R Notebook

Introduction

a) **Specifying the Question**

The main objective of the study is to identify customer groups and their characteristics thus aiding Kira Plastinina's Sales and Marketing team in formulating their strategies.

b) **Defining the Metric for Success**

- Determining and visualising the descriptive statistics of the variables in the dataset.
- Identifying customer groups through clustering methods.
- Identifying the characteristics of clusters.

c) **Understanding the context**

Sales and Marketing teams aim to maximise a business' profit. Being able to understand a customer's behaviour allows for the planning of more targeted and effective campaigns, as different customer groups may prioritise different products or services.

d) **Recording the Experimental Design**

- Determine the main objectives.
- Load and preview the dataset.
- Understand the data.
- Prepare the dataset - Identify outliers, anomalies, duplicates, missing values, and determine how deal with them, drop unnecessary columns etc.
- Analyse the dataset using univariate, bivariate, and multivariate analysis techniques.
- Challenge the solution.
- Conclusion and recommendations

e) **Data Relevance**

The dataset provided (here) is relevant to the research question. It has relevant information on customer behaviour on the website.

Loading the dataset

```
#loading some required libraries
library(readr)
library(data.table)
library(caret)
```

```
## Loading required package: ggplot2

## Loading required package: lattice

library(psych)

##
## Attaching package: 'psych'

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

library(Metrics)

##
## Attaching package: 'Metrics'

## The following objects are masked from 'package:caret':
##
##     precision, recall

library(Amelia)

## Loading required package: Rcpp

## ##
## ## Amelia II: Multiple Imputation
## ## (Version 1.8.0, built: 2021-05-26)
## ## Copyright (C) 2005-2022 James Honaker, Gary King and Matthew Blackwell
## ## Refer to http://gking.harvard.edu/amelia/ for more information
## ##

library(tidyverse)

## ── Attaching packages
## ─────────────────────────────────────
## tidyverse 1.3.2 ──

## ✓ tibble  3.1.7     ✓ dplyr   1.0.9
## ✓ tidyr   1.2.0     ✓ stringr 1.4.0
## ✓ purrr   0.3.4     ✓ forcats 0.5.1
## ── Conflicts ──────────────────────────────────────
tidyverse_conflicts() ──
## ✕ psych::%+%()       masks ggplot2::%+%()
## ✕ psych::alpha()     masks ggplot2::alpha()
## ✕ dplyr::between()   masks data.table::between()
## ✕ dplyr::filter()    masks stats::filter()
## ✕ dplyr::first()     masks data.table::first()
## ✕ dplyr::lag()       masks stats::lag()
## ✕ dplyr::last()      masks data.table::last()
```

```
## ✖ purrr::lift()      masks caret::lift()
## ✖ purrr::transpose() masks data.table::transpose()

df <- fread("http://bit.ly/EcommerceCustomersDataset")

df <- data.frame(df)
```

Checking the Data

Determining the no. of records in the dataset:

```
dim(df)

## [1] 12330    18

#the dataset has 12330 rows and 18  columns
```

Previewing the top of the dataset:

```
head(df)

##   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
```

Previewing the bottom of the dataset:

```
tail(df)

##       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
```

Checking datatype of each column:

```
str(df)
```

```
## 'data.frame':    12330 obs. of  18 variables:
##  $ Administrative         : int  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" "Returning_Visitor" ...
##  $ Weekend                : logi  FALSE FALSE FALSE FALSE TRUE FALSE ...
##  $ Revenue                : logi  FALSE FALSE FALSE FALSE FALSE FALSE ...
```

Tidying the Dataset

```
#checking column names
colnames(df)
```

```
##  [1] "Administrative"          "Administrative_Duration"
##  [3] "Informational"           "Informational_Duration"
##  [5] "ProductRelated"          "ProductRelated_Duration"
##  [7] "BounceRates"             "ExitRates"
##  [9] "PageValues"              "SpecialDay"
## [11] "Month"                   "OperatingSystems"
## [13] "Browser"                 "Region"
## [15] "TrafficType"             "VisitorType"
## [17] "Weekend"                 "Revenue"
```

```
#converting column names to lowercase
colnames(df) = tolower(colnames(df))
colnames(df)
```

```
##  [1] "administrative"          "administrative_duration"
##  [3] "informational"           "informational_duration"
##  [5] "productrelated"          "productrelated_duration"
##  [7] "bouncerates"             "exitrates"
##  [9] "pagevalues"              "specialday"
```

```
## [11] "month"                    "operatingsystems"
## [13] "browser"                  "region"
## [15] "traffictype"              "visitortype"
## [17] "weekend"                  "revenue"

#checking for missing values
data.frame(colSums(is.na(df)))

##                          colSums.is.na.df..
## administrative                           14
## administrative_duration                  14
## informational                            14
## informational_duration                   14
## productrelated                           14
## productrelated_duration                  14
## bouncerates                              14
## exitrates                                14
## pagevalues                                0
## specialday                                0
## month                                     0
## operatingsystems                          0
## browser                                   0
## region                                    0
## traffictype                               0
## visitortype                               0
## weekend                                   0
## revenue                                   0
```

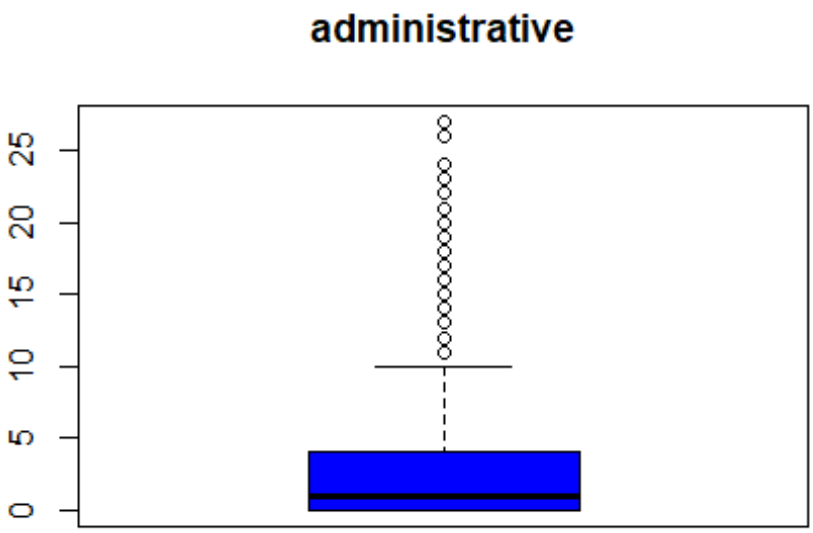
There were 14 missing values in administrative, administrative_duration, informational, informational_duration, productrelated, productrelated_duration, bouncerates, and exitrates columns. Given that the dataset has 12330 rows, the missing values will be dropped

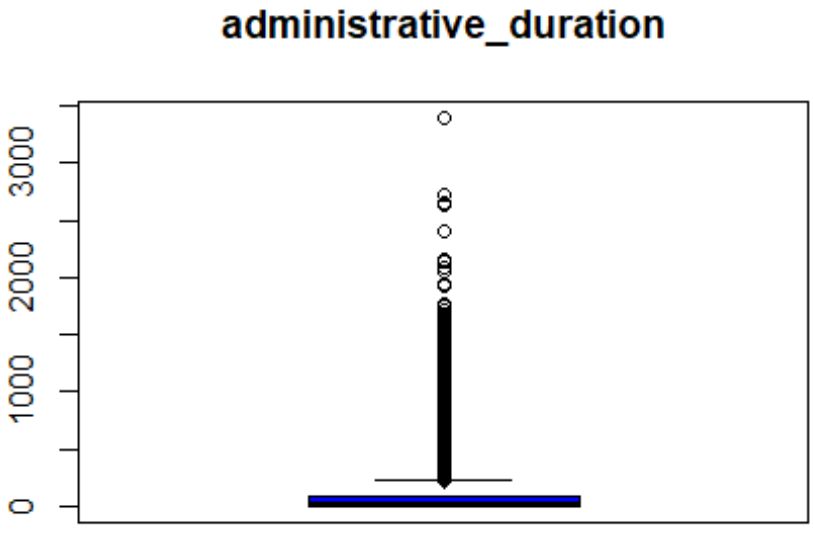
```
#dropping missing values
df <- na.omit(df)

#the 14 nulls have been dropped
print(data.frame(colSums(is.na(df))))

##                          colSums.is.na.df..
## administrative                           0
## administrative_duration                  0
## informational                            0
## informational_duration                   0
## productrelated                           0
## productrelated_duration                  0
## bouncerates                              0
## exitrates                                0
## pagevalues                               0
## specialday                               0
## month                                    0
```

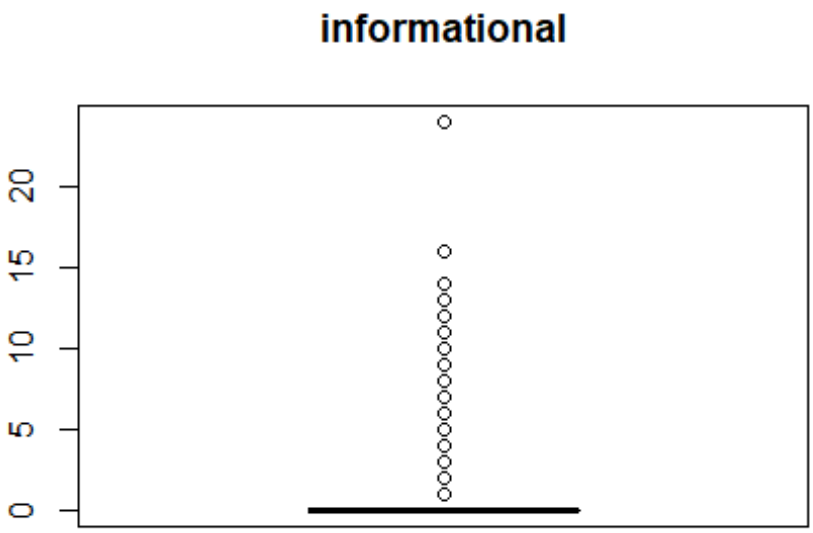
```
## operatingsystems                          0
## browser                                   0
## region                                    0
## traffictype                               0
## visitortype                               0
## weekend                                   0
## revenue                                   0

print(dim(df))

## [1] 12316    18

#checking for duplicates
nrow(df[duplicated(df),])

## [1] 117
```

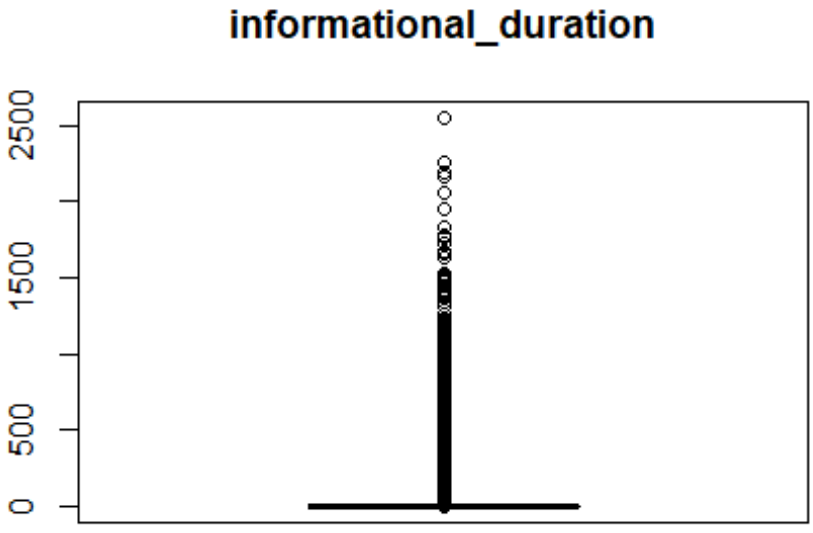
There were 117 duplicates which will not be dropped because it is possible for user behaviour and characteristics on the website to be similar.

