  7863  7864  7865  7866  7867  7868  7869  7870
##     3     1     3     3     3     1     2     2     3     3     3     3     2
##  7871  7872  7873  7874  7875  7876  7877  7878  7879  7880  7881  7882  7883
##     3     3     1     3     3     3     3     3     1     3     1     3     3
##  7884  7885  7886  7887  7888  7889  7890  7891  7892  7893  7894  7895  7896
##     3     3     3     2     3     3     3     1     3     3     3     1     3
##  7897  7898  7899  7900  7901  7902  7903  7904  7905  7906  7907  7908  7909
##     3     3     3     3     3     1     3     3     3     3     3     3     3
##  7910  7911  7912  7913  7914  7915  7916  7917  7918  7919  7920  7921  7922
##     3     3     3     1     3     3     3     3     3     3     1     3     3
```

```
##  7923  7924  7925  7926  7927  7928  7929  7930  7931  7932  7933  7934  7935
##     3     3     3     3     1     1     3     3     3     3     3     3     1
##  7936  7937  7938  7939  7940  7941  7942  7943  7944  7945  7946  7947  7948
##     3     1     1     2     3     2     3     3     3     3     3     3     2
##  7949  7950  7951  7952  7953  7954  7955  7956  7957  7958  7959  7960  7961
##     1     3     3     1     3     3     1     3     3     2     3     3     2
##  7962  7963  7964  7965  7966  7967  7968  7969  7970  7971  7972  7973  7974
##     3     1     1     3     3     1     3     3     3     3     3     3     3
##  7975  7976  7977  7978  7979  7980  7981  7982  7983  7984  7985  7986  7987
##     3     3     1     3     3     1     3     3     3     3     3     2     2
##  7988  7989  7990  7991  7992  7993  7994  7995  7996  7997  7998  7999  8000
##     3     1     3     3     2     2     2     3     3     3     1     3     3
##  8001  8002  8003  8004  8005  8006  8007  8008  8009  8010  8011  8012  8013
##     2     2     3     2     3     3     2     3     3     3     3     1     3
##  8014  8015  8016  8017  8018  8019  8020  8021  8022  8023  8024  8025  8026
##     3     3     2     3     3     3     3     3     2     3     1     3     2
##  8027  8028  8029  8030  8031  8032  8033  8034  8035  8036  8037  8038  8039
##     3     3     3     2     2     3     2     1     1     3     3     2     3
##  8040  8041  8042  8043  8044  8045  8046  8047  8048  8049  8050  8051  8052
##     1     3     3     2     3     3     3     2     3     2     3     3     3
##  8053  8054  8055  8056  8057  8058  8059  8060  8061  8062  8063  8064  8065
##     1     2     3     2     2     1     3     2     3     3     3     3     2
##  8066  8067  8068  8069  8070  8071  8072  8073  8074  8075  8076  8077  8078
##     3     3     2     3     3     3     3     3     3     1     2     3     3
##  8079  8080  8081  8082  8083  8084  8085  8086  8087  8088  8089  8090  8091
##     3     3     1     3     2     3     2     2     3     3     3     3     3
##  8092  8093  8094  8095  8096  8097  8098  8099  8100  8101  8102  8103  8104
##     3     3     3     3     3     1     3     1     2     2     1     3     3
##  8105  8106  8107  8108  8109  8110  8111  8112  8113  8114  8115  8116  8117
##     1     2     2     1     3     3     2     2     3     1     2     2     2
##  8118  8119  8120  8121  8122  8123  8124  8125  8126  8127  8128  8129  8130
##     2     2     3     1     1     1     3     1     3     3     3     3     2
##  8131  8132  8133  8134  8135  8136  8137  8138  8139  8140  8141  8142  8143
##     1     3     2     2     3     1     3     3     3     2     2     3     3
##  8144  8145  8146  8147  8148  8149  8150  8151  8152  8153  8154  8155  8156
##     3     3     3     3     3     2     1     2     1     1     2     3     2
##  8157  8158  8159  8160  8161  8162  8163  8164  8165  8166  8167  8168  8169
##     3     3     2     2     3     1     3     2     3     3     3     3     3
##  8170  8171  8172  8173  8174  8175  8176  8177  8178  8179  8180  8181  8182
##     3     2     3     3     3     1     3     3     1     1     3     3     3
##  8183  8184  8185  8186  8187  8188  8189  8190  8191  8192  8193  8194  8195
##     1     3     3     1     1     2     3     1     3     1     1     3     1
##  8196  8197  8198  8199  8200  8201  8202  8203  8204  8205  8206  8207  8208
##     1     3     3     3     3     1     2     3     2     3     2     3     1
##  8209  8210  8211  8212  8213  8214  8215  8216  8217  8218  8219  8220  8221
##     3     2     3     3     3     3     3     2     3     1     3     3     3
##  8222  8223  8224  8225  8226  8227  8228  8229  8230  8231  8232  8233  8234
##     1     3     3     3     3     3     3     3     1     3     2     3     2
##  8235  8236  8237  8238  8239  8240  8241  8242  8243  8244  8245  8246  8247
##     3     3     2     3     3     3     1     3     3     3     2     2     3
##  8248  8249  8250  8251  8252  8253  8254  8255  8256  8257  8258  8259  8260
##     3     1     2     2     3     3     3     3     3     3     3     3     1
##  8261  8262  8263  8264  8265  8266  8267  8268  8269  8270  8271  8272  8273
##     3     3     3     3     2     3     2     1     3     3     3     3     3
```

```
##  8274  8275  8276  8277  8278  8279  8280  8281  8282  8283  8284  8285  8286
##     2     3     1     3     3     3     2     2     3     3     2     2     3
##  8287  8288  8289  8290  8291  8292  8293  8294  8295  8296  8297  8298  8299
##     1     3     2     3     1     3     3     3     3     3     3     3     3
##  8300  8301  8302  8303  8304  8305  8306  8307  8308  8309  8310  8311  8312
##     2     3     3     3     3     3     3     3     3     2     3     2     3
##  8313  8314  8315  8316  8317  8318  8319  8320  8321  8322  8323  8324  8325
##     1     2     3     3     3     3     3     3     2     3     3     3     1
##  8326  8327  8328  8329  8330  8331  8332  8333  8334  8335  8336  8337  8338
##     1     3     2     2     3     2     3     3     1     3     3     3     3
##  8339  8340  8341  8342  8343  8344  8345  8346  8347  8348  8349  8350  8351
##     2     1     1     1     3     3     3     3     2     2     3     2     2
##  8352  8353  8354  8355  8356  8357  8358  8359  8360  8361  8362  8363  8364
##     3     2     3     2     3     2     3     3     3     2     3     3     3
##  8365  8366  8367  8368  8369  8370  8371  8372  8373  8374  8375  8376  8377
##     3     3     3     2     2     2     1     3     2     1     3     2     3
##  8378  8379  8380  8381  8382  8383  8384  8385  8386  8387  8388  8389  8390
##     3     2     2     3     2     3     3     3     3     2     3     2     1
##  8391  8392  8393  8394  8395  8396  8397  8398  8399  8400  8401  8402  8403
##     3     2     3     1     3     2     3     3     1     1     1     3     2
##  8404  8405  8406  8407  8408  8409  8410  8411  8412  8413  8414  8415  8416
##     3     2     3     3     1     1     3     3     3     3     2     2     1
##  8417  8418  8419  8420  8421  8422  8423  8424  8425  8426  8427  8428  8429
##     3     3     3     2     3     2     3     3     3     3     3     2     2
##  8430  8431  8432  8433  8434  8435  8436  8437  8438  8439  8440  8441  8442
##     3     2     1     3     2     3     3     1     3     3     1     1     1
##  8443  8444  8445  8446  8447  8448  8449  8450  8451  8452  8453  8454  8455
##     1     3     3     3     1     3     2     2     3     3     3     2     3
##  8456  8457  8458  8459  8460  8461  8462  8463  8464  8465  8466  8467  8468
##     3     3     3     2     2     3     2     3     1     3     3     3     2
##  8469  8470  8471  8472  8473  8474  8475  8476  8477  8478  8479  8480  8481
##     3     3     3     3     2     3     3     3     3     3     3     2     2
##  8482  8483  8484  8485  8486  8487  8488  8489  8490  8491  8492  8493  8494
##     1     1     2     2     3     3     3     3     1     2     3     3     2
##  8495  8496  8497  8498  8499  8500  8501  8502  8503  8504  8505  8506  8507
##     2     1     2     3     1     3     3     3     3     3     2     3     2
##  8508  8509  8510  8511  8512  8513  8514  8515  8516  8517  8518  8519  8520
##     3     3     3     1     1     1     1     2     3     1     1     3     3
##  8521  8522  8523  8524  8525  8526  8527  8528  8529  8530  8531  8532  8533
##     3     3     3     3     1     2     3     3     1     1     2     2     3
##  8534  8535  8536  8537  8538  8539  8540  8541  8542  8543  8544  8546  8547
##     3     3     2     3     3     2     3     3     3     1     3     3     3
##  8548  8549  8550  8551  8552  8553  8554  8555  8556  8557  8558  8559  8560
##     3     3     1     3     2     3     2     2     3     3     2     3     3
##  8561  8562  8563  8564  8565  8566  8567  8568  8569  8570  8571  8572  8573
##     3     3     1     3     3     2     2     3     3     3     1     3     3
##  8574  8575  8576  8577  8578  8579  8580  8581  8582  8583  8584  8585  8586
##     3     3     3     2     3     3     3     3     3     3     3     3     3
##  8587  8588  8589  8590  8591  8592  8593  8594  8595  8596  8597  8598  8599
##     2     1     3     1     3     3     3     3     3     3     3     1     3
##  8600  8601  8602  8603  8604  8605  8606  8607  8608  8609  8610  8611  8612
##     3     3     1     3     1     3     3     3     1     3     1     1     3
##  8613  8614  8615  8616  8617  8618  8619  8620  8621  8622  8623  8624  8625
##     2     2     2     3     3     3     3     3     3     3     3     3     3
```