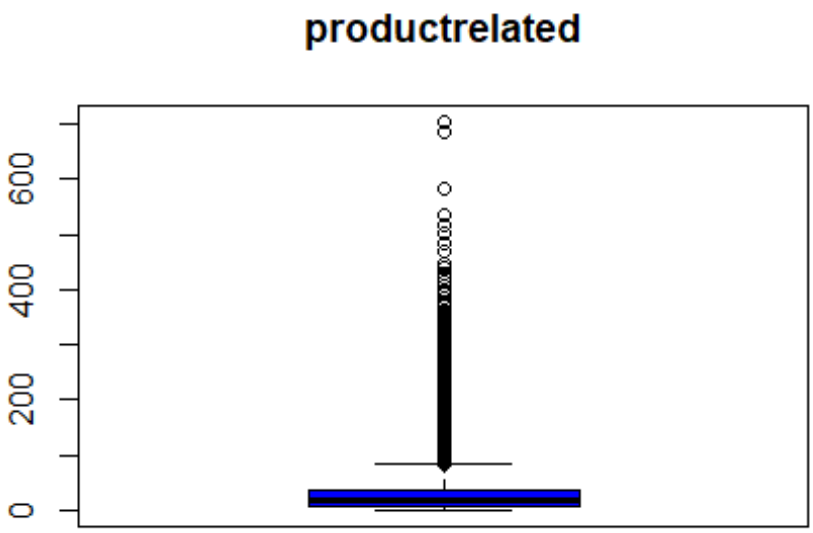
```
#separating continuous and categorical
colnames(df)

##  [1] "administrative"          "administrative_duration"
##  [3] "informational"           "informational_duration"
##  [5] "productrelated"          "productrelated_duration"
##  [7] "bouncerates"             "exitrates"
##  [9] "pagevalues"              "specialday"
## [11] "month"                   "operatingsystems"
## [13] "browser"                 "region"
## [15] "traffictype"             "visitortype"
## [17] "weekend"                 "revenue"

contin = c( "administrative","administrative_duration",
"informational","informational_duration",
"productrelated","productrelated_duration",
"bouncerates","exitrates","pagevalues")
cat = c("specialday", "month", "operatingsystems", "browser", "region",
"traffictype", "visitortype", "weekend", "revenue")

#checking for outliers in continuous columns
for (x in contin){
  boxplot(df[x], main=x, xlab=x, col="blue")
}
```

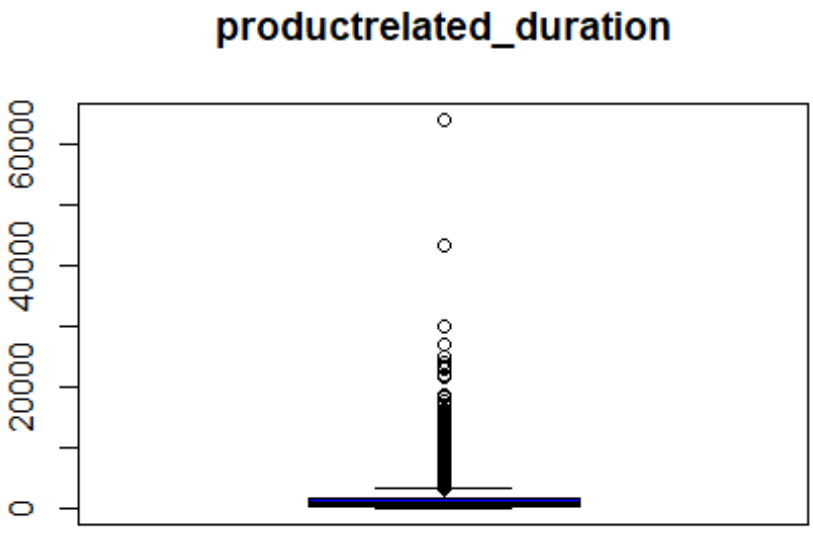

administrative
0
5
10
15
20
25
administrative

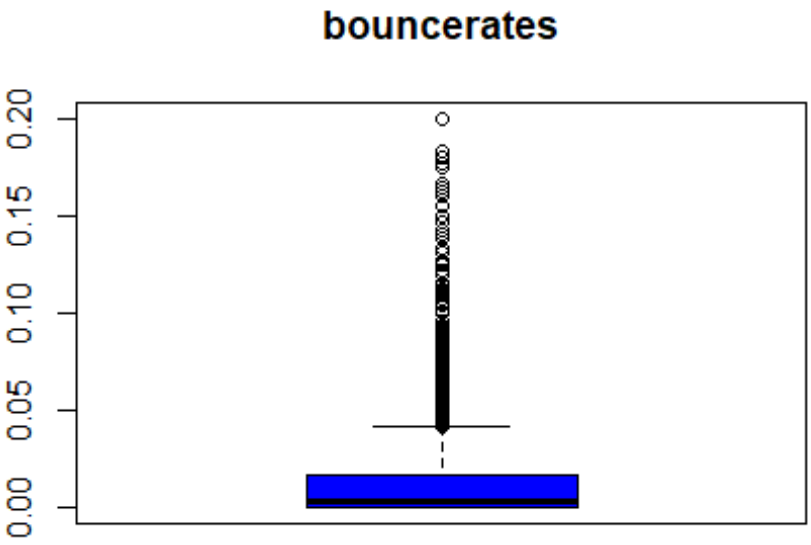

administrative_duration
0
1000
2000
3000
administrative_duration

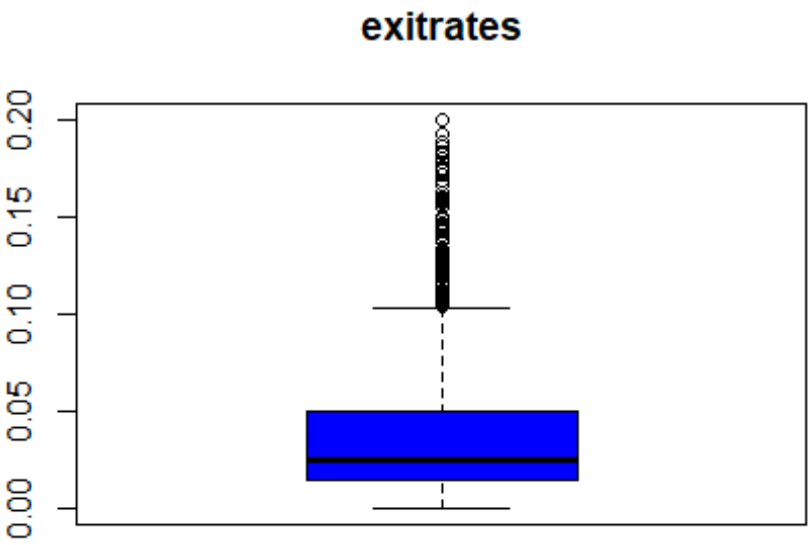

informational
0
5
10
15
20
informational

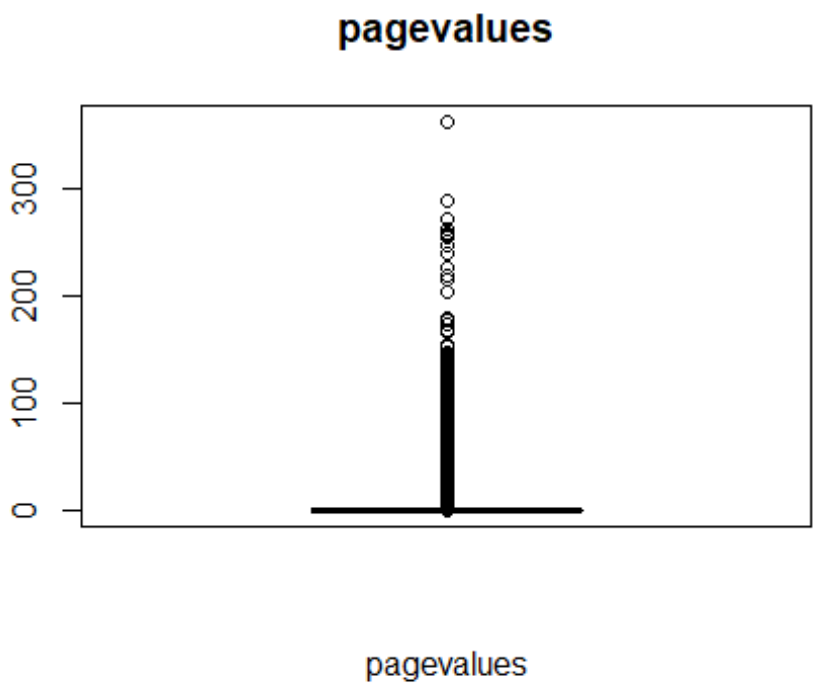

informational_duration
0
500
1500
2500
informational_duration


productrelated
0
200
400
600
productrelated


productrelated_duration
0
20000
40000
60000
productrelated_duration


bouncerates
0.00
0.05
0.10
0.15
0.20
bouncerates


exitrates
0.00
0.05
0.10
0.15
0.20
exitrates



There were outliers in the “administrative”,“administrative_duration”, “informational”,“informational_duration”, “productrelated”, “productrelated_duration”, “bouncerates”, “exitrates” and “pagevalues” columns. They will not be dropped as it is possible for some users to have spent longer than average on the site navigating through the numerous webpages.

```
#checking for anomalies in continuous
#the number of different types of pages visited by the visitor in the session
and total time spent in each of these page categories should not be less than
zero.

for (x in contin){
  print(paste(x, nrow(subset(df, df[x] < 0))))
}
```

```
## [1] "administrative 0"
## [1] "administrative_duration 33"
## [1] "informational 0"
## [1] "informational_duration 33"
## [1] "productrelated 0"
## [1] "productrelated_duration 33"
## [1] "bouncerates 0"
## [1] "exitrates 0"
## [1] "pagevalues 0"
```

```
dim(df)
```

```
## [1] 12316    18
```

```
#dropping observations that have the values above < 0 as those are anomalies

df <- subset(df, df["administrative_duration"] >= 0)

#checking that the 33 observations have been dropped

print(dim(df))
```

```
## [1] 12283    18
```

```
for (x in contin){
  print(paste(x, nrow(subset(df, df[x] < 0))))
}
```

```
## [1] "administrative 0"
## [1] "administrative_duration 0"
## [1] "informational 0"
## [1] "informational_duration 0"
## [1] "productrelated 0"
## [1] "productrelated_duration 0"
## [1] "bouncerates 0"
## [1] "exitrates 0"
## [1] "pagevalues 0"
```

```
#checking for number of unique values in categorical columns
for (x in cat){
  print(paste(x, length(unique(df[[x]]))))
}
```

```
## [1] "specialday 6"
## [1] "month 10"
## [1] "operatingsystems 8"
## [1] "browser 13"
## [1] "region 9"
## [1] "traffictype 20"
## [1] "visitortype 3"
## [1] "weekend 2"
## [1] "revenue 2"
```

```
#checking for anomalies in categorical

for (x in cat){
  print(x)
  print(unique(df[[x]]))

  print("****************************************")
}
```

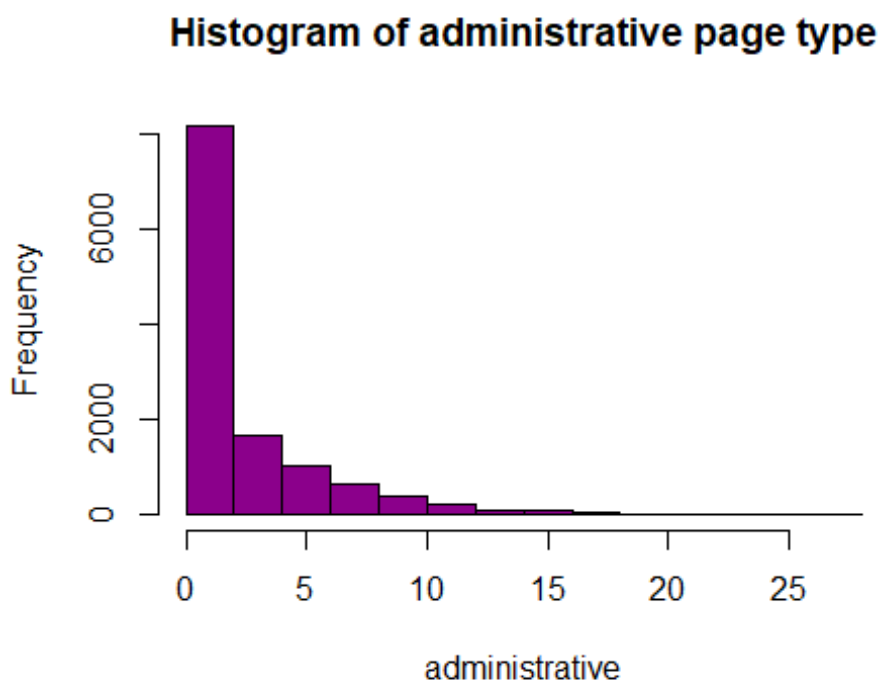
```
## [1] "specialday"
## [1] 0.0 0.8 0.4 1.0 0.2 0.6
## [1] "****************************************"
## [1] "month"
##  [1] "Feb"  "Mar"  "May"  "Oct"  "June" "Jul"  "Aug"  "Nov"  "Sep"  "Dec"
## [1] "****************************************"
## [1] "operatingsystems"
## [1] 1 2 3 4 7 6 8 5
## [1] "****************************************"
## [1] "browser"
##  [1]  1  2  3  4  5  6  7 10  8  9 12 13 11
## [1] "****************************************"
## [1] "region"
## [1] 1 2 3 4 9 5 6 7 8
## [1] "****************************************"
## [1] "traffictype"
##  [1]  1  2  4  3  5  6  7  8  9 10 11 12 13 14 15 18 19 16 17 20
## [1] "****************************************"
## [1] "visitortype"
## [1] "Returning_Visitor" "New_Visitor"       "Other"
## [1] "****************************************"
## [1] "weekend"
## [1] FALSE  TRUE
## [1] "****************************************"
## [1] "revenue"
## [1] FALSE  TRUE
## [1] "****************************************"
```

No anomalous values observed

Univariate Analysis

```
#loading ggplot 2 library for visualisation
library(ggplot2)

contin

## [1] "administrative"          "administrative_duration"
## [3] "informational"           "informational_duration"
## [5] "productrelated"          "productrelated_duration"
## [7] "bouncerates"             "exitrates"
## [9] "pagevalues"

#statistical summary of administrative variable
data.frame(describe(df$administrative))

##    vars     n     mean       sd median  trimmed    mad min max range
skew
## X1    1 12283 2.323862 3.325128      1 1.638852 1.4826   0  27    27
1.954851
##    kurtosis         se
## X1 4.674564 0.03000241
```

```r
#plotting administrative histogram
hist(df$administrative, col="darkmagenta",
     main="Histogram of administrative page type",
     xlab="administrative")
```

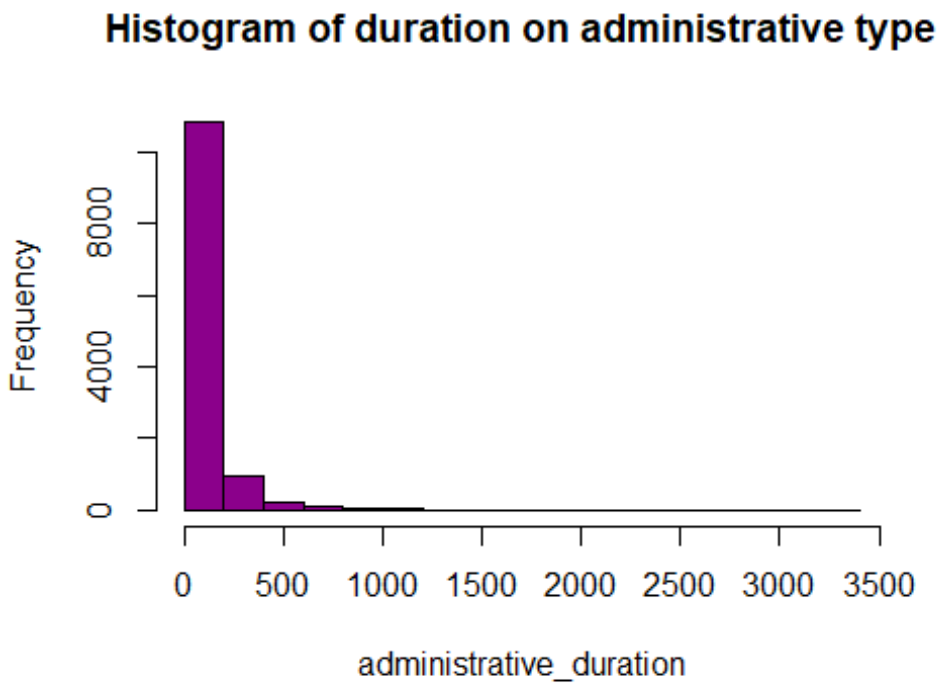


The number of administrative page types visited in a given session mostly ranged from 0 to 2.

```r
#statistical sumary of administrative_duration
describe(df$administrative_duration)
```

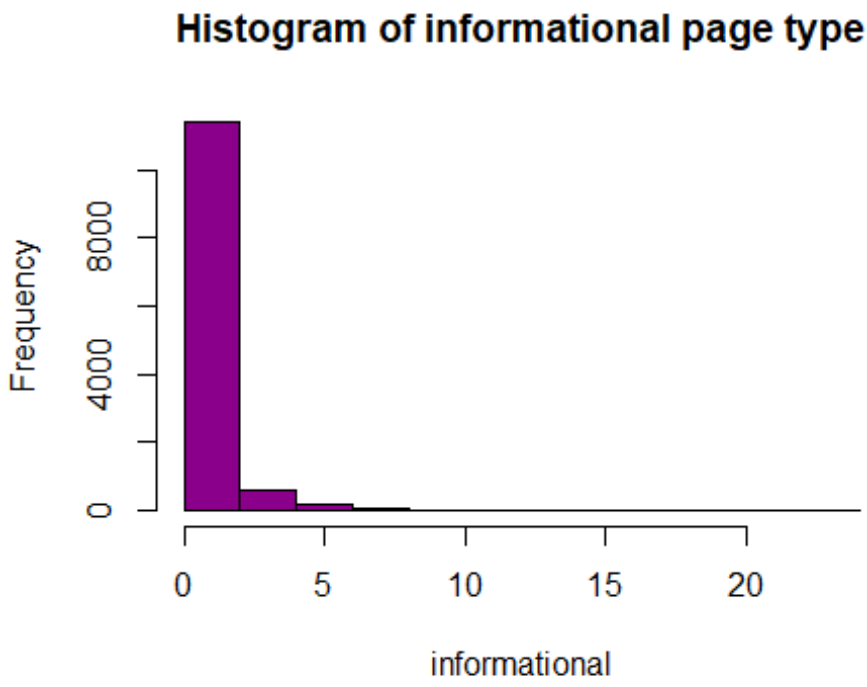
```
##    vars     n  mean     sd median trimmed   mad min     max   range skew
## X1    1 12283 81.13 177.05      8   42.37 11.86   0 3398.75 3398.75 5.61
##    kurtosis  se
## X1    50.37 1.6
```

```r
#histogram of administrative_duration
hist(df$administrative_duration, col="darkmagenta",
     main="Histogram of duration on administrative type",
     xlab="administrative_duration")
```



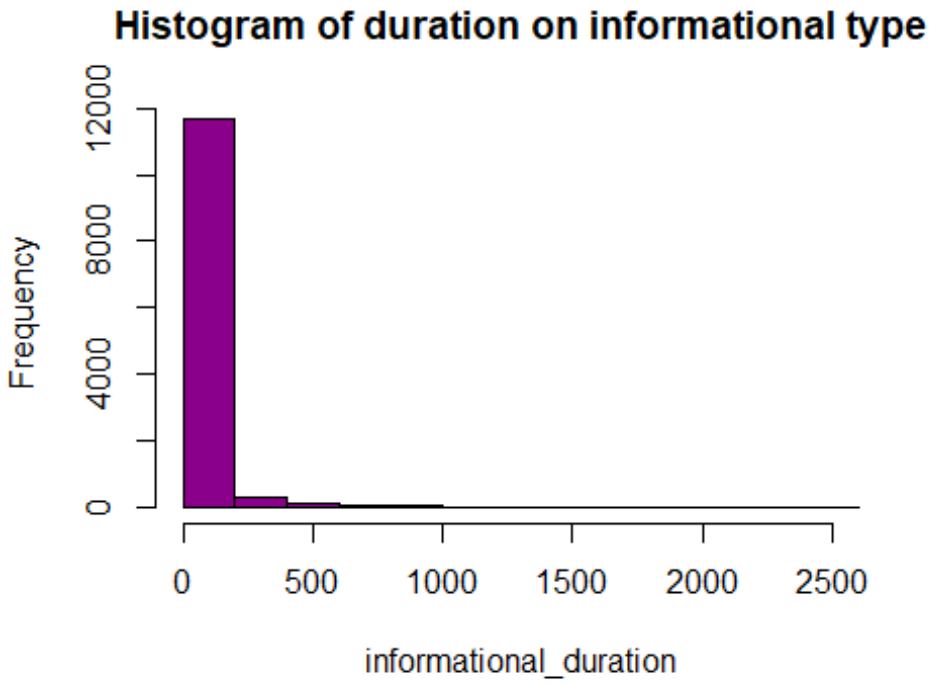
The duration on administrative page types in a given session mostly ranged from 0 to 200.

```
#statistical sumary of informational variable
describe(df$informational)

##    vars     n mean   sd median trimmed mad min max range skew kurtosis
se
## X1    1 12283 0.51 1.27      0    0.18   0   0  24    24 4.03    26.82
0.01

#histogram of informational
hist(df$informational, col="darkmagenta",
     main="Histogram of informational page type",
     xlab="informational")
```



The number of informational page types visited in a given session mostly ranged from 0 to 2.

```
#statistical summary of informational_duration variable
describe(df$informational_duration)

##    vars     n mean  sd median trimmed mad min     max   range skew
kurtosis
## X1    1 12283 34.6 141      0    3.63   0   0 2549.38 2549.38 7.56
75.98
##      se
## X1 1.27

#histogram of informational_duration
hist(df$informational_duration, col="darkmagenta",
     main="Histogram of duration on informational type",
     xlab="informational_duration")
```

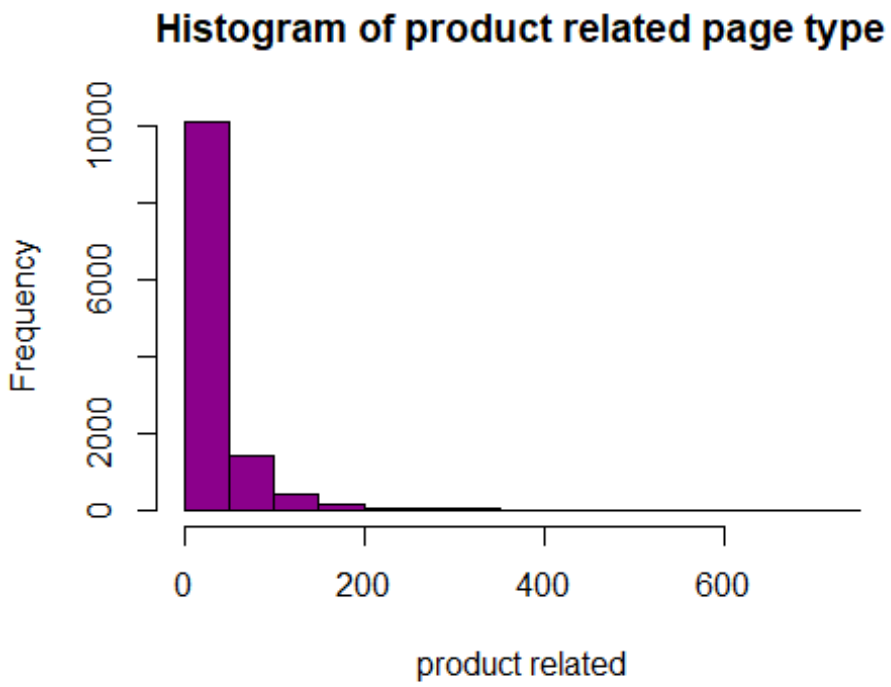


The duration on informational page types visited in a given session mostly ranged from 0 to 200.

```
#statistical sumary of productrelated variable
describe(df$productrelated)
```

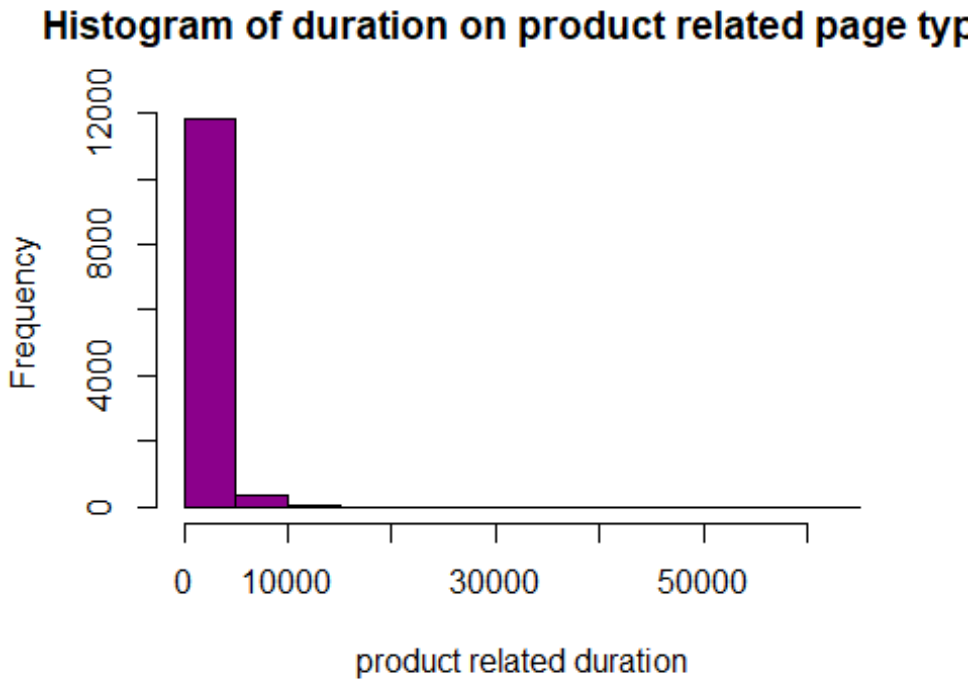
```
##    vars     n  mean    sd median trimmed   mad min max range skew kurtosis
se
## X1    1 12283 31.85 44.52     18   22.86 19.27   0 705   705 4.34    31.14
0.4
```

```
#histogram of productrelated
hist(df$productrelated, col="darkmagenta",
     main="Histogram of product related page type",
     xlab="product related")
```