```
##  8626  8627  8628  8629  8630  8631  8632  8633  8634  8635  8636  8637  8638
##     3     3     3     2     1     3     3     3     1     2     2     3     3
##  8639  8640  8641  8642  8643  8644  8645  8646  8647  8648  8649  8650  8651
##     1     1     2     1     3     2     1     2     3     2     3     3     2
##  8652  8653  8654  8655  8656  8657  8658  8659  8660  8661  8662  8663  8664
##     2     2     2     2     3     2     1     2     2     1     3     3     3
##  8665  8666  8667  8668  8669  8670  8671  8672  8673  8674  8675  8676  8677
##     3     1     1     3     2     3     3     3     3     3     3     2     1
##  8678  8679  8680  8681  8682  8683  8684  8685  8686  8687  8688  8689  8690
##     3     3     3     3     3     3     2     2     3     3     3     3     3
##  8691  8692  8693  8694  8695  8696  8697  8698  8699  8700  8701  8702  8703
##     3     2     2     3     3     1     1     3     3     3     2     3     3
##  8704  8705  8706  8707  8708  8709  8710  8711  8712  8713  8714  8715  8716
##     2     2     3     3     2     3     3     1     3     2     1     1     3
##  8717  8718  8719  8720  8721  8722  8723  8724  8725  8726  8727  8728  8729
##     2     3     1     1     2     3     3     2     3     3     1     3     3
##  8730  8731  8732  8733  8734  8735  8736  8737  8738  8739  8740  8741  8742
##     2     2     3     2     2     3     3     3     3     3     1     3     3
##  8743  8744  8745  8746  8747  8748  8749  8750  8751  8752  8753  8754  8755
##     3     3     3     2     1     3     3     3     2     3     3     2     3
##  8756  8757  8758  8759  8760  8761  8762  8763  8764  8765  8766  8767  8768
##     2     1     3     3     1     1     3     3     3     3     1     2     2
##  8769  8770  8771  8772  8773  8774  8775  8776  8777  8778  8779  8780  8781
##     1     3     3     1     2     3     3     3     3     3     3     1     1
##  8782  8783  8784  8785  8786  8787  8788  8789  8790  8791  8792  8793  8794
##     3     3     2     3     2     2     1     3     1     3     3     3     1
##  8795  8796  8797  8798  8799  8800  8801  8802  8803  8804  8805  8806  8807
##     2     1     3     2     2     3     3     2     3     3     2     3     2
##  8808  8809  8810  8811  8812  8813  8814  8815  8816  8817  8818  8819  8820
##     3     1     1     2     2     2     1     1     3     3     2     1     3
##  8821  8822  8823  8824  8825  8826  8827  8828  8829  8830  8831  8832  8833
##     1     1     3     2     2     3     1     3     3     3     3     3     3
##  8834  8835  8836  8837  8838  8839  8840  8841  8842  8843  8844  8845  8846
##     3     3     1     3     2     3     1     2     3     1     1     1     1
##  8847  8848  8849  8850  8851  8852  8853  8854  8855  8856  8857  8858  8859
##     3     2     2     3     1     1     1     3     2     3     1     1     3
##  8860  8861  8862  8863  8864  8865  8866  8867  8868  8869  8870  8871  8872
##     3     3     3     3     2     1     3     3     2     3     1     3     3
##  8873  8874  8875  8876  8877  8878  8879  8880  8881  8882  8883  8884  8885
##     1     3     3     3     2     3     3     1     1     3     3     3     3
##  8886  8887  8888  8889  8890  8891  8892  8893  8894  8895  8896  8897  8898
##     3     1     2     3     3     2     3     3     3     1     3     3     3
##  8899  8900  8901  8902  8903  8904  8905  8906  8907  8908  8909  8910  8911
##     3     1     3     2     3     2     2     1     2     3     3     3     3
##  8912  8913  8914  8915  8916  8917  8918  8919  8920  8921  8922  8923  8924
##     2     2     1     3     3     2     3     3     1     3     3     3     3
##  8925  8926  8927  8928  8929  8930  8931  8932  8933  8934  8935  8936  8937
##     3     3     1     3     3     3     3     1     2     3     2     3     3
##  8938  8939  8940  8941  8942  8943  8944  8945  8946  8947  8948  8949  8950
##     3     2     2     3     3     1     3     3     1     3     3     3     3
##  8951  8952  8953  8954  8955  8956  8957  8958  8959  8960  8961  8962  8963
##     3     1     3     1     3     1     2     1     3     3     3     1     3
##  8964  8965  8966  8967  8968  8969  8970  8971  8972  8973  8974  8975  8976
##     2     1     1     2     3     3     3     3     2     3     2     1     3
```

```
##  8977  8978  8979  8980  8981  8982  8983  8984  8985  8986  8987  8988  8989
##     3     3     3     3     2     3     2     2     1     3     2     3     2
##  8990  8991  8992  8993  8994  8995  8996  8997  8998  8999  9000  9001  9002
##     2     3     2     3     3     2     3     2     3     3     3     2     3
##  9003  9004  9005  9006  9007  9008  9009  9010  9011  9012  9013  9014  9015
##     2     3     2     3     3     1     2     1     2     3     3     3     3
##  9016  9017  9018  9019  9020  9021  9022  9023  9024  9025  9026  9027  9028
##     3     1     3     3     3     3     3     3     2     1     3     2     2
##  9029  9030  9031  9032  9033  9034  9035  9036  9037  9038  9039  9040  9041
##     3     2     3     3     3     1     2     3     1     2     3     3     3
##  9042  9043  9044  9045  9046  9047  9048  9049  9050  9051  9052  9053  9054
##     2     3     3     3     3     1     3     1     3     3     2     1     3
##  9055  9056  9057  9058  9059  9060  9061  9062  9063  9064  9065  9066  9067
##     3     3     3     2     3     3     2     3     2     3     3     3     3
##  9068  9069  9070  9071  9072  9073  9074  9075  9076  9077  9078  9079  9080
##     1     3     2     3     2     3     3     3     1     3     2     2     1
##  9081  9082  9083  9084  9085  9086  9087  9088  9089  9090  9091  9092  9093
##     2     2     3     1     1     1     2     3     1     3     2     3     3
##  9094  9095  9096  9097  9098  9099  9100  9101  9102  9103  9104  9105  9106
##     2     1     3     1     3     3     3     3     3     2     3     3     3
##  9107  9108  9109  9110  9111  9112  9113  9114  9115  9116  9117  9118  9119
##     2     2     2     3     1     3     2     3     2     1     3     1     3
##  9120  9121  9122  9123  9124  9125  9126  9127  9128  9129  9130  9131  9132
##     3     3     3     3     3     3     3     3     3     3     2     3     3
##  9133  9134  9135  9136  9137  9138  9139  9140  9141  9142  9143  9144  9145
##     3     3     3     3     2     3     2     3     1     3     2     1     2
##  9146  9147  9148  9149  9150  9151  9152  9153  9154  9155  9156  9157  9158
##     3     3     3     3     1     3     3     2     3     1     3     3     3
##  9159  9160  9161  9162  9163  9164  9165  9166  9167  9168  9169  9170  9171
##     3     3     3     1     3     3     3     2     1     3     3     2     2
##  9172  9173  9174  9175  9176  9177  9178  9179  9180  9181  9182  9183  9184
##     3     2     2     1     2     2     1     3     3     3     3     2     2
##  9185  9186  9187  9188  9189  9190  9191  9192  9193  9194  9195  9196  9197
##     3     3     3     1     3     3     3     3     2     3     3     3     3
##  9198  9199  9200  9201  9202  9203  9204  9205  9206  9207  9208  9209  9210
##     3     3     3     3     1     1     1     3     1     2     2     1     3
##  9211  9212  9213  9214  9215  9216  9217  9218  9219  9220  9221  9222  9223
##     3     3     3     3     2     1     1     3     2     2     3     1     1
##  9224  9225  9226  9227  9228  9229  9230  9231  9232  9233  9234  9235  9236
##     3     2     3     3     2     2     3     2     2     3     3     2     2
##  9237  9238  9239  9240  9241  9242  9243  9244  9245  9246  9247  9248  9249
##     1     3     3     3     3     2     3     1     2     3     2     1     2
##  9250  9251  9252  9253  9254  9255  9256  9257  9258  9259  9260  9261  9262
##     3     3     3     1     3     2     3     3     3     1     2     3     3
##  9263  9264  9265  9266  9267  9268  9269  9270  9271  9272  9273  9274  9275
##     3     3     1     3     3     3     3     3     3     1     3     3     1
##  9276  9277  9278  9279  9280  9281  9282  9283  9284  9285  9286  9287  9288
##     3     1     1     1     1     1     3     3     3     1     3     3     3
##  9289  9290  9291  9292  9293  9294  9295  9296  9297  9298  9299  9300  9301
##     3     3     3     3     3     2     3     3     1     2     3     2     2
##  9302  9303  9304  9305  9306  9308  9309  9310  9311  9312  9313  9314  9315
##     3     3     2     3     2     3     3     3     1     3     2     1     3
##  9316  9317  9318  9319  9320  9321  9322  9323  9324  9325  9326  9327  9328
##     3     3     3     1     3     1     2     3     3     3     3     1     3
```

```
##  9329  9330  9331  9332  9333  9334  9335  9336  9337  9338  9339  9340  9341
##     3     3     3     3     3     3     3     3     3     3     3     1     3
##  9342  9343  9344  9345  9346  9347  9348  9349  9350  9351  9352  9353  9354
##     2     3     3     3     3     1     3     3     3     2     2     3     3
##  9355  9356  9357  9358  9359  9360  9361  9362  9363  9364  9365  9366  9367
##     3     3     3     2     1     3     1     3     3     3     3     2     3
##  9368  9369  9370  9371  9372  9373  9374  9375  9376  9377  9378  9379  9380
##     2     3     1     3     3     3     2     2     1     3     3     3     3
##  9381  9382  9383  9384  9385  9386  9387  9388  9389  9390  9391  9392  9393
##     1     3     3     2     3     3     2     1     3     3     3     1     2
##  9394  9395  9396  9397  9398  9399  9400  9401  9402  9403  9404  9405  9406
##     2     3     3     2     3     2     3     3     2     3     3     3     2
##  9407  9408  9409  9410  9411  9412  9413  9414  9415  9416  9417  9418  9419
##     3     2     3     3     3     1     1     3     3     3     1     3     3
##  9420  9421  9422  9423  9424  9425  9426  9427  9428  9429  9430  9431  9432
##     3     3     2     3     3     3     2     3     3     1     3     2     1
##  9433  9434  9435  9436  9437  9438  9439  9440  9441  9442  9443  9444  9445
##     3     3     3     1     3     3     1     3     1     3     3     3     3
##  9446  9447  9448  9449  9450  9451  9452  9453  9454  9455  9456  9457  9458
##     3     3     2     1     1     3     3     3     2     1     3     1     2
##  9459  9460  9461  9462  9463  9464  9465  9466  9467  9468  9469  9470  9471
##     1     2     2     3     3     3     2     3     2     3     1     3     2
##  9472  9473  9474  9475  9476  9477  9478  9479  9480  9481  9482  9483  9484
##     3     3     3     2     3     3     2     2     3     1     3     3     3
##  9485  9486  9487  9488  9489  9490  9491  9492  9493  9494  9496  9497  9498
##     3     2     3     3     1     3     3     2     1     3     1     3     3
##  9499  9500  9501  9502  9503  9504  9505  9506  9507  9508  9509  9510  9511
##     3     3     3     1     2     3     3     3     2     2     3     2     2
##  9512  9513  9514  9515  9516  9517  9518  9519  9520  9521  9522  9523  9524
##     1     1     1     3     2     2     3     3     2     3     2     3     2
##  9525  9526  9527  9528  9529  9530  9531  9532  9533  9534  9535  9536  9537
##     3     3     1     1     3     3     2     3     3     3     2     3     3
##  9538  9539  9540  9541  9542  9543  9544  9545  9546  9547  9548  9549  9550
##     2     3     3     3     2     3     3     3     3     1     2     3     3
##  9551  9553  9554  9555  9556  9557  9558  9559  9560  9561  9562  9563  9564
##     3     2     3     2     2     2     3     1     3     1     3     3     3
##  9565  9566  9567  9568  9570  9571  9572  9573  9574  9575  9576  9577  9578
##     3     3     3     2     3     1     3     3     2     2     3     3     3
##  9579  9580  9581  9583  9584  9585  9586  9587  9588  9589  9590  9591  9592
##     3     2     3     3     3     3     3     3     3     3     3     3     2
##  9593  9594  9595  9596  9597  9598  9599  9600  9601  9602  9603  9604  9605
##     2     2     1     3     3     3     3     2     3     3     1     3     3
##  9606  9607  9608  9609  9610  9611  9612  9613  9614  9615  9616  9617  9618
##     3     3     1     2     1     3     3     2     3     3     3     3     3
##  9619  9620  9621  9622  9623  9624  9625  9626  9627  9628  9629  9630  9631
##     1     3     3     2     2     3     3     2     2     3     3     2     3
##  9632  9633  9634  9635  9636  9637  9638  9639  9640  9641  9642  9643  9644
##     2     2     3     3     3     3     3     2     3     3     3     3     3
##  9645  9646  9647  9648  9649  9650  9651  9652  9653  9654  9655  9656  9657
##     2     3     3     3     2     2     3     1     1     2     2     2     3
##  9658  9659  9660  9661  9662  9663  9664  9665  9666  9667  9668  9669  9670
##     3     1     3     3     3     3     3     3     2     3     1     2     3
##  9671  9672  9673  9674  9675  9676  9677  9678  9679  9680  9681  9682  9683
##     2     3     3     1     2     3     2     1     3     3     3     1     2
```

```
##  9684  9685  9686  9687  9688  9689  9690  9691  9692  9693  9694  9695  9696
##     2     1     2     3     1     3     3     3     3     3     1     1     3
##  9697  9698  9699  9700  9701  9702  9703  9704  9705  9706  9707  9708  9709
##     3     1     3     3     1     2     2     3     1     3     3     3     3
##  9710  9711  9712  9713  9714  9715  9716  9717  9718  9720  9721  9722  9723
##     3     2     3     3     3     2     3     1     1     3     2     1     1
##  9724  9725  9726  9727  9728  9729  9730  9731  9732  9733  9734  9735  9736
##     2     1     3     3     2     1     1     3     3     2     3     3     3
##  9737  9738  9739  9740  9741  9742  9743  9744  9745  9746  9747  9748  9749
##     3     1     3     2     3     3     1     3     2     3     3     3     3
##  9750  9751  9752  9753  9754  9755  9756  9757  9758  9759  9760  9761  9762
##     3     3     3     3     3     2     3     3     3     2     1     2     3
##  9763  9764  9765  9766  9767  9768  9769  9771  9772  9773  9774  9775  9776
##     3     3     3     3     3     2     2     1     1     3     1     3     3
##  9777  9778  9779  9780  9781  9782  9783  9784  9785  9786  9787  9788  9789
##     2     3     3     3     2     3     1     3     3     2     3     1     1
##  9790  9791  9792  9793  9794  9795  9796  9797  9798  9799  9800  9801  9802
##     3     1     3     2     1     3     2     2     3     3     3     2     3
##  9803  9804  9805  9806  9807  9808  9809  9810  9811  9812  9813  9814  9815
##     2     2     3     2     2     3     1     3     3     3     2     3     3
##  9816  9817  9818  9819  9820  9821  9822  9823  9824  9825  9826  9827  9828
##     3     2     1     3     1     3     3     2     3     3     3     2     3
##  9829  9830  9831  9832  9833  9834  9835  9836  9837  9838  9839  9840  9841
##     3     3     3     2     3     3     3     3     3     3     3     3     2
##  9842  9843  9844  9845  9846  9847  9848  9849  9850  9851  9852  9853  9854
##     3     3     3     1     2     3     1     2     3     1     2     3     3
##  9855  9856  9857  9858  9859  9860  9861  9862  9863  9864  9865  9866  9867
##     3     2     3     3     3     3     3     3     3     1     3     2     1
##  9868  9869  9870  9871  9872  9873  9874  9875  9876  9877  9878  9880  9881
##     2     2     3     1     2     3     3     3     1     3     2     1     3
##  9882  9883  9884  9885  9886  9887  9888  9889  9890  9891  9892  9893  9894
##     1     1     3     3     1     3     3     2     3     3     3     3     3
##  9895  9896  9897  9898  9899  9900  9901  9902  9903  9904  9905  9906  9907
##     3     2     3     3     1     2     2     1     3     2     3     2     1
##  9909  9910  9911  9912  9913  9914  9915  9916  9917  9918  9919  9920  9921
##     2     3     2     3     3     3     3     3     2     2     3     3     3
##  9922  9923  9924  9925  9926  9927  9928  9929  9930  9931  9932  9933  9934
##     3     1     3     3     3     3     2     2     2     1     2     1     2
##  9935  9936  9937  9938  9939  9940  9941  9942  9943  9944  9945  9946  9947
##     3     3     1     2     2     3     2     3     3     2     2     3     2
##  9948  9949  9950  9951  9952  9953  9954  9955  9956  9957  9958  9959  9960
##     1     3     3     2     3     3     3     1     1     1     1     3     2
##  9961  9962  9963  9964  9965  9966  9967  9968  9969  9970  9971  9972  9973
##     3     3     3     3     3     3     3     3     3     3     2     3     1
##  9974  9975  9976  9977  9978  9979  9980  9981  9982  9983  9984  9985  9986
##     3     3     3     2     2     3     3     3     1     3     3     2     3
##  9987  9988  9989  9990  9991  9992  9993  9994  9995  9996  9997  9998  9999
##     3     3     2     3     2     1     3     3     3     3     3     2     2
## 10000 10001 10002 10003 10004 10005 10006 10007 10008 10009 10010 10011 10012
##     2     3     3     2     1     3     3     1     3     1     2     3     3
## 10013 10014 10015 10016 10017 10018 10019 10020 10021 10022 10023 10024 10025
##     3     3     3     3     3     1     3     3     2     1     3     3     2
## 10026 10027 10028 10029 10030 10031 10032 10033 10034 10035 10036 10037 10038
##     2     3     3     3     3     3     3     3     3     3     3     3     1
```