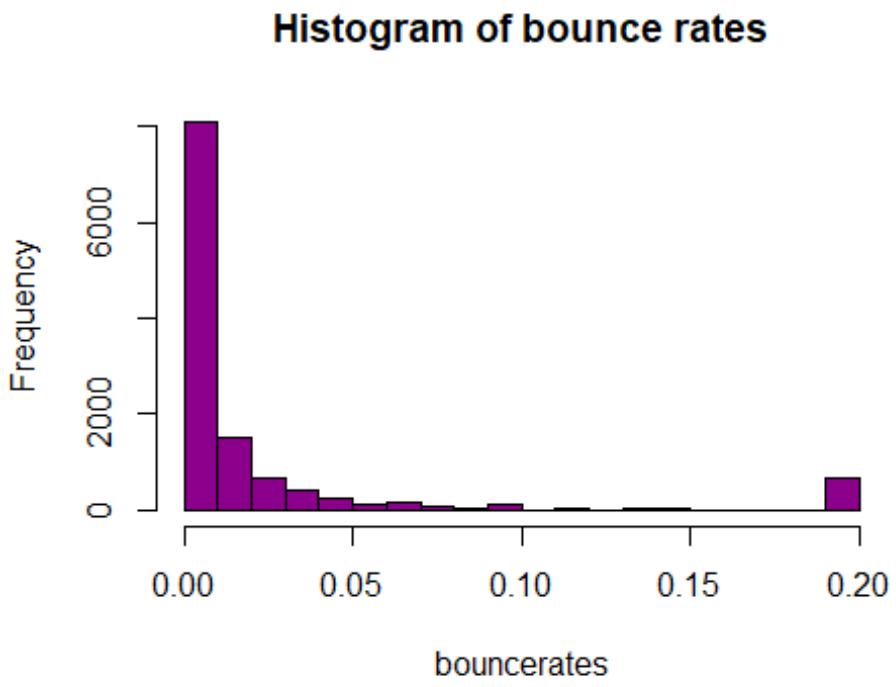
The number of product related page types visited in a given session mostly ranged from 0 to 50.

```
#statistical sumary of productrelated_duration variable
describe(df$productrelated_duration)

##    vars     n    mean      sd median trimmed    mad min      max    range
skew
## X1    1 12283 1199.25 1915.94  602.5  824.43 744.39   0 63973.52 63973.52
7.26
##    kurtosis    se
## X1    136.9 17.29

#histogram of productrelated_duration
hist(df$productrelated_duration, col="darkmagenta",
     main="Histogram of duration on product related page type",
     xlab="product related duration")
```



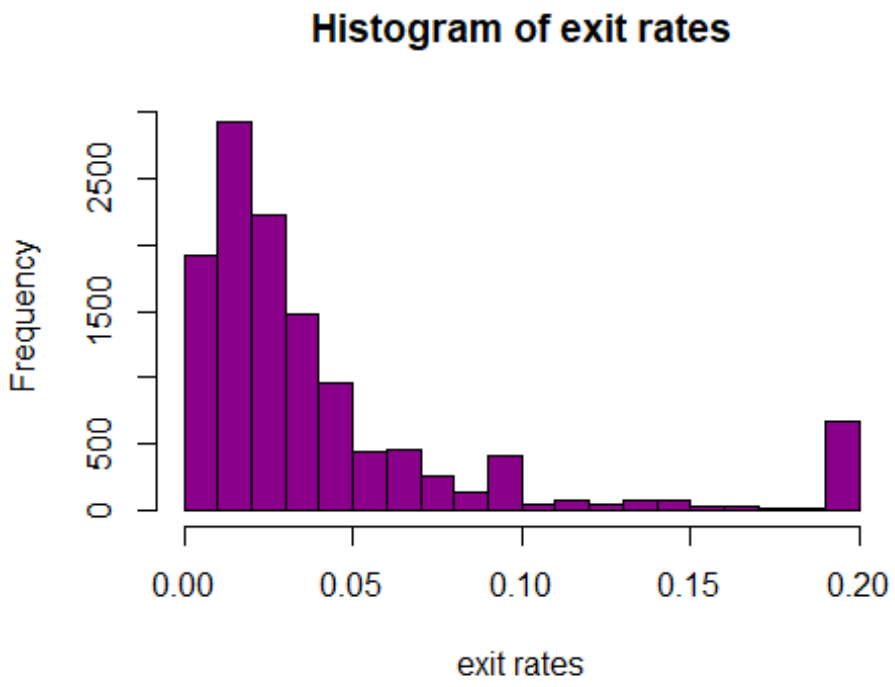
The duration on product-related page types in a given session mostly ranged from 0 to 5000.

```
contin

## [1] "administrative"          "administrative_duration"
## [3] "informational"           "informational_duration"
## [5] "productrelated"          "productrelated_duration"
## [7] "bouncerates"             "exitrates"
## [9] "pagevalues"

#statistical sumary of bouncerates variable
describe(df$bouncerates)

##    vars     n mean   sd median trimmed mad min max range skew kurtosis se
## X1    1 12283 0.02 0.05      0    0.01   0   0 0.2   0.2    3      8.1  0

#histogram of bouncerates
hist(df$bouncerates, col="darkmagenta",
     main="Histogram of bounce rates",
     xlab="bouncerates")
```



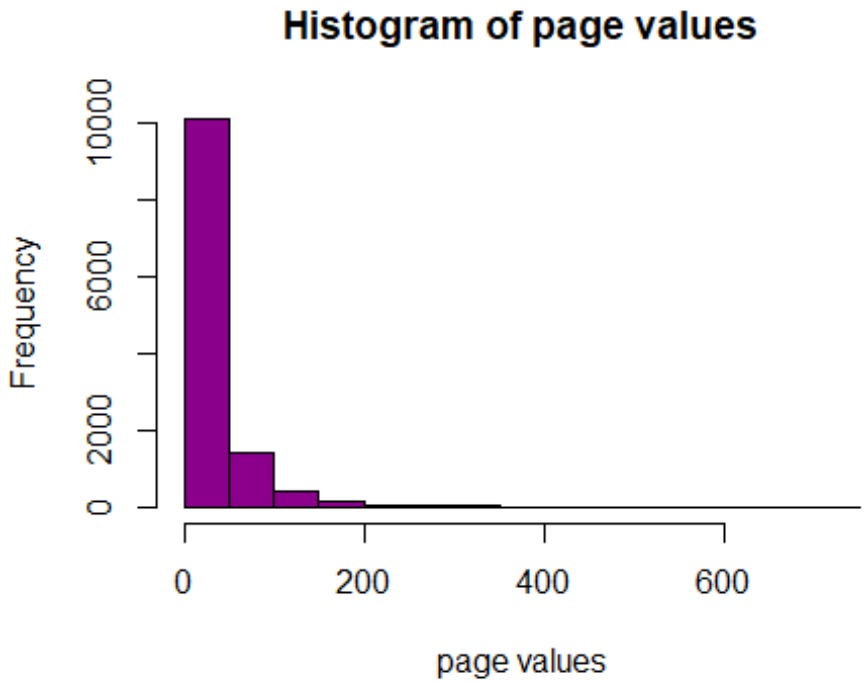
Bounce rates mostly ranged from 0 to 0.01

```
#statistical sumary of exitrates variable
describe(df$exitrates)

##    vars     n mean   sd median trimmed  mad min max range skew kurtosis se
## X1    1 12283 0.04 0.05   0.03    0.03 0.02   0 0.2   0.2 2.17     4.18  0

#histogram of exitrates
hist(df$exitrates, col="darkmagenta",
     main="Histogram of exit rates",
     xlab="exit rates")
```



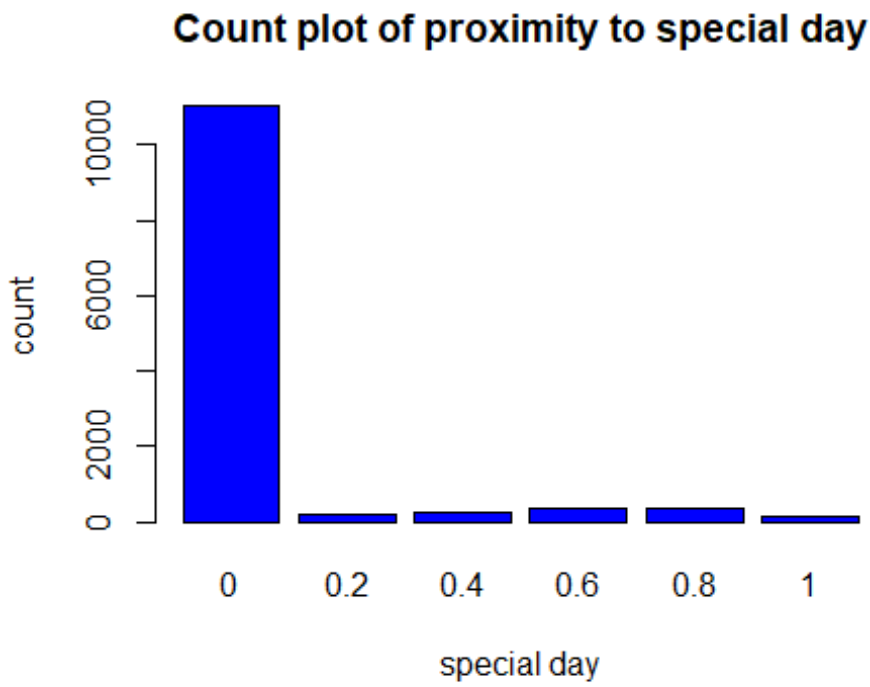
Exit rates mostly ranged from 0.01 to 0.02

```
#statistical sumary of page values variable
describe(df$pagevalues)

##    vars     n mean   sd median trimmed mad min    max  range skew kurtosis
se
## X1    1 12283 5.91 18.6      0    1.31   0   0 361.76 361.76 6.37    65.36
0.17

#histogram of page values
hist(df$productrelated, col="darkmagenta",
     main="Histogram of page values",
     xlab="page values")
```



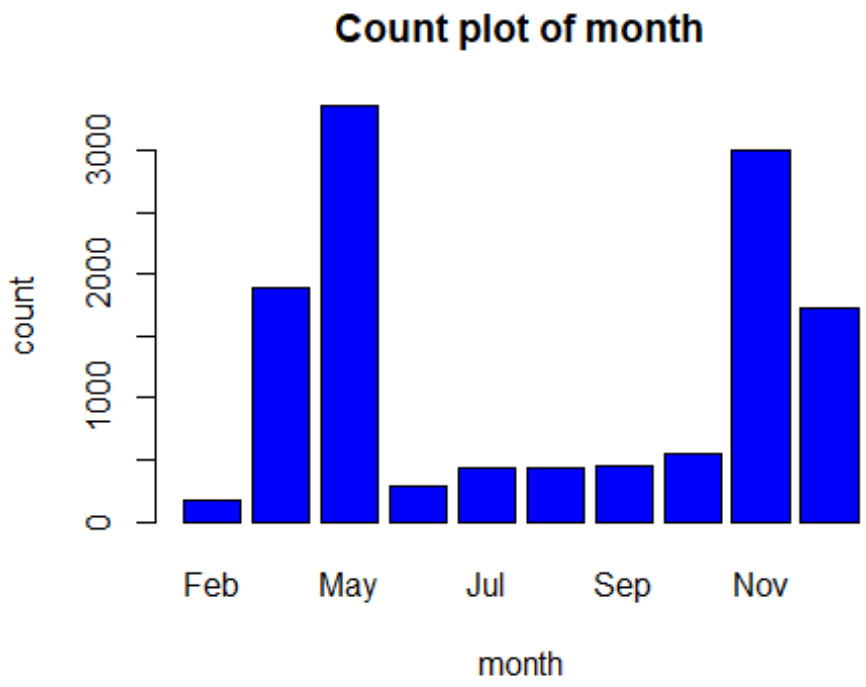
Page values mostly ranged from 0 to 50

```
cat

## [1] "specialday"       "month"            "operatingsystems" "browser"
## [5] "region"           "traffictype"      "visitortype"      "weekend"
## [9] "revenue"

#Count plot of specialday
barplot(table(df$specialday), col="blue", main="Count plot of proximity to
special day",
        xlab = "special day", ylab="count")
```



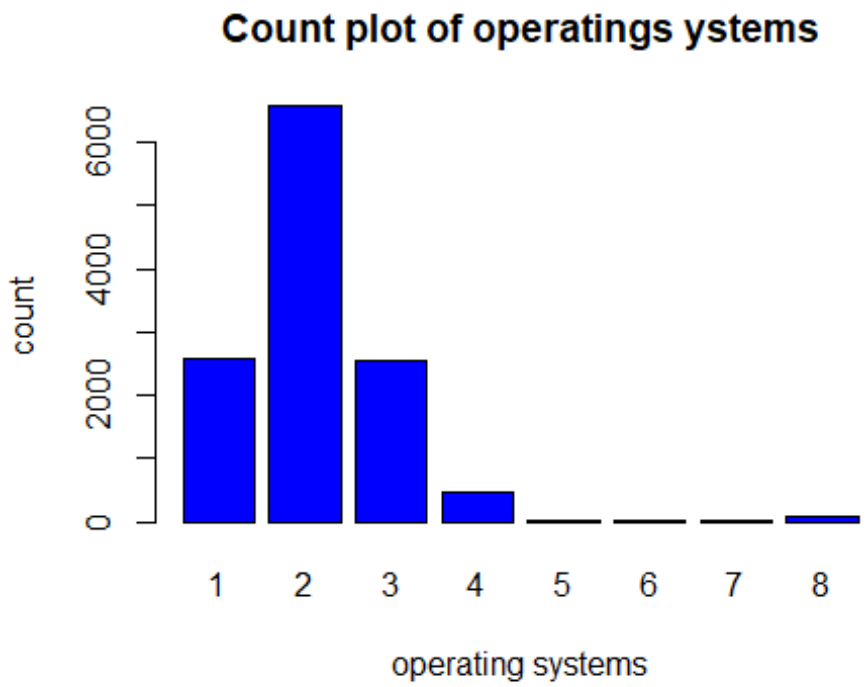
closeness of the site visiting time to a specific special day. Most visits were not close to a special day

```
#count plot of month
df2 <- copy(df)
df2$month <- factor(df$month, levels=c("Feb", "Mar", "May", "June", "Jul",
"Aug", "Sep", "Oct", "Nov", "Dec" ), ordered = TRUE)

barplot(table(df2$month), col="blue", main="Count plot of month",
        xlab = "month", ylab="count")
```



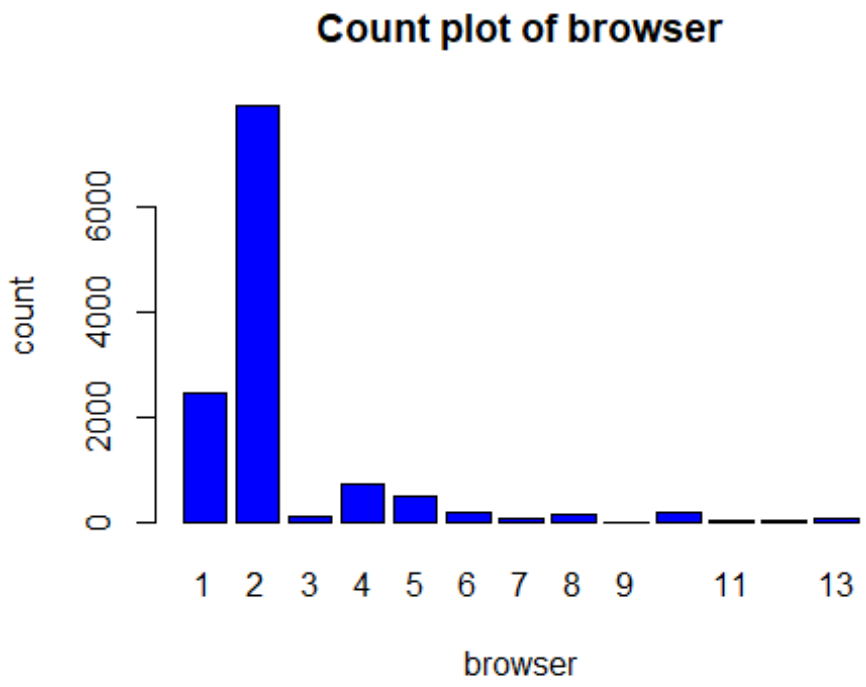
May was the month with the most visits according to the dataset

```
#count plot of  operatingsystems
barplot(table(df$operatingsystems), col="blue", main="Count plot of
operatings ystems",
        xlab = "operating systems", ylab="count")
```



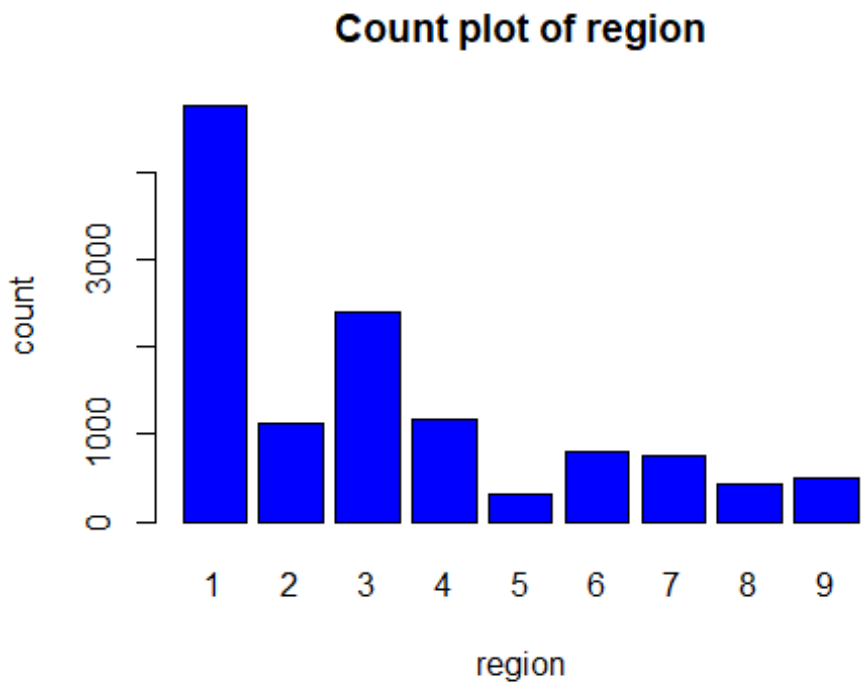
Operating system type 2 was the most common

```
#count plot of browser
barplot(table(df$browser), col="blue", main="Count plot of browser",
        xlab = "browser", ylab="count")
```



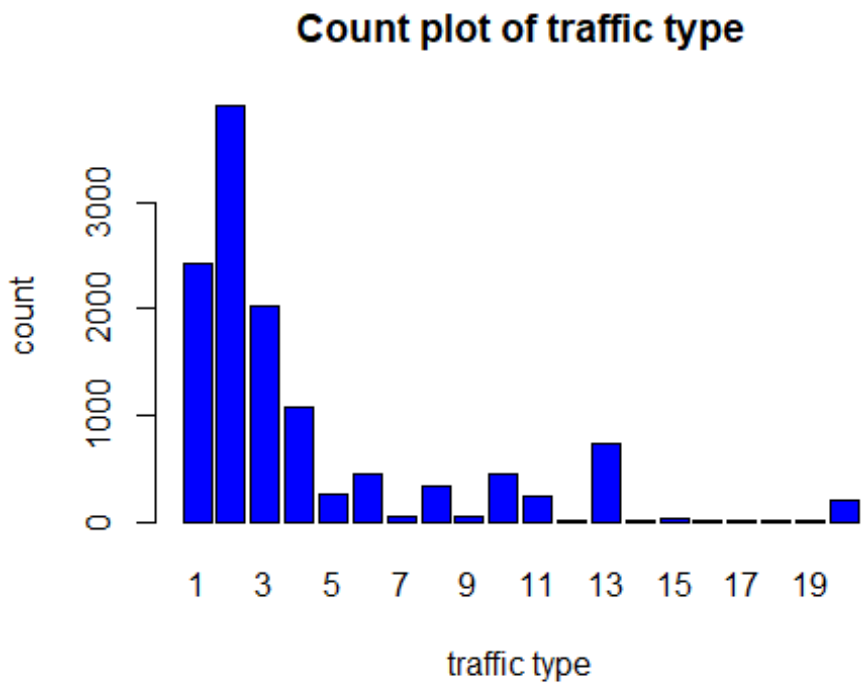
Browser 2 was the most used browser

```
#count plot of region
barplot(table(df$region), col="blue",
        main="Count plot of region",
        xlab = "region", ylab="count")
```



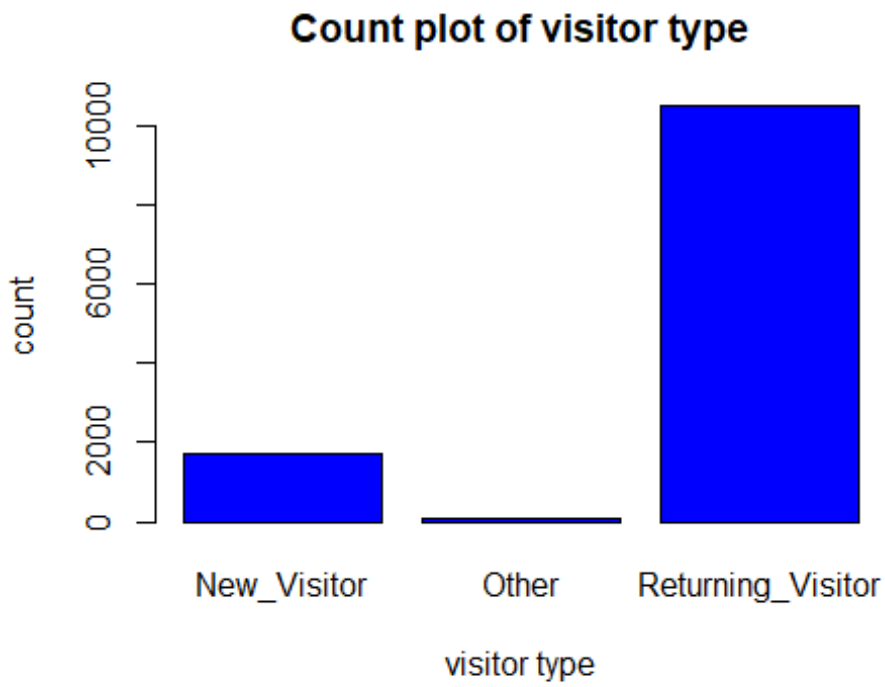
Region 1 was the most represented

```
#count plot of traffictype
barplot(table(df$traffictype), col="blue",
        main="Count plot of traffic type",
        xlab = "traffic type", ylab="count")
```



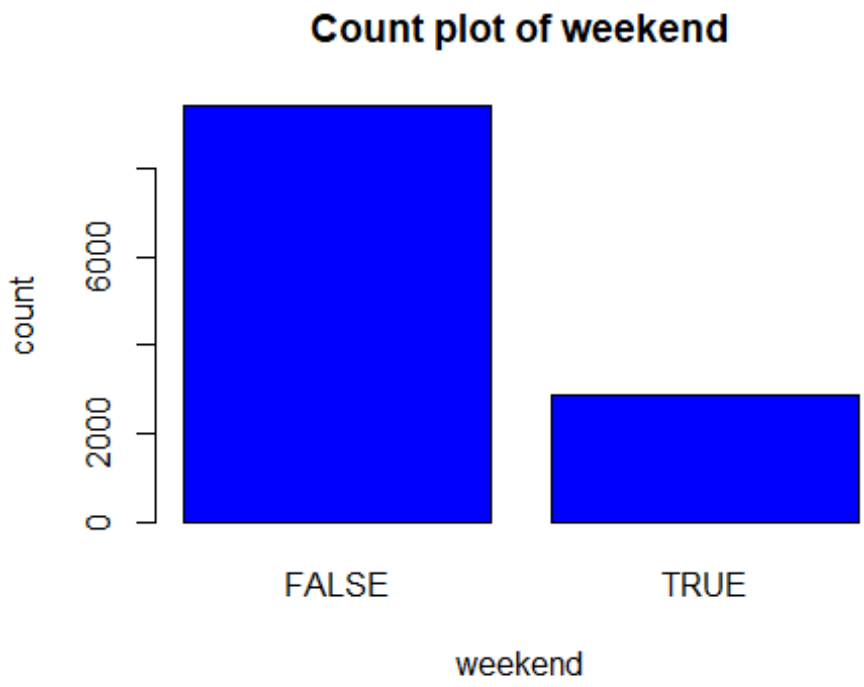
traffic type 2 was the most common

```
#count plot of visitortype
barplot(table(df$visitortype), col="blue",
        main="Count plot of visitor type",
        xlab = "visitor type", ylab="count")
```



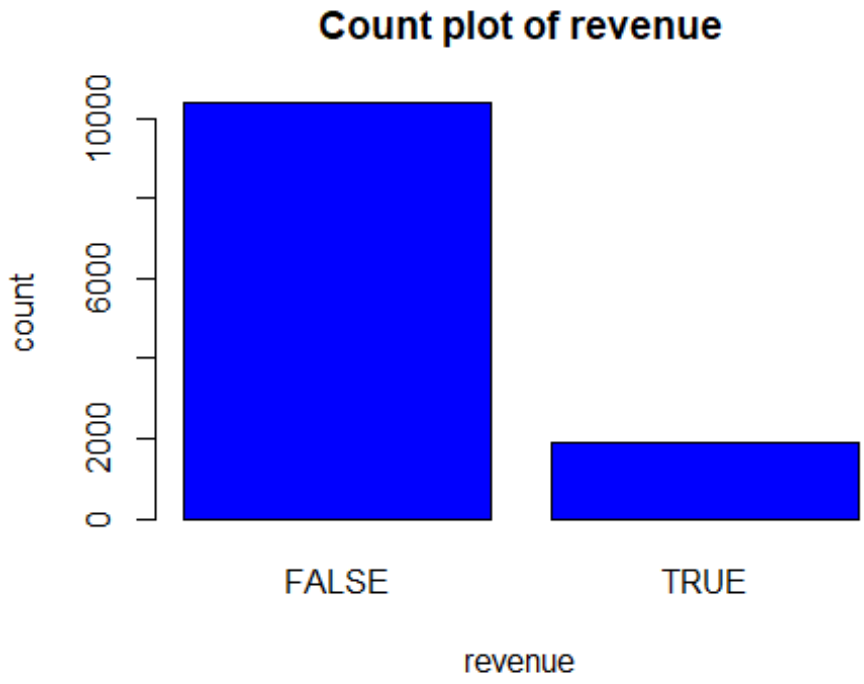
Most visitors were returning visitors

```
#count plot of weekend
barplot(table(df$weekend), col="blue",
        main="Count plot of weekend",
        xlab = "weekend", ylab="count")
```