```
## 10039 10040 10041 10042 10043 10044 10045 10046 10047 10048 10049 10050 10051
##     3     3     1     3     1     3     3     1     3     3     2     3     3
## 10052 10053 10054 10055 10056 10057 10058 10059 10060 10061 10062 10063 10064
##     2     3     3     3     1     3     3     3     2     3     3     3     3
## 10065 10066 10067 10068 10069 10070 10071 10072 10073 10074 10075 10076 10077
##     1     2     2     2     3     3     2     1     3     2     3     3     3
## 10078 10079 10080 10081 10082 10083 10084 10085 10086 10087 10088 10089 10090
##     1     3     3     3     1     3     2     3     1     3     3     1     3
## 10091 10092 10093 10094 10095 10096 10097 10098 10099 10100 10101 10102 10103
##     3     3     3     3     3     3     2     1     3     2     3     3     2
## 10104 10105 10106 10107 10108 10109 10110 10111 10112 10113 10114 10115 10116
##     2     2     3     3     3     1     1     3     3     3     3     2     3
## 10117 10118 10119 10120 10121 10122 10123 10124 10125 10126 10127 10128 10129
##     1     3     3     1     1     3     2     3     2     3     2     1     3
## 10130 10131 10132 10133 10134 10135 10136 10137 10138 10139 10140 10141 10142
##     3     3     3     1     2     2     3     1     3     3     3     3     2
## 10143 10144 10145 10146 10148 10149 10150 10151 10152 10153 10154 10155 10156
##     3     3     1     2     2     3     3     3     1     2     3     2     3
## 10157 10158 10159 10160 10161 10162 10163 10164 10165 10166 10167 10168 10169
##     3     2     3     3     3     3     3     2     3     3     3     3     3
## 10170 10171 10172 10173 10174 10175 10176 10177 10178 10179 10180 10181 10182
##     1     3     2     3     1     2     1     2     3     1     2     1     1
## 10183 10184 10185 10186 10187 10188 10189 10190 10191 10192 10193 10194 10195
##     3     2     3     2     3     2     1     1     2     3     3     3     2
## 10196 10197 10198 10199 10200 10201 10202 10203 10204 10205 10206 10207 10208
##     3     3     1     3     3     2     1     3     3     3     3     3     3
## 10209 10210 10211 10212 10213 10214 10215 10216 10217 10218 10219 10220 10221
##     3     3     3     3     3     3     2     1     3     3     2     3     1
## 10222 10224 10225 10226 10227 10228 10229 10230 10231 10232 10233 10234 10235
##     3     1     3     2     3     3     3     3     3     3     2     1     2
## 10236 10237 10238 10239 10240 10241 10242 10243 10244 10245 10246 10247 10248
##     3     3     3     1     3     3     3     3     3     3     3     3     3
## 10249 10250 10251 10252 10253 10254 10255 10256 10257 10258 10259 10260 10261
##     1     3     3     2     2     2     3     1     2     3     3     1     2
## 10262 10263 10264 10265 10266 10267 10268 10269 10271 10272 10273 10274 10275
##     1     2     3     1     3     2     3     2     1     2     2     2     3
## 10276 10277 10278 10279 10280 10281 10282 10283 10284 10285 10286 10287 10288
##     3     2     3     3     3     2     1     3     1     3     2     2     3
## 10289 10290 10291 10292 10293 10294 10295 10296 10297 10298 10299 10300 10301
##     3     3     2     2     1     3     3     3     3     3     2     3     1
## 10302 10303 10304 10305 10306 10307 10308 10309 10310 10311 10312 10313 10314
##     3     2     3     3     2     3     3     3     3     2     3     3     3
## 10315 10316 10317 10318 10319 10320 10321 10322 10323 10324 10325 10326 10327
##     3     3     2     2     3     3     2     2     1     3     1     1     2
## 10328 10329 10330 10331 10332 10333 10334 10335 10336 10337 10338 10339 10340
##     1     2     3     3     1     2     3     1     3     3     3     3     3
## 10341 10342 10343 10344 10345 10346 10347 10348 10349 10350 10351 10352 10353
##     3     3     3     3     3     3     2     3     1     3     1     1     3
## 10354 10355 10356 10357 10358 10359 10360 10361 10362 10363 10364 10365 10366
##     2     3     2     2     2     2     3     2     3     3     3     3     3
## 10367 10368 10369 10370 10371 10372 10373 10374 10375 10376 10377 10378 10379
##     2     3     3     3     3     1     3     3     2     2     3     3     3
## 10380 10381 10382 10383 10384 10385 10386 10387 10388 10389 10390 10391 10392
##     2     2     3     2     3     3     3     3     3     2     2     2     3
```

```
## 10393 10394 10395 10396 10397 10398 10399 10400 10401 10402 10403 10404 10405
##     3     2     3     2     3     3     3     3     2     3     1     3     2
## 10406 10407 10408 10409 10410 10411 10412 10413 10414 10415 10416 10417 10418
##     3     3     3     3     3     3     1     2     3     2     3     3     2
## 10419 10420 10421 10422 10423 10424 10425 10426 10427 10428 10429 10430 10431
##     3     2     2     2     1     2     2     1     3     3     1     3     2
## 10432 10433 10434 10435 10436 10437 10438 10439 10440 10441 10442 10443 10444
##     3     2     2     2     2     3     3     3     2     3     2     2     1
## 10445 10446 10447 10448 10449 10450 10451 10452 10453 10454 10455 10456 10457
##     2     2     3     3     2     3     3     3     3     2     3     3     3
## 10458 10459 10460 10461 10462 10463 10464 10465 10466 10467 10468 10469 10470
##     1     3     1     3     2     3     3     3     3     1     2     3     3
## 10471 10472 10473 10474 10475 10476 10477 10478 10479 10480 10481 10482 10483
##     2     3     3     1     3     1     3     3     1     3     3     3     3
## 10484 10485 10486 10487 10488 10489 10490 10491 10492 10493 10494 10495 10496
##     2     3     3     2     1     3     2     2     3     2     3     3     1
## 10497 10498 10499 10500 10501 10502 10503 10504 10505 10506 10507 10508 10509
##     3     3     3     3     3     3     1     2     3     3     2     3     3
## 10510 10511 10512 10513 10514 10515 10516 10517 10518 10519 10520 10521 10522
##     3     3     3     1     3     3     2     3     2     3     1     2     3
## 10523 10524 10525 10526 10527 10528 10529 10530 10531 10532 10533 10534 10535
##     2     3     1     3     3     3     2     3     3     3     3     2     3
## 10536 10537 10538 10539 10540 10541 10542 10543 10544 10545 10546 10547 10548
##     3     1     2     2     3     3     3     3     1     3     2     2     1
## 10549 10550 10551 10552 10553 10554 10555 10556 10557 10558 10559 10560 10561
##     1     3     1     3     3     3     3     3     3     2     3     3     3
## 10562 10563 10564 10565 10566 10567 10568 10569 10570 10571 10572 10574 10575
##     3     1     1     3     1     1     3     3     3     2     1     2     3
## 10576 10577 10578 10579 10580 10581 10582 10583 10584 10585 10586 10587 10588
##     3     3     2     1     3     2     1     2     3     3     1     3     1
## 10589 10590 10591 10592 10593 10594 10595 10596 10597 10598 10599 10600 10601
##     3     3     3     3     3     2     3     3     2     1     3     1     3
## 10602 10603 10604 10605 10606 10607 10608 10609 10610 10611 10612 10613 10614
##     3     1     2     3     2     3     3     3     2     2     3     3     2
## 10615 10616 10617 10618 10619 10620 10621 10622 10623 10624 10625 10626 10627
##     3     3     3     2     1     2     3     3     3     2     2     3     3
## 10628 10629 10630 10631 10633 10634 10635 10636 10637 10638 10639 10640 10641
##     1     3     3     3     2     1     3     3     3     3     3     3     3
## 10642 10643 10644 10645 10646 10647 10648 10649 10650 10651 10652 10653 10654
##     1     3     3     2     1     3     1     3     1     1     1     3     3
## 10655 10656 10657 10658 10659 10660 10661 10662 10663 10664 10665 10666 10667
##     1     3     2     3     3     3     3     2     3     3     3     3     3
## 10668 10669 10670 10671 10672 10673 10674 10675 10676 10677 10678 10679 10680
##     2     3     3     3     2     3     3     3     1     3     3     3     2
## 10681 10682 10683 10684 10685 10686 10687 10688 10689 10690 10691 10692 10693
##     3     2     3     3     3     2     3     1     3     3     3     3     3
## 10694 10695 10696 10697 10698 10699 10700 10701 10702 10703 10704 10705 10706
##     2     3     3     3     1     1     2     1     2     3     1     1     3
## 10707 10708 10709 10710 10711 10712 10713 10714 10715 10716 10717 10718 10719
##     1     3     3     3     3     3     2     3     3     3     3     3     3
## 10720 10721 10722 10723 10724 10725 10726 10727 10728 10729 10730 10731 10732
##     3     3     3     1     2     3     3     1     3     3     1     1     3
## 10733 10734 10735 10736 10737 10738 10739 10740 10741 10742 10743 10744 10745
##     3     1     3     3     3     3     2     3     1     3     2     2     3
```