Most visits were not during the weekend

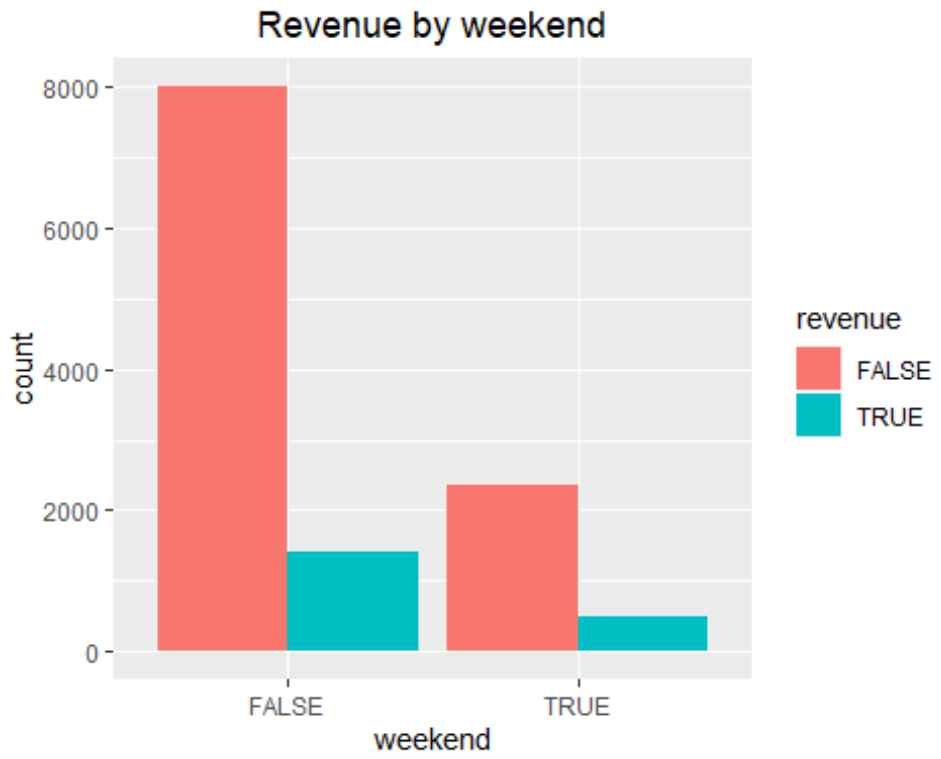
```
#count plot of revenue
barplot(table(df$revenue), col="blue",
        main="Count plot of revenue",
        xlab = "revenue", ylab="count")
```



Most site visits did not result in revenue generation (did not end in a transaction)

Bivariate Analysis

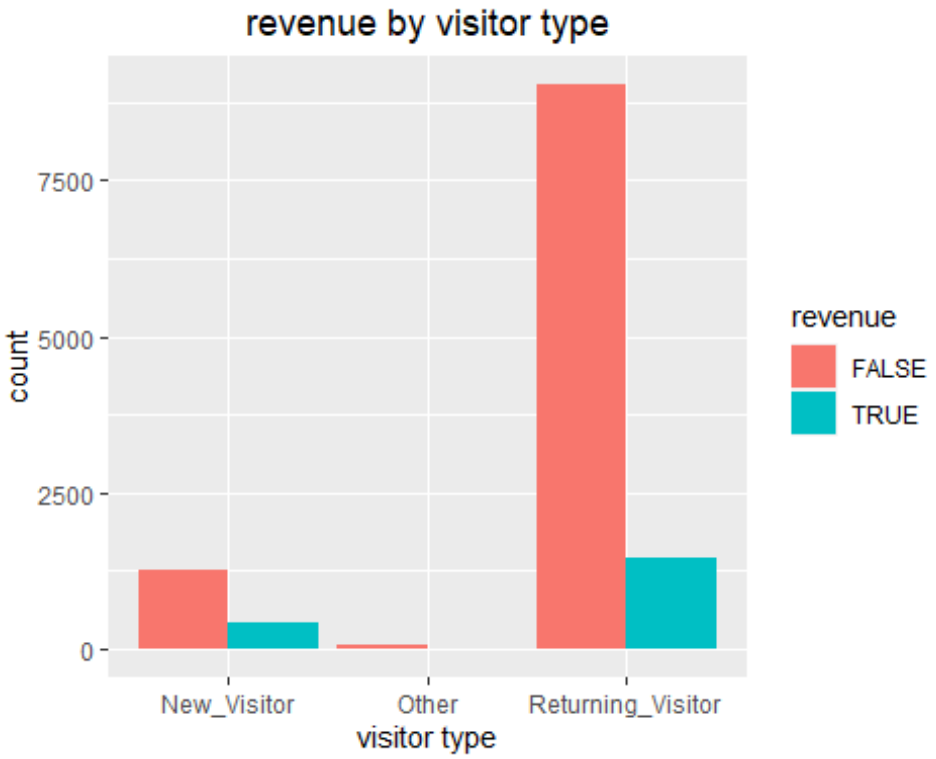
```
#loading library to use functions
library("dplyr")

#plotting revenue by weekend
ggplot() + geom_bar(
    data=df,
    aes(x=factor(weekend), fill = factor(revenue)
    ), position="dodge") + labs(title = "Revenue by weekend",
           y="count", x="weekend", fill="revenue") + theme(plot.title =
element_text(hjust=0.5))
```




```
prop.table(table(df$weekend, df$revenue), 1)

##
##              FALSE      TRUE
##   FALSE 0.8504405 0.1495595
##   TRUE  0.8256464 0.1743536

#rows false true represent weekend
```

The proportion of visits that generated revenue during weekends (0.17) was higher than revenue producing visits during the weekdays (0.14)

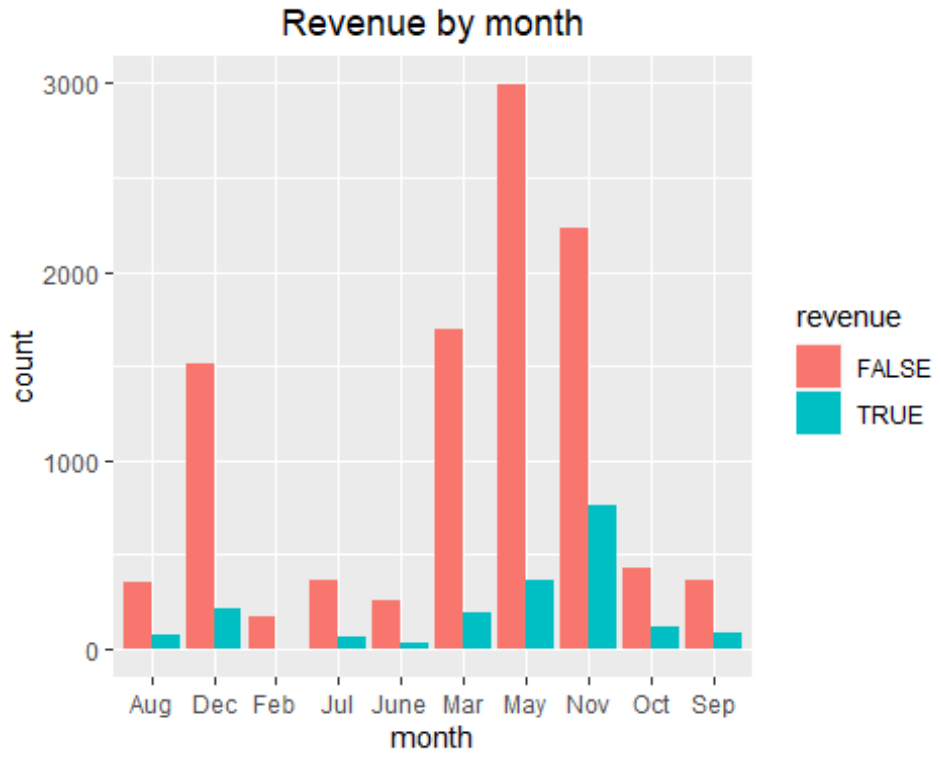
```
table(df$weekend, df$revenue)

##
##         FALSE TRUE
##   FALSE  8012 1409
##   TRUE   2363  499

#revenue by visitortype
ggplot() + geom_bar(
    data=df,
    aes(x=factor(visitortype), fill = factor(revenue)
    ), position="dodge") + labs(title = "revenue by visitor type",
           y="count", x="visitor type", fill="revenue") + theme(plot.title =
element_text(hjust=0.5))
```




```
prop.table(table(df$visitortype, df$revenue), 1)

##
##                          FALSE      TRUE
##   New_Visitor       0.7508855 0.2491145
##   Other             0.8117647 0.1882353
##   Returning_Visitor 0.8600533 0.1399467
```

The proportion of revenue producing visits was highest among new visitors (0.24).

```
#revenue by month
ggplot() + geom_bar(
    data=df,
    aes(x=factor(month), fill = factor(revenue)
    ), position="dodge") + labs(title = "Revenue by month",
           y="count", x="month", fill="revenue") + theme(plot.title =
element_text(hjust=0.5))
```




```
prop.table(table(df$month, df$revenue), 1)
```

```
##
##              FALSE       TRUE
##   Aug  0.82448037 0.17551963
##   Dec  0.87492762 0.12507238
##   Feb  0.98245614 0.01754386
##   Jul  0.84686775 0.15313225
##   June 0.89930556 0.10069444
##   Mar  0.89808917 0.10191083
##   May  0.89127197 0.10872803
##   Nov  0.74624374 0.25375626
##   Oct  0.79052823 0.20947177
##   Sep  0.80803571 0.19196429
```

The month with the highest proportion of revenue generating visits was November (0.25).

Scatterplots of continuous columns

```
#continuous columns
contin
```

```
## [1] "administrative"          "administrative_duration"
## [3] "informational"           "informational_duration"
## [5] "productrelated"          "productrelated_duration"
## [7] "bouncerates"             "exitrates"
## [9] "pagevalues"
```

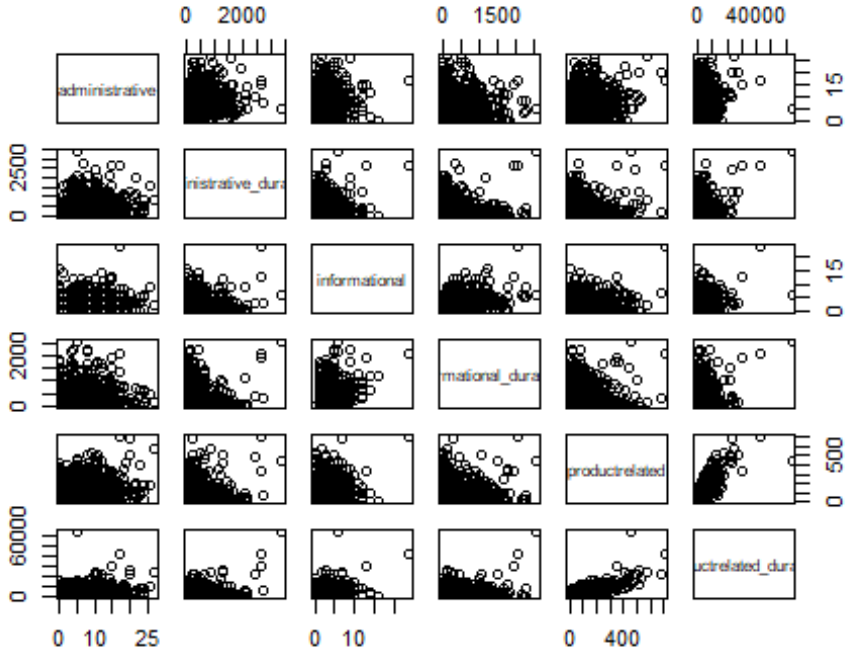
```r
#creating dataframe that containing the continuous variables
scatterp = subset(df, select = c("administrative"
,"administrative_duration", "informational",
"informational_duration",  "productrelated",
"productrelated_duration"))
head(scatterp)
```

```
##   administrative administrative_duration informational
informational_duration
## 1              0                        0             0
0
## 2              0                        0             0
0
## 4              0                        0             0
0
## 5              0                        0             0
0
## 6              0                        0             0
0
## 9              0                        0             0
0
##   productrelated productrelated_duration
## 1              1                0.000000
## 2              2               64.000000
## 4              2                2.666667
## 5             10              627.500000
## 6             19              154.216667
## 9              2               37.000000
```

```r
#loading library for pair plot
library(GGally)
```

```
## Registered S3 method overwritten by 'GGally':
##   method from
##   +.gg   ggplot2
```

```r
#plotting scatterplots of continuous variables
plot(scatterp)
```



There are is a positive correlation between administrative (number of page type visited in a session) and administrative duration (duration on said page type). Similarly, between informational and informational duration, and product related and product related duration.