```
## 10746 10747 10748 10749 10750 10751 10753 10754 10755 10756 10757 10758 10759
##     2     3     1     3     2     3     3     3     3     1     2     1     3
## 10760 10761 10762 10763 10764 10765 10766 10767 10768 10769 10770 10771 10772
##     3     1     3     1     2     3     3     3     2     2     1     3     2
## 10773 10774 10775 10776 10777 10778 10779 10780 10781 10782 10783 10784 10785
##     3     3     1     2     3     3     3     1     3     3     1     1     2
## 10786 10787 10788 10789 10790 10791 10792 10793 10794 10795 10797 10798 10799
##     3     3     3     3     2     3     1     3     1     3     3     2     3
## 10800 10801 10802 10803 10804 10805 10806 10807 10808 10809 10810 10811 10812
##     2     1     3     2     2     3     3     3     3     3     2     3     1
## 10813 10814 10815 10816 10817 10818 10819 10820 10821 10822 10823 10824 10825
##     2     3     2     3     3     3     3     3     2     2     3     3     1
## 10826 10827 10828 10829 10830 10831 10832 10833 10834 10835 10836 10837 10838
##     3     3     3     2     3     3     2     1     2     2     3     3     3
## 10839 10840 10841 10843 10844 10845 10846 10847 10848 10849 10850 10851 10852
##     3     1     2     3     1     2     2     3     1     2     2     3     2
## 10853 10854 10855 10856 10857 10858 10859 10860 10861 10862 10863 10864 10865
##     1     3     3     1     2     3     1     3     3     3     1     3     3
## 10866 10867 10868 10869 10870 10871 10872 10873 10874 10875 10876 10877 10878
##     2     3     3     3     3     1     3     3     1     1     2     2     3
## 10879 10880 10881 10882 10883 10884 10885 10886 10887 10888 10889 10890 10891
##     1     3     3     2     2     2     3     3     3     2     3     3     3
## 10892 10893 10894 10895 10896 10897 10898 10899 10900 10901 10902 10903 10904
##     3     3     1     3     3     3     1     1     3     3     3     1     2
## 10905 10906 10907 10908 10909 10910 10911 10912 10913 10914 10915 10916 10917
##     3     1     3     1     3     2     3     3     1     2     3     2     3
## 10918 10919 10920 10921 10922 10923 10924 10925 10926 10927 10928 10929 10930
##     2     3     3     3     1     3     2     3     3     3     1     3     3
## 10931 10932 10933 10934 10935 10936 10937 10938 10939 10940 10941 10942 10943
##     2     3     3     2     2     3     2     2     3     3     3     2     1
## 10944 10945 10946 10947 10948 10949 10950 10951 10952 10953 10954 10955 10956
##     2     3     3     3     2     1     2     2     2     3     3     3     2
## 10957 10958 10959 10960 10961 10962 10963 10964 10965 10966 10967 10968 10969
##     3     3     3     2     3     2     3     3     3     3     2     1     1
## 10970 10971 10972 10973 10974 10975 10976 10977 10978 10979 10980 10981 10982
##     2     1     3     3     3     3     1     1     1     3     3     3     3
## 10983 10984 10985 10986 10987 10988 10990 10991 10992 10993 10994 10995 10996
##     1     3     3     1     1     3     3     3     1     2     3     3     3
## 10997 10998 10999 11000 11001 11002 11003 11004 11005 11006 11007 11008 11009
##     1     3     3     3     1     1     1     3     3     3     3     2     3
## 11010 11011 11012 11013 11014 11015 11016 11017 11018 11019 11020 11021 11022
##     3     3     3     3     3     3     3     3     3     3     3     3     1
## 11023 11024 11025 11026 11027 11028 11029 11030 11031 11032 11033 11034 11035
##     3     2     1     2     1     3     3     1     1     3     2     1     3
## 11036 11037 11038 11039 11040 11041 11042 11043 11045 11046 11047 11048 11049
##     2     3     2     2     2     3     3     1     3     3     3     3     2
## 11050 11051 11052 11053 11054 11055 11056 11057 11058 11059 11060 11061 11062
##     3     2     3     3     1     1     1     3     2     3     3     2     3
## 11063 11064 11065 11066 11067 11068 11069 11070 11071 11072 11073 11074 11075
##     2     2     1     3     3     3     3     3     3     3     3     3     3
## 11076 11077 11078 11079 11080 11081 11082 11083 11084 11085 11086 11087 11088
##     3     1     3     3     3     1     3     1     3     1     3     3     3
## 11089 11090 11091 11092 11093 11094 11095 11096 11097 11098 11099 11100 11101
##     3     3     2     3     3     2     1     3     3     3     3     3     2
```

```
## 11102 11103 11104 11105 11106 11107 11108 11109 11110 11111 11112 11113 11114
##     1     2     1     2     3     1     3     2     3     3     3     1     3
## 11115 11116 11117 11118 11119 11120 11121 11122 11123 11124 11125 11126 11127
##     3     1     3     2     2     3     1     2     1     2     3     3     1
## 11128 11129 11130 11131 11132 11133 11134 11135 11136 11137 11138 11139 11140
##     3     3     2     3     3     1     3     3     2     2     2     2     2
## 11141 11142 11143 11144 11145 11146 11147 11148 11149 11150 11151 11152 11153
##     1     2     3     2     3     3     3     2     1     1     3     3     3
## 11154 11155 11156 11157 11158 11159 11160 11161 11162 11163 11164 11165 11166
##     2     2     3     2     3     1     3     1     2     3     3     3     2
## 11167 11168 11169 11170 11171 11172 11173 11174 11175 11176 11177 11178 11179
##     3     3     3     2     3     2     2     2     3     1     3     3     3
## 11180 11181 11182 11183 11184 11185 11186 11187 11188 11189 11190 11191 11192
##     2     2     1     3     3     3     2     3     1     1     3     3     1
## 11193 11194 11195 11196 11197 11198 11199 11200 11201 11202 11203 11204 11205
##     2     2     3     2     3     2     2     1     3     3     3     2     1
## 11207 11208 11209 11210 11211 11212 11213 11214 11215 11216 11217 11218 11219
##     2     2     3     1     3     1     2     1     3     3     3     2     3
## 11220 11221 11222 11223 11224 11225 11226 11227 11228 11229 11230 11231 11232
##     3     2     3     2     1     3     3     1     1     2     1     3     3
## 11233 11234 11235 11236 11237 11238 11239 11240 11241 11242 11243 11244 11245
##     1     3     2     2     3     1     3     2     2     3     3     3     3
## 11246 11247 11248 11249 11250 11251 11252 11253 11254 11255 11256 11257 11258
##     3     2     3     3     3     2     3     3     3     1     2     3     3
## 11259 11260 11261 11262 11263 11264 11265 11266 11267 11268 11269 11270 11271
##     3     1     3     3     3     3     3     2     3     3     3     1     3
## 11272 11273 11274 11275 11276 11277 11278 11279 11280 11281 11282 11283 11284
##     3     2     1     3     1     1     1     2     3     3     2     3     1
## 11285 11286 11287 11288 11289 11290 11291 11292 11293 11294 11295 11296 11297
##     3     1     1     2     3     3     1     3     2     1     2     3     2
## 11298 11299 11300 11301 11302 11303 11304 11305 11306 11307 11308 11309 11310
##     2     3     2     3     3     3     3     1     3     3     2     3     3
## 11311 11312 11313 11314 11315 11316 11317 11318 11319 11320 11321 11322 11323
##     3     3     3     2     3     3     2     1     3     2     1     3     3
## 11324 11325 11326 11327 11328 11329 11330 11331 11332 11333 11334 11335 11336
##     3     3     2     3     3     3     3     3     1     1     3     3     1
## 11337 11338 11339 11340 11341 11342 11343 11344 11345 11346 11347 11348 11349
##     3     3     3     2     3     3     3     3     3     2     3     3     3
## 11350 11351 11352 11353 11354 11355 11356 11357 11358 11359 11360 11361 11362
##     3     3     2     1     3     3     2     2     2     3     3     3     2
## 11363 11364 11365 11366 11367 11368 11369 11370 11371 11372 11373 11374 11375
##     3     3     1     3     2     1     3     2     1     3     3     1     3
## 11376 11377 11378 11379 11380 11381 11382 11383 11384 11385 11386 11387 11388
##     3     3     1     3     3     1     3     3     3     3     2     2     2
## 11389 11390 11391 11392 11393 11394 11395 11396 11397 11398 11399 11400 11401
##     3     3     2     2     3     2     3     3     2     1     1     1     3
## 11402 11403 11404 11406 11407 11408 11409 11410 11411 11412 11413 11414 11415
##     3     3     1     1     3     1     2     1     3     2     3     3     3
## 11416 11417 11418 11419 11420 11421 11422 11423 11424 11425 11426 11427 11428
##     3     3     3     2     3     3     2     3     2     3     3     3     3
## 11429 11430 11431 11432 11433 11434 11435 11436 11437 11438 11439 11440 11441
##     1     1     2     3     3     3     2     1     2     1     3     2     1
## 11442 11443 11444 11445 11446 11447 11448 11449 11450 11451 11452 11453 11454
##     2     3     3     3     3     3     3     2     3     1     2     2     3
```