Correlation matrix

```
str(df)

## 'data.frame':    12283 obs. of  18 variables:
##  $ administrative         : int  0 0 0 0 0 0 0 0 0 0 ...
##  $ administrative_duration: num  0 0 0 0 0 0 0 0 0 0 ...
##  $ informational          : int  0 0 0 0 0 0 0 0 0 0 ...
##  $ informational_duration : num  0 0 0 0 0 0 0 0 0 0 ...
##  $ productrelated         : int  1 2 2 10 19 2 3 3 16 7 ...
##  $ productrelated_duration: num  0 64 2.67 627.5 154.22 ...
##  $ bouncerates            : num  0.2 0 0.05 0.02 0.0158 ...
##  $ exitrates              : num  0.2 0.1 0.14 0.05 0.0246 ...
##  $ pagevalues             : num  0 0 0 0 0 0 0 0 0 0 ...
##  $ specialday             : num  0 0 0 0 0 0.8 0.4 0 0.4 0 ...
##  $ month                  : chr  "Feb" "Feb" "Feb" "Feb" ...
##  $ operatingsystems       : int  1 2 3 3 2 2 2 1 1 1 ...
##  $ browser                : int  1 2 2 3 2 2 4 1 1 1 ...
##  $ region                 : int  1 1 2 1 1 2 1 3 4 1 ...
##  $ traffictype            : int  1 2 4 4 3 3 2 3 3 3 ...
##  $ visitortype            : chr  "Returning_Visitor" "Returning_Visitor"
"Returning_Visitor" "Returning_Visitor" ...
```

```
##  $ weekend                : logi  FALSE FALSE FALSE TRUE FALSE FALSE ...
##  $ revenue                : logi  FALSE FALSE FALSE FALSE FALSE FALSE ...
```

```
#converting categorical to numerical
#removing timestamp column
#dataframe for correlation matrix
enc_df <- copy(df)

enc_df$month <- as.numeric(factor(enc_df$month))
enc_df$weekend <- as.numeric(factor(enc_df$weekend))
enc_df$visitortype <- as.numeric(factor(enc_df$visitortype))
enc_df$revenue <- as.numeric(factor(enc_df$revenue))

#checking that datatype conversion worked
str(enc_df)
```

```
## 'data.frame':    12283 obs. of  18 variables:
##  $ administrative         : int  0 0 0 0 0 0 0 0 0 0 ...
##  $ administrative_duration: num  0 0 0 0 0 0 0 0 0 0 ...
##  $ informational          : int  0 0 0 0 0 0 0 0 0 0 ...
##  $ informational_duration : num  0 0 0 0 0 0 0 0 0 0 ...
##  $ productrelated         : int  1 2 2 10 19 2 3 3 16 7 ...
##  $ productrelated_duration: num  0 64 2.67 627.5 154.22 ...
##  $ bouncerates            : num  0.2 0 0.05 0.02 0.0158 ...
##  $ exitrates              : num  0.2 0.1 0.14 0.05 0.0246 ...
##  $ pagevalues             : num  0 0 0 0 0 0 0 0 0 0 ...
##  $ specialday             : num  0 0 0 0 0 0.8 0.4 0 0.4 0 ...
##  $ month                  : num  3 3 3 3 3 3 3 3 3 3 ...
##  $ operatingsystems       : int  1 2 3 3 2 2 2 1 1 1 ...
##  $ browser                : int  1 2 2 3 2 2 4 1 1 1 ...
##  $ region                 : int  1 1 2 1 1 2 1 3 4 1 ...
##  $ traffictype            : int  1 2 4 4 3 3 2 3 3 3 ...
##  $ visitortype            : num  3 3 3 3 3 3 3 3 3 3 ...
##  $ weekend                : num  1 1 1 2 1 1 1 1 1 1 ...
##  $ revenue                : num  1 1 1 1 1 1 1 1 1 1 ...
```

```
library(reshape2)
```

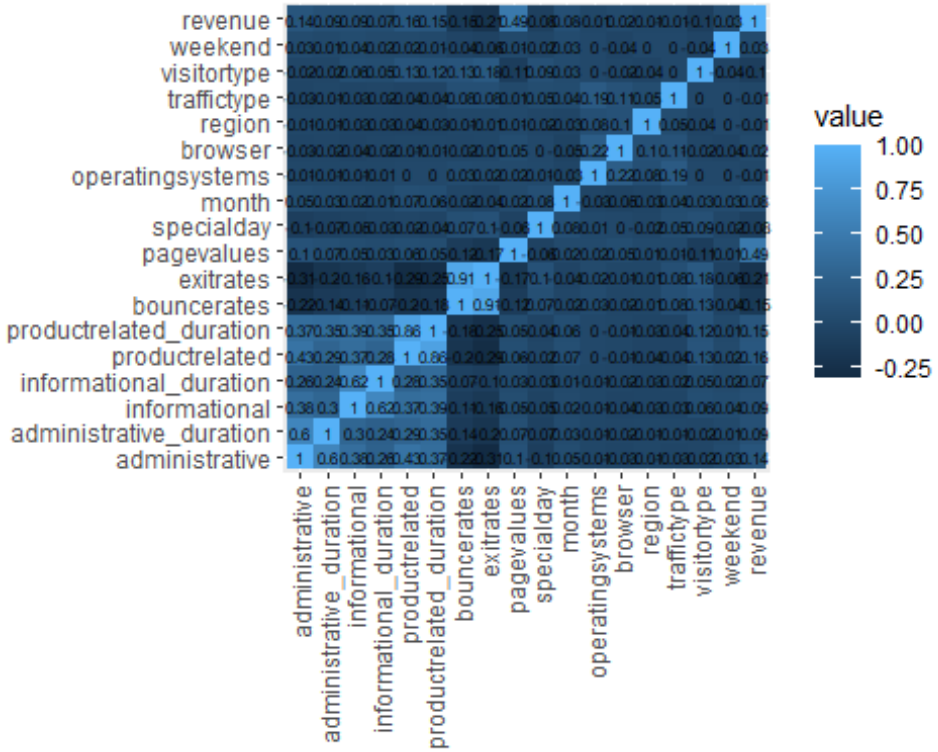
```
##
## Attaching package: 'reshape2'
```

```
## The following object is masked from 'package:tidyr':
##
##     smiths
```

```
## The following objects are masked from 'package:data.table':
##
##     dcast, melt
```

```
#plotting the correlation heatmap
datam = melt(round(cor(enc_df),2))
```

```
ggplot(data=datam, aes(x=Var1, y=Var2, fill=value)) + geom_tile() +
geom_text(aes(Var2, Var1, label=value), color="black",size=2) +
theme(axis.text.x=element_text(angle=90,vjust=0.5,hjust=1), axis.title.x =
element_blank(), axis.title.y = element_blank())
```



According to the correlation heatmap above, revenue seems to be most strongly correlated to page values, exit rates, and product-related, in that order.

Variables with strongest positive correlations: exit rates and bounce rates, product related and product related duration.

Modelling

```
library(caret)
library(factoextra)

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

# library("psych")
```

1. K-Means clustering

```
#describe
describe(enc_df)

##                          vars     n    mean       sd median trimmed    mad
min
## administrative              1 12283    2.32    3.33   1.00    1.64   1.48
```

```
## administrative_duration    2 12283   81.13  177.05   8.00   42.37  11.86
## informational              3 12283    0.51    1.27   0.00    0.18   0.00
## informational_duration     4 12283   34.60  141.00   0.00    3.63   0.00
## productrelated             5 12283   31.85   44.52  18.00   22.86  19.27
## productrelated_duration    6 12283 1199.25 1915.94 602.50  824.43 744.39
## bouncerates                7 12283    0.02    0.05   0.00    0.01   0.00
## exitrates                  8 12283    0.04    0.05   0.03    0.03   0.02
## pagevalues                 9 12283    5.91   18.60   0.00    1.31   0.00
## specialday                10 12283    0.06    0.20   0.00    0.00   0.00
## month                     11 12283    6.17    2.37   7.00    6.36   1.48
## operatingsystems          12 12283    2.12    0.91   2.00    2.06   0.00
## browser                   13 12283    2.36    1.72   2.00    2.00   0.00
## region                    14 12283    3.15    2.40   3.00    2.79   2.97
## traffictype               15 12283    4.07    4.03   2.00    3.22   1.48
## visitortype               16 12283    2.72    0.69   3.00    2.90   0.00
## weekend                   17 12283    1.23    0.42   1.00    1.17   0.00
## revenue                   18 12283    1.16    0.36   1.00    1.07   0.00
##                              max    range  skew kurtosis    se
## administrative             27.00    27.00  1.95     4.67  0.03
## administrative_duration  3398.75  3398.75  5.61    50.37  1.60
## informational              24.00    24.00  4.03    26.82  0.01
## informational_duration   2549.38  2549.38  7.56    75.98  1.27
## productrelated            705.00   705.00  4.34    31.14  0.40
## productrelated_duration 63973.52 63973.52  7.26   136.90 17.29
## bouncerates                0.20     0.20  3.00     8.10  0.00
## exitrates                  0.20     0.20  2.17     4.18  0.00
## pagevalues               361.76   361.76  6.37    65.36  0.17
## specialday                 1.00     1.00  3.30     9.89  0.00
## month                     10.00     9.00 -0.83    -0.37  0.02
## operatingsystems           8.00     7.00  2.07    10.47  0.01
## browser                   13.00    12.00  3.24    12.76  0.02
## region                     9.00     8.00  0.98    -0.15  0.02
```

```
## traffictype                20.00    19.00  1.96     3.47  0.04
## visitortype                 3.00     2.00 -2.06     2.27  0.01
## weekend                     2.00     1.00  1.26    -0.40  0.00
## revenue                     2.00     1.00  1.90     1.62  0.00
```

```
#scaling the variables
enc_df_sc <- copy(enc_df)
for (col in colnames(enc_df_sc)){
  enc_df_sc[col] <- scale(enc_df_sc[col])
}
summary(enc_df_sc)
```

```
##  administrative.administrative
administrative_duration.administrative_duration
##  Min.   :-0.698879            Min.   :-0.458219
##  1st Qu.:-0.698879            1st Qu.:-0.458219
##  Median :-0.398139            Median :-0.413033
##  Mean   : 0.000000            Mean   : 0.000000
##  3rd Qu.: 0.504082            3rd Qu.: 0.072432
##  Max.   : 7.421108            Max.   :18.738678
##  informational.informational informational_duration.informational_duration
##  Min.   :-0.397231           Min.   :-0.245398
##  1st Qu.:-0.397231           1st Qu.:-0.245398
##  Median :-0.397231           Median :-0.245398
##  Mean   : 0.000000           Mean   : 0.000000
##  3rd Qu.:-0.397231           3rd Qu.:-0.245398
##  Max.   :18.468643           Max.   :17.834955
##  productrelated.productrelated
productrelated_duration.productrelated_duration
##  Min.   :-0.715308            Min.   :-0.62594
##  1st Qu.:-0.558080            1st Qu.:-0.52828
##  Median :-0.311008            Median :-0.31147
##  Mean   : 0.000000            Mean   : 0.00000
##  3rd Qu.: 0.138213            3rd Qu.: 0.14179
##  Max.   :15.119758            Max.   :32.76429
##  bouncerates.bouncerates exitrates.exitrates pagevalues.pagevalues
##  Min.   :-0.455556       Min.   :-0.888394   Min.   :-0.317832
##  1st Qu.:-0.455556       1st Qu.:-0.590549   1st Qu.:-0.317832
##  Median :-0.391031       Median :-0.367165   Median :-0.317832
##  Mean   : 0.000000       Mean   : 0.000000   Mean   : 0.000000
##  3rd Qu.:-0.106045       3rd Qu.: 0.154063   3rd Qu.:-0.317832
##  Max.   : 3.738574       Max.   : 3.281431   Max.   :19.131465
##  specialday.specialday     month.month
operatingsystems.operatingsystems
##  Min.   :-0.309018     Min.   :-2.1781515   Min.   :-1.233186
##  1st Qu.:-0.309018     1st Qu.:-0.0703571   1st Qu.:-0.136356
##  Median :-0.309018     Median : 0.3512018   Median :-0.136356
##  Mean   : 0.000000     Mean   : 0.0000000   Mean   : 0.000000
##  3rd Qu.:-0.309018     3rd Qu.: 0.7727607   3rd Qu.: 0.960474
##  Max.   : 4.713039     Max.   : 1.6158785   Max.   : 6.444625
```

```
##    browser.browser      region.region     traffictype.traffictype
##  Min.   :-0.790209   Min.   :-0.8938929   Min.   :-0.763141
##  1st Qu.:-0.207887   1st Qu.:-0.8938929   1st Qu.:-0.514720
##  Median :-0.207887   Median :-0.0612469   Median :-0.514720
##  Mean   : 0.000000   Mean   : 0.0000000   Mean   : 0.000000
##  3rd Qu.:-0.207887   3rd Qu.: 0.3550761   3rd Qu.:-0.017879
##  Max.   : 6.197651   Max.   : 2.4366911   Max.   : 3.956854
##  visitortype.visitortype   weekend.weekend      revenue.revenue
##  Min.   :-2.4820823      Min.   :-0.5511485   Min.   :-0.4288224
##  1st Qu.: 0.4086793      1st Qu.:-0.5511485   1st Qu.:-0.4288224
##  Median : 0.4086793      Median :-0.5511485   Median :-0.4288224
##  Mean   : 0.0000000      Mean   : 0.0000000   Mean   : 0.0000000
##  3rd Qu.: 0.4086793      3rd Qu.:-0.5511485   3rd Qu.:-0.4288224
##  Max.   : 0.4086793      Max.   : 1.8142453   Max.   : 2.3317779
```

```
 set.seed(123)
grouping <- kmeans(enc_df_sc, 3)
print("Cluster sizes:")
```

```
## [1] "Cluster sizes:"
```

```
grouping$size
```

```
## [1] 1030 9596 1657
```

```
print("Within cluster sum of squares")
```

```
## [1] "Within cluster sum of squares"
```

```
grouping$withinss
```

```
## [1]  10553.72 116122.10  50696.39
```

```
print("Total sum of squares (including between ss)")
```

```
## [1] "Total sum of squares (including between ss)"
```