```
## 11455 11456 11457 11458 11459 11460 11461 11462 11463 11464 11465 11466 11467
##     2     1     3     1     2     3     3     1     2     3     2     2     3
## 11468 11469 11470 11471 11472 11473 11474 11475 11476 11477 11478 11479 11480
##     3     3     3     3     3     3     3     3     2     3     3     3     3
## 11481 11482 11483 11484 11485 11486 11487 11488 11489 11490 11491 11492 11493
##     2     3     3     2     3     2     1     1     2     2     1     3     3
## 11494 11495 11496 11497 11498 11499 11500 11501 11502 11503 11504 11505 11506
##     2     3     3     3     1     3     3     1     3     1     3     3     3
## 11507 11508 11509 11510 11511 11512 11513 11514 11515 11516 11517 11518 11519
##     2     2     2     3     1     3     3     3     3     3     1     3     1
## 11520 11521 11522 11523 11525 11526 11527 11528 11529 11530 11531 11532 11533
##     3     3     2     3     3     2     3     3     2     3     1     1     3
## 11534 11535 11536 11537 11538 11539 11540 11541 11542 11543 11544 11545 11546
##     1     2     3     3     3     3     2     3     1     2     3     3     2
## 11547 11548 11549 11550 11551 11552 11553 11554 11555 11556 11557 11558 11559
##     2     3     3     3     2     3     1     2     3     3     3     3     3
## 11560 11561 11562 11563 11564 11565 11566 11567 11568 11569 11570 11571 11572
##     2     2     3     3     1     3     2     3     3     2     1     2     1
## 11573 11574 11575 11576 11577 11578 11579 11580 11581 11583 11584 11585 11586
##     2     3     3     3     3     3     3     3     2     3     1     3     2
## 11587 11588 11589 11590 11591 11592 11593 11594 11595 11596 11597 11598 11599
##     3     3     3     2     3     3     3     2     3     3     3     2     3
## 11600 11601 11602 11603 11604 11605 11606 11607 11608 11609 11610 11611 11612
##     2     3     2     2     3     3     3     3     3     2     3     1     1
## 11613 11614 11615 11616 11617 11618 11619 11620 11621 11622 11623 11624 11626
##     2     3     2     2     2     3     1     3     3     3     3     2     2
## 11627 11628 11629 11630 11631 11632 11633 11634 11635 11636 11637 11638 11639
##     3     3     3     2     2     3     2     3     3     3     3     2     2
## 11640 11641 11642 11643 11644 11645 11646 11647 11648 11649 11650 11651 11652
##     3     1     2     3     2     1     3     3     3     3     1     1     3
## 11653 11654 11655 11656 11657 11658 11660 11661 11662 11663 11664 11665 11666
##     1     3     3     2     3     3     3     3     3     3     3     2     3
## 11667 11668 11669 11670 11671 11672 11673 11674 11675 11676 11677 11678 11679
##     3     3     3     2     2     1     2     2     3     2     2     3     3
## 11680 11681 11682 11683 11684 11685 11686 11687 11688 11689 11690 11691 11692
##     1     3     1     2     3     3     2     3     3     2     3     3     2
## 11693 11694 11695 11696 11697 11698 11699 11700 11701 11702 11703 11704 11705
##     3     1     3     3     3     3     1     3     2     3     3     1     3
## 11706 11707 11708 11709 11710 11711 11712 11713 11714 11715 11716 11717 11718
##     3     3     3     3     3     3     3     3     3     2     3     3     1
## 11719 11720 11721 11722 11723 11724 11725 11726 11727 11728 11729 11730 11731
##     1     2     3     3     3     3     1     3     1     3     3     3     3
## 11732 11733 11735 11736 11737 11738 11739 11740 11741 11742 11743 11744 11745
##     3     3     2     3     3     1     2     3     3     3     2     3     3
## 11746 11747 11749 11750 11751 11752 11753 11754 11755 11756 11757 11758 11759
##     3     3     3     3     3     3     3     3     3     3     2     2     3
## 11760 11761 11762 11763 11764 11765 11766 11767 11768 11769 11770 11771 11772
##     2     2     3     1     2     3     2     2     2     1     3     3     2
## 11773 11774 11775 11776 11777 11778 11779 11780 11781 11782 11783 11784 11785
##     3     3     3     2     3     1     1     3     3     3     3     3     1
## 11786 11787 11788 11789 11790 11791 11792 11793 11794 11795 11796 11797 11798
##     3     1     3     3     2     3     3     3     2     3     2     3     3
## 11799 11800 11801 11803 11804 11805 11806 11807 11808 11809 11810 11811 11812
##     3     3     3     3     1     3     3     1     3     2     2     3     3
```

```
## 11813 11815 11816 11817 11818 11819 11820 11821 11822 11823 11824 11825 11826
##     1     2     3     2     2     2     1     2     1     2     3     3     1
## 11827 11829 11830 11831 11832 11833 11834 11835 11836 11837 11838 11839 11840
##     3     3     3     3     2     3     1     2     3     3     3     3     2
## 11841 11842 11843 11844 11845 11846 11847 11848 11849 11850 11851 11852 11853
##     3     3     3     3     3     2     2     3     3     3     2     3     1
## 11854 11855 11856 11857 11858 11859 11860 11861 11862 11863 11864 11865 11866
##     3     3     3     1     2     3     3     3     3     3     3     1     1
## 11867 11868 11869 11870 11871 11872 11873 11874 11875 11876 11877 11878 11879
##     1     2     3     3     3     2     1     3     3     3     1     3     1
## 11880 11881 11882 11883 11884 11885 11886 11887 11888 11889 11890 11891 11892
##     1     1     3     3     3     2     1     3     3     3     2     3     3
## 11893 11894 11895 11896 11897 11898 11899 11900 11901 11902 11903 11904 11905
##     1     3     1     3     2     3     3     3     2     3     3     3     2
## 11906 11907 11908 11909 11910 11911 11912 11913 11914 11915 11916 11917 11918
##     2     3     3     2     2     1     3     1     1     3     3     3     2
## 11919 11920 11921 11922 11923 11924 11925 11926 11927 11928 11929 11930 11931
##     1     3     3     1     3     3     1     3     2     2     2     3     3
## 11932 11933 11934 11936 11937 11938 11940 11941 11942 11943 11944 11945 11946
##     2     3     2     3     3     3     2     3     3     3     2     3     3
## 11947 11948 11949 11950 11951 11952 11953 11954 11955 11956 11957 11958 11959
##     1     3     1     3     2     2     2     3     3     3     1     2     3
## 11960 11961 11962 11963 11964 11965 11966 11967 11968 11969 11970 11971 11972
##     3     3     3     2     2     3     3     2     3     2     2     3     3
## 11973 11974 11975 11976 11977 11978 11979 11980 11981 11982 11983 11984 11985
##     3     3     3     3     3     3     3     2     3     2     3     3     3
## 11986 11987 11988 11989 11990 11991 11992 11993 11994 11995 11996 11997 11998
##     2     2     3     1     3     3     3     2     3     3     3     3     3
## 11999 12000 12001 12002 12003 12004 12005 12006 12007 12008 12009 12010 12011
##     2     2     2     3     3     2     3     1     1     3     3     3     1
## 12012 12013 12014 12015 12016 12017 12018 12019 12020 12021 12022 12023 12024
##     3     1     3     3     3     3     3     3     3     3     2     1     3
## 12025 12026 12027 12028 12029 12030 12031 12032 12033 12034 12035 12036 12037
##     2     2     1     1     3     3     1     1     3     3     3     3     3
## 12038 12039 12040 12041 12042 12043 12044 12045 12046 12047 12048 12049 12050
##     3     3     2     2     1     3     3     3     2     2     1     1     3
## 12051 12052 12053 12054 12055 12056 12057 12058 12059 12060 12061 12062 12063
##     3     1     1     3     3     3     2     2     1     3     1     3     1
## 12064 12065 12066 12067 12068 12069 12070 12071 12072 12073 12074 12075 12076
##     3     3     3     3     3     3     3     3     1     3     1     3     2
## 12077 12078 12079 12080 12081 12082 12083 12084 12085 12086 12087 12088 12089
##     2     3     3     3     2     2     3     3     3     3     1     3     2
## 12090 12091 12092 12093 12094 12095 12096 12097 12098 12099 12100 12101 12102
##     3     3     3     1     3     3     3     1     2     3     2     3     1
## 12103 12104 12105 12106 12107 12108 12109 12110 12111 12112 12113 12114 12115
##     1     3     3     2     3     1     2     2     3     2     2     3     3
## 12116 12117 12118 12119 12120 12121 12122 12123 12124 12125 12126 12127 12128
##     3     3     2     3     3     3     3     3     3     3     3     3     3
## 12129 12130 12131 12132 12133 12134 12135 12136 12137 12138 12139 12140 12141
##     3     3     3     3     3     3     3     2     2     3     2     3     1
## 12142 12143 12144 12145 12146 12147 12148 12149 12150 12151 12152 12153 12154
##     3     3     3     3     3     1     3     3     3     3     2     3     2
## 12155 12156 12157 12158 12159 12161 12162 12163 12164 12165 12166 12167 12168
##     2     3     2     2     1     1     3     1     3     3     3     2     3
```

```
## 12169 12170 12171 12172 12173 12174 12175 12176 12177 12178 12179 12180 12182
##     2     3     3     2     2     3     1     1     3     2     2     3     3
## 12183 12184 12185 12187 12188 12189 12190 12191 12192 12193 12194 12195 12196
##     3     3     3     3     3     2     1     3     2     3     2     1     3
## 12197 12198 12199 12200 12201 12202 12203 12204 12205 12206 12207 12208 12209
##     3     2     2     3     1     3     3     2     3     3     1     1     3
## 12210 12211 12212 12213 12214 12215 12216 12217 12218 12219 12220 12221 12222
##     2     1     3     3     2     3     3     1     3     2     3     3     2
## 12223 12224 12225 12226 12227 12228 12229 12230 12231 12232 12233 12234 12235
##     3     3     2     3     3     1     3     3     3     1     1     3     2
## 12236 12237 12238 12239 12240 12241 12242 12243 12244 12245 12246 12247 12248
##     3     3     3     2     3     1     1     3     2     3     3     3     2
## 12249 12250 12251 12252 12253 12254 12255 12256 12257 12258 12259 12260 12261
##     3     1     3     1     1     2     2     3     3     2     3     3     3
## 12262 12263 12264 12265 12266 12267 12268 12269 12270 12271 12272 12273 12274
##     1     1     3     3     1     3     3     1     3     3     3     3     3
## 12275 12276 12277 12278 12279 12280 12281 12282 12283 12284 12285 12286 12287
##     2     1     3     3     3     2     1     1     3     1     3     3     1
## 12288 12289 12290 12291 12292 12293 12294 12295 12296 12297 12298 12299 12300
##     1     2     3     3     3     2     3     1     2     3     3     3     3
## 12301 12302 12303 12304 12305 12306 12307 12308 12309 12310 12311 12312 12313
##     3     3     3     2     3     3     1     3     3     3     1     3     3
## 12314 12315 12316 12317 12318 12319 12320 12321 12322 12323 12324 12325 12326
##     3     3     2     3     3     2     3     3     3     3     2     3     3
## 12327 12328 12329 12330
##     2     2     2     3
```

```
fact_data <- as.numeric(shop.class)
table(res$cluster, fact_data)
```

```
##    fact_data
##        0    1
##   1 2002  360
##   2 1712  319
##   3 6589 1229
```

```
fact = c("Region", "TrafficType","Weekend")
for (i in fact) {
    shop[, i] = as.numeric(shop[, i])
}
```

```
sapply(factdata, class)
```

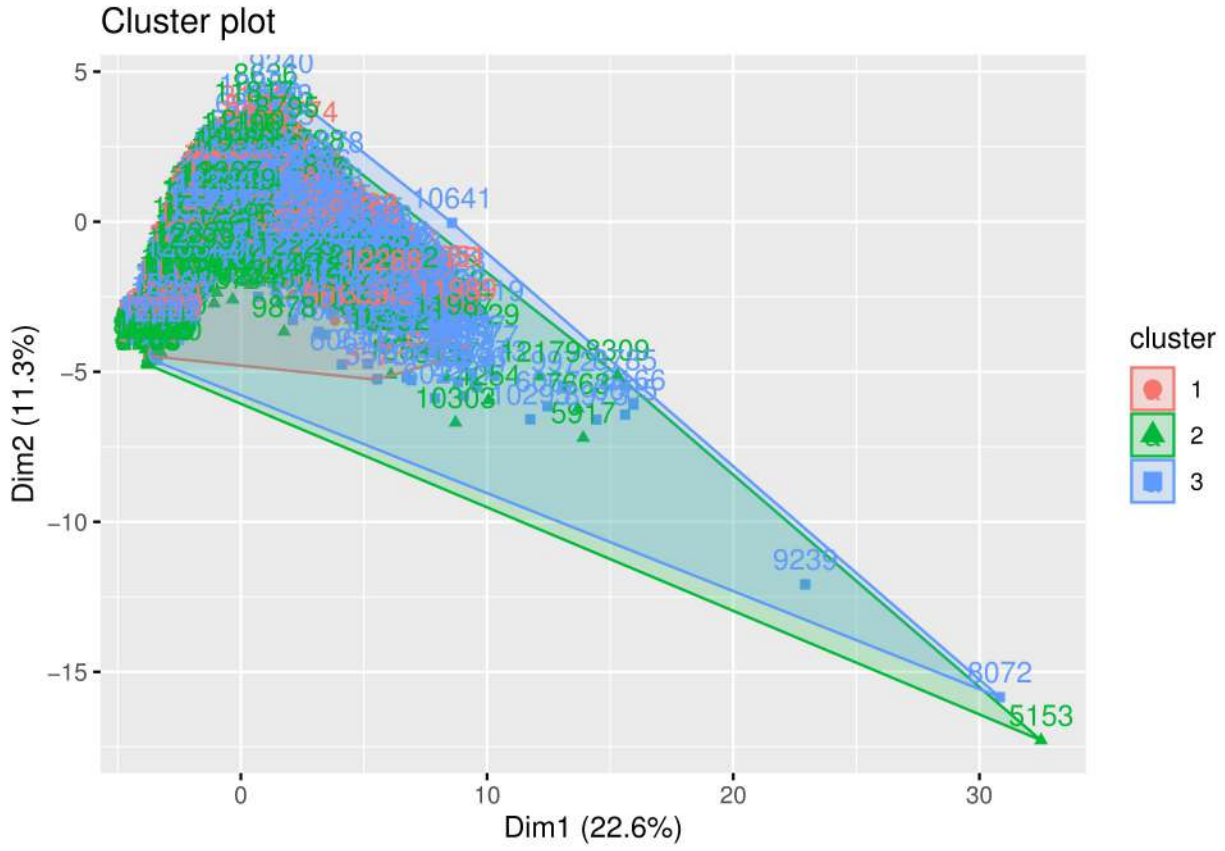
```
##          Administrative Administrative_Duration           Informational
##               "numeric"               "numeric"               "numeric"
##  Informational_Duration          ProductRelated ProductRelated_Duration
##               "numeric"               "numeric"               "numeric"
##             BounceRates               ExitRates              PageValues
##               "numeric"               "numeric"               "numeric"
##              SpecialDay        OperatingSystems                 Browser
##               "numeric"               "integer"               "integer"
##                  Region             TrafficType                 Weekend
##               "numeric"               "integer"               "logical"
```

```
library("factoextra")
```

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

```
library("cluster")
```

```
#visualization of the cluster
fviz_cluster(res, data = factdata)
```




```
mean(factdata == res$cluster)
```

```
## [1] 0.05422433
```

The appropriate number of clusters for this model is 3 for the best results. **Hierarchical clustering**

```
# Before hierarchical clustering, we can compute some descriptive statistics
# ---
#
desc_stats <- data.frame(
  Min = apply(factdata, 2, min),    # minimum
  Med = apply(factdata, 2, median), # median
  Mean = apply(factdata, 2, mean),  # mean
  SD = apply(factdata, 2, sd),      # Standard deviation
```

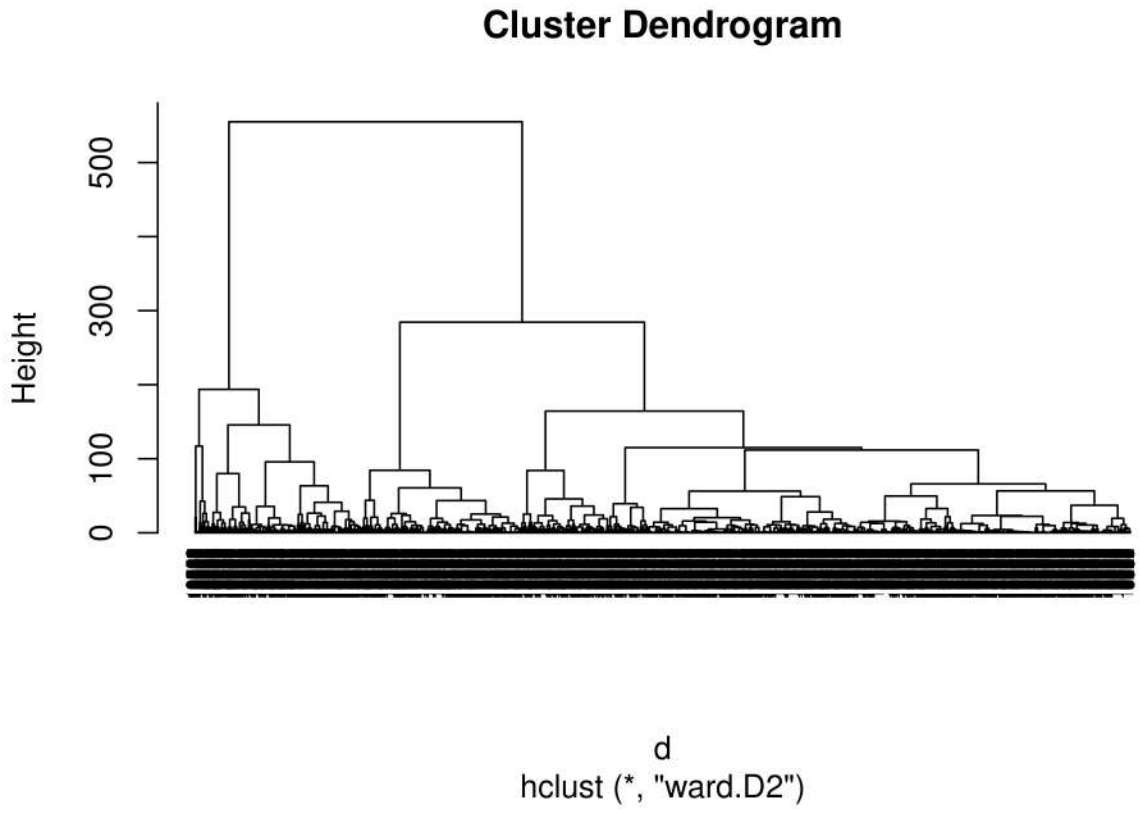
```
  Max = apply(factdata, 2, max)      # Maximum
)
desc_stats <- round(desc_stats, 1)
head(desc_stats)
```

```
##                           Min Med Mean  SD Max
## Administrative              0   0  0.1 0.1   1
## Administrative_Duration     0   0  0.0 0.1   1
## Informational               0   0  0.0 0.1   1
## Informational_Duration      0   0  0.0 0.1   1
## ProductRelated              0   0  0.0 0.1   1
## ProductRelated_Duration     0   0  0.0 0.0   1
```

```
# Calculating euclidean distances of the independent variables.

d <- dist(factdata, method = "euclidean")
```

```
# using the hclust clustering method.
hie <- hclust(d, method = "ward.D2" )
```

```
# plotting the dendogram
plot(hie, cex = 0.6, hang = -1)
```



```
# Cut tree into 2 groups.
sub_grp = cutree (hie, k = 2)
table (sub_grp)
```

```
## sub_grp
##     1     2
## 10023  2188
```

```
table (sub_grp, shop.class)
```

```
##         shop.class
## sub_grp FALSE TRUE
##       1  8454 1569
##       2  1849  339
```

```
#checking accuracy
mean(sub_grp == shop.class)
```

```
## [1] 0.1284907
```

challenging the solution

DBSCAN

```
# Loading the required library
library("dbscan")

# Applying our DBSCAN algorithm
# using a minimum of 4 points with in a distance of eps(0.4)
#
l = c('OperatingSystems','Browser','Region','TrafficType')
for (i in l){
    factdata[,i] = as.numeric(factdata[,i])
}
db_model <- dbscan(factdata,eps=0.4,MinPts = 4)
```

```
## Warning in dbscan(factdata, eps = 0.4, MinPts = 4): converting argument MinPts
## (fpc) to minPts (dbscan)!
```

```
print(db_model)
```

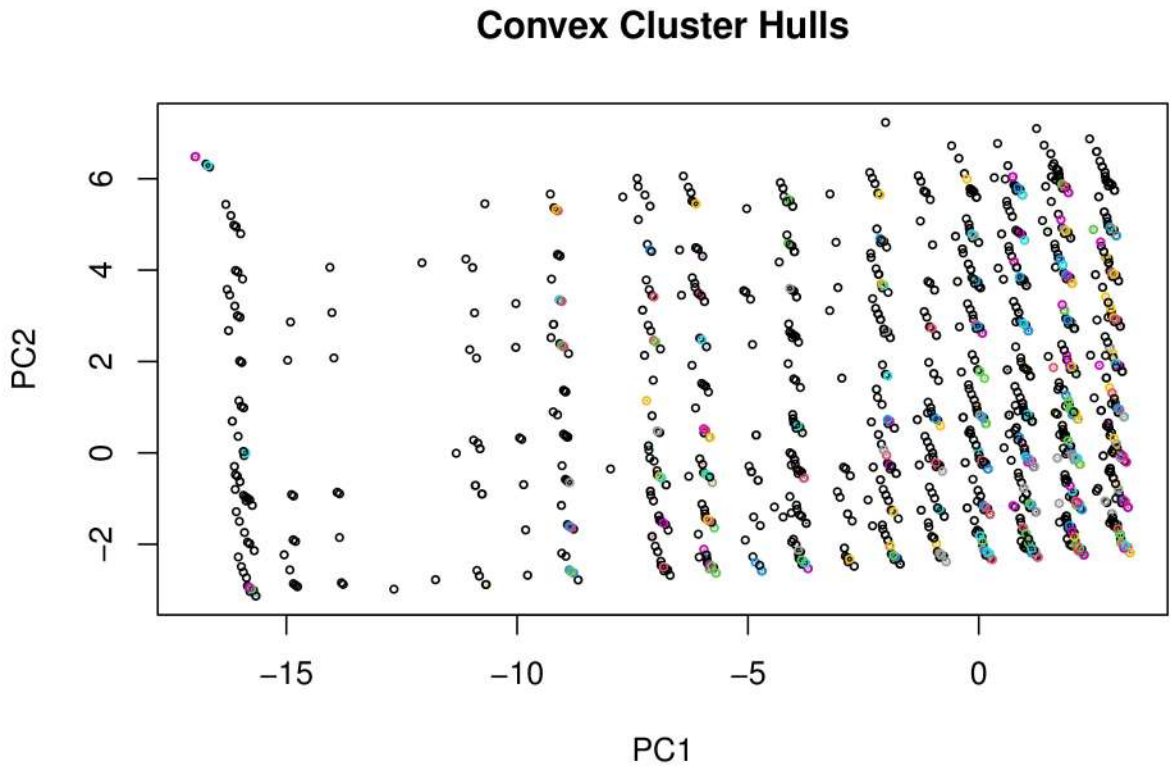
```
## DBSCAN clustering for 12211 objects.
## Parameters: eps = 0.4, minPts = 4
## The clustering contains 496 cluster(s) and 2403 noise points.
##
##    0    1    2    3    4    5    6    7    8    9   10   11   12   13   14   15
## 2403   10  571   12  213    4   66   78   40  186   24   50   14   26    5    9
##   16   17   18   19   20   21   22   23   24   25   26   27   28   29   30   31
##   54   13   93   23  310   42   69   17   10    7    9   26    7  212  109    4
##   32   33   34   35   36   37   38   39   40   41   42   43   44   45   46   47
```

```
##   10   82  101    5    4  161    6   92   36   19   38   10   28   87   56   36
##   48   49   50   51   52   53   54   55   56   57   58   59   60   61   62   63
##    7   24   11   26   10   11   13   35   14    5    4   38   43    6    8    7
##   64   65   66   67   68   69   70   71   72   73   74   75   76   77   78   79
##   24    9   13   10   21   86    8   19   30   41   20    4  262  119   63    9
##   80   81   82   83   84   85   86   87   88   89   90   91   92   93   94   95
##  101   64   16    7    7   30   49    9   24   15   59    4   13   29   36    8
##   96   97   98   99  100  101  102  103  104  105  106  107  108  109  110  111
##   68   28   12    7   40   97   24   14    5   35   46   43   34   20    8   10
##  112  113  114  115  116  117  118  119  120  121  122  123  124  125  126  127
##   32    6   26   17   21    5    4    8   59   63    4   89   30   16   27   22
##  128  129  130  131  132  133  134  135  136  137  138  139  140  141  142  143
##   18  142    4   10    4   11    6   19   63    8   57   24    7   15   10    9
##  144  145  146  147  148  149  150  151  152  153  154  155  156  157  158  159
##   23   22   26   17   25   16    6   10   12    7   14    8   26   20    4  126
##  160  161  162  163  164  165  166  167  168  169  170  171  172  173  174  175
##    5   40   27   40   27    7    4   13   20    9   16    6   23   11    4    6
##  176  177  178  179  180  181  182  183  184  185  186  187  188  189  190  191
##   15    6   54   27   16    6   19   12   19    8    6   11    8    5    4   12
##  192  193  194  195  196  197  198  199  200  201  202  203  204  205  206  207
##   14   78   22    8   12   33   10   42    5   16    7   47   14    4    7    4
##  208  209  210  211  212  213  214  215  216  217  218  219  220  221  222  223
##    5   11    9    8   19   23   50   16   13   18    5   26    7   12    4    5
##  224  225  226  227  228  229  230  231  232  233  234  235  236  237  238  239
##   25    4    8   13    4   17   10    5    5    4    8   11   14    5    6   11
##  240  241  242  243  244  245  246  247  248  249  250  251  252  253  254  255
##   30   13    4   20    6   18    6    7    8    5    9   12    4    5   12    4
##  256  257  258  259  260  261  262  263  264  265  266  267  268  269  270  271
##    9   14   12    5    6   22    7    5    5   15    8    4   12    5    6    4
##  272  273  274  275  276  277  278  279  280  281  282  283  284  285  286  287
##    6    4    4   19    5   23    5    7    4    4    6    8    8    6   13  112
##  288  289  290  291  292  293  294  295  296  297  298  299  300  301  302  303
##    5    6    5   13    6    6    4    5    5    4    4    4   28    5   11    7
##  304  305  306  307  308  309  310  311  312  313  314  315  316  317  318  319
##   12    4    8   10   13    8    4    7   10    4   10    8   12    4   11    4
##  320  321  322  323  324  325  326  327  328  329  330  331  332  333  334  335
##    4    7   14    9   10    8   12   10   30    7   20   13  134    8   11    5
##  336  337  338  339  340  341  342  343  344  345  346  347  348  349  350  351
##    5    5    9   29    4   15    4   11   52   25   20   39   19    5    7    4
##  352  353  354  355  356  357  358  359  360  361  362  363  364  365  366  367
##   54   24    5   31   13    6    6    8   14    5    4   27    6    5   12    4
##  368  369  370  371  372  373  374  375  376  377  378  379  380  381  382  383
##    6    9   13    5    5    5    4    6    8    6   10    4    5    4   14   13
##  384  385  386  387  388  389  390  391  392  393  394  395  396  397  398  399
##    5   13    6    7    5    7    5    7    4   10    7    5    9    4    4    5
##  400  401  402  403  404  405  406  407  408  409  410  411  412  413  414  415
##    7    4    4   10    7    4    5    7    5    4    5    4    7    4    4    4
##  416  417  418  419  420  421  422  423  424  425  426  427  428  429  430  431
##    4    8    5    4    4    4    7    5    5    4    4   13    7    7    6   22
##  432  433  434  435  436  437  438  439  440  441  442  443  444  445  446  447
##    4    7    5    4    4    4    6    4    4    6    8    6    5    4    4    5
##  448  449  450  451  452  453  454  455  456  457  458  459  460  461  462  463
##    7    4    5    4    4    9    4    6   10    4   19    5    5   10    5    4
##  464  465  466  467  468  469  470  471  472  473  474  475  476  477  478  479
```

```
##    4    4    4    4    4    4    6    4    4    4    9    4    4   43   14    9
##  480  481  482  483  484  485  486  487  488  489  490  491  492  493  494  495
##    6    9   11    4    4    4    8    4    6    4    5    4    3    4    4    4
##  496
##    4
##
## Available fields: cluster, eps, minPts
```

```
library(dbscan)
hullplot(factdata,db_model$cluster)
```

```
## Warning in hullplot(factdata, db_model$cluster): Not enough colors. Some colors
## will be reused.
```



Conclusion and Recommendations From the above models performed, K-means has the most clear clusters. I would recommend Kira Plastinina marketers to use K-means for customer segmentation. Also DBSCAN would also be another alternative.