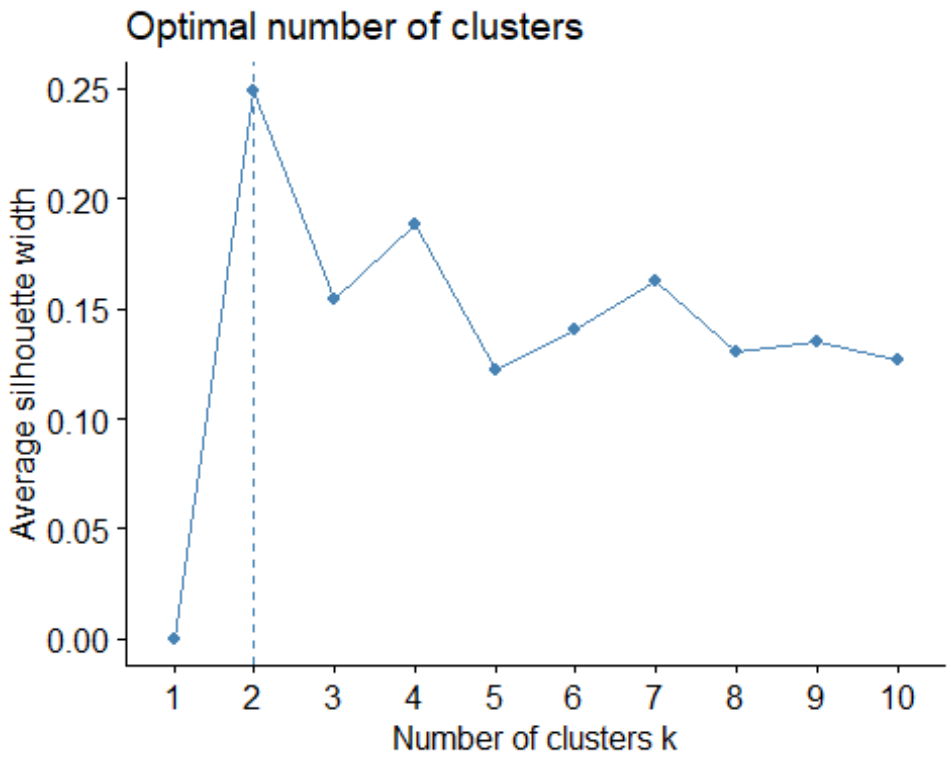
```
grouping$tot.withinss
```

```
## [1] 177372.2
```

```
#
print("**********************************************************************
*****")
# # grouping$cluster
# subset(grouping, select=!cluster)
```

Challenging the solution

```
# Determining Optimal clusters (k) Using Average Silhouette Method
#A good silhouette score is usually near 1 and attempts to minimise within
cluster variance while maximising the between cluster variance.

fviz_nbclust(x = enc_df_sc,FUNcluster = kmeans, method = 'silhouette' )
```



Optimal number of clusters determined to be 2.

```
#grouping with value identified above
set.seed(123)
grouping <- kmeans(enc_df_sc, 2)
print("Cluster sizes:")
```

```
## [1] "Cluster sizes:"
```

```
grouping$size
```

```
## [1] 10178  2105
```

```
print("Within cluster sum of squares")
```

```
## [1] "Within cluster sum of squares"
```

```
grouping$withinss
```

```
## [1] 135765.64  61258.13
```

```
print("Total sum of squares (including between ss)")
```

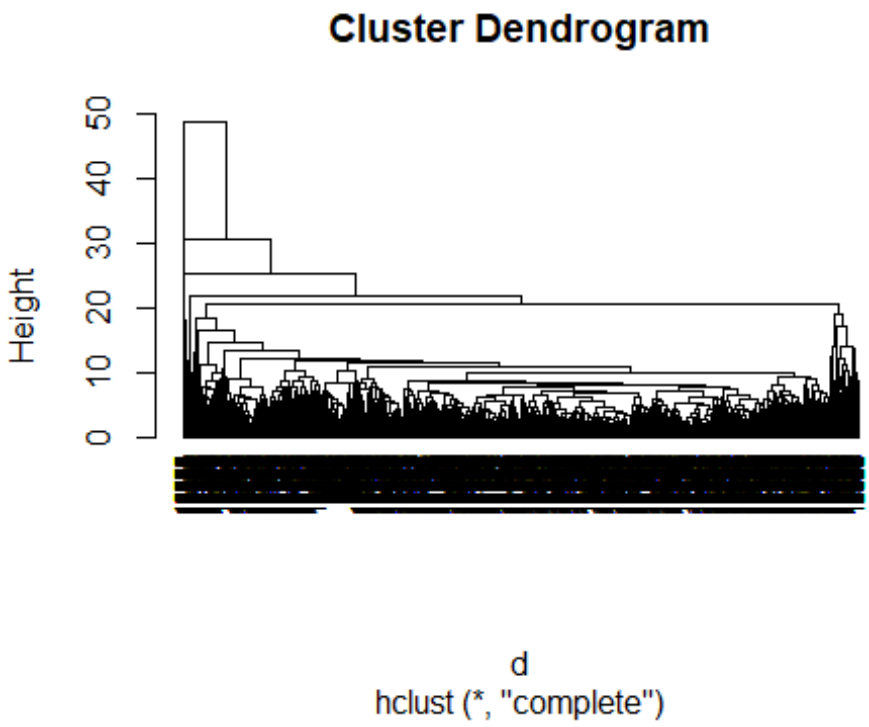
```
## [1] "Total sum of squares (including between ss)"
```

```
grouping$tot.withinss
```

```
## [1] 197023.8
```

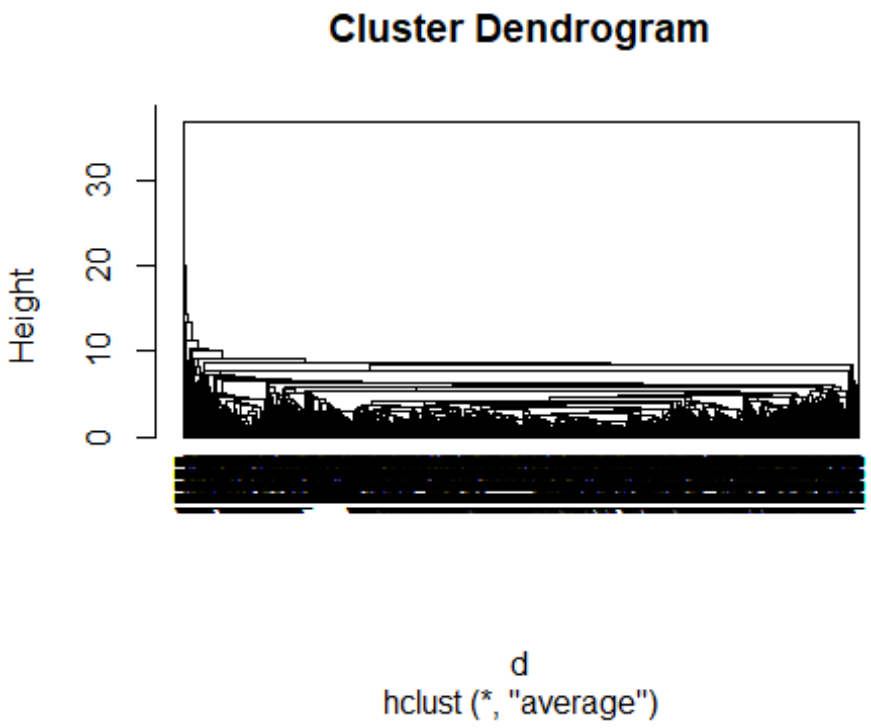
2. Hierarchical clustering

```
# d will be the first argument in the hclust() function distance matrix
# ---
#using scaled df
d <- dist(enc_df_sc, method = "euclidean")

# hierarchical clustering using the complete linkage method
# ---
#
res.hc <- hclust(d, method = "complete" )

plot(res.hc, cex = 0.6, hang = -1)
```

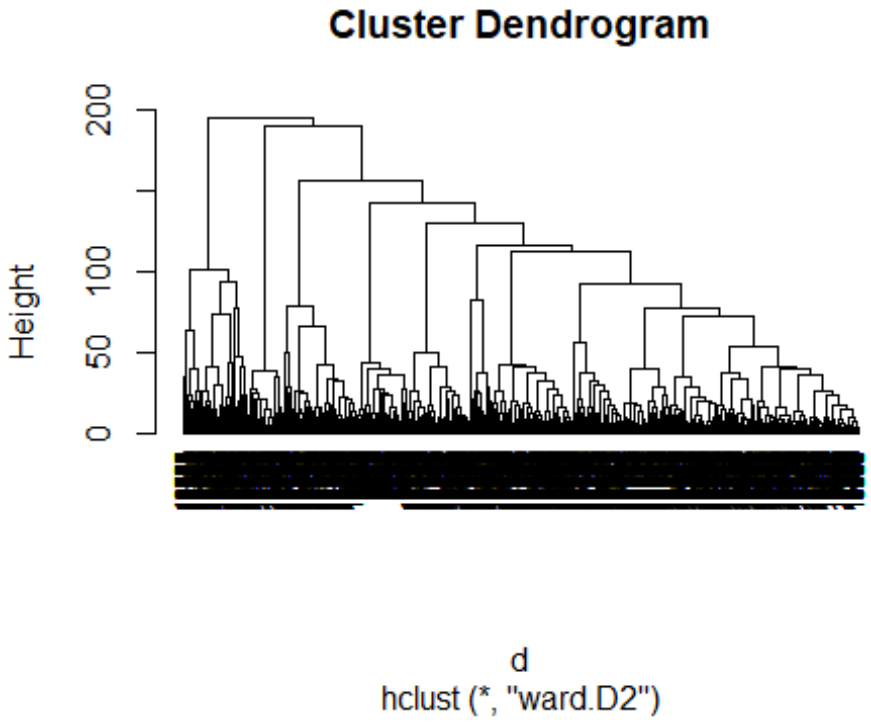


Challenging the approach

```
res.hc <- hclust(d, method = "average" )
plot(res.hc, cex = 0.6, hang = -1)
```



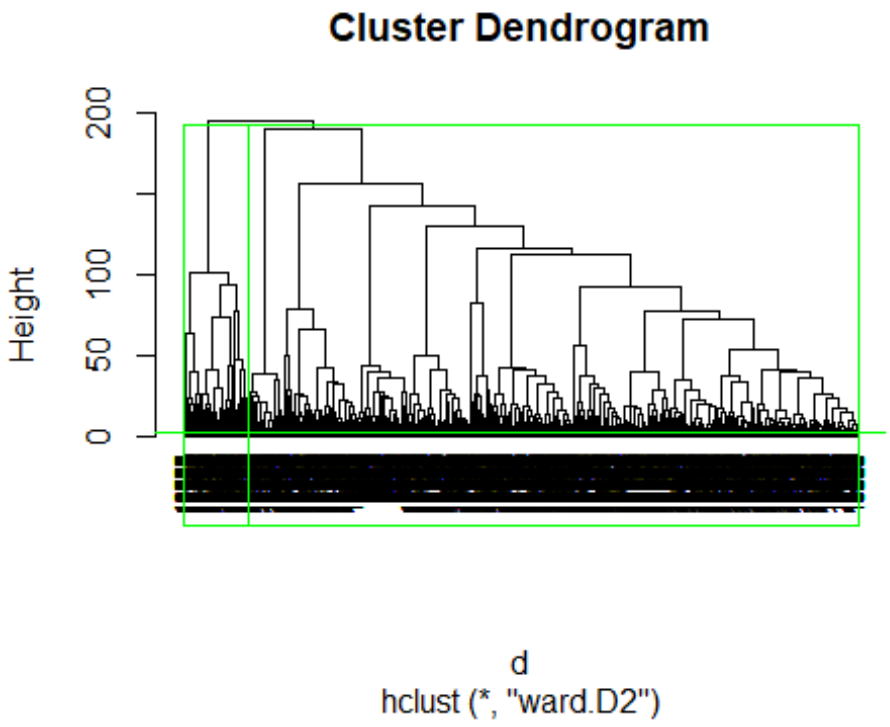

```
res.hc <- hclust(d, method = "ward.D2" )
plot(res.hc, cex = 0.6, hang = -1)
```



```r
# Choosing no. of clusters to highlight
# Cutting tree by height
# res.hc <- hclust(d, method = "ward.D2" )

# cutting to 2 clusters
two <- cutree(res.hc, k = 2 )

table(two)
```

```
## two
##     1     2
## 11109  1174
```

```r
#dendrogram showing borders of cutting into two clusters. wards method
produces clearest dendrogram

plot(res.hc, cex = 0.6, hang = -1)
abline(h = 1.9, col = "green")
rect.hclust(res.hc, k = 2, border = "green")
```



Group characteristics comparisons - k means clusters (bivariate analysis)

K means identified 2 clusters as optimal number using the average silhouette score. Therefore, further analysis will be carried out on the 2 customer groups that were identified while using kmeans.

```
#summary of the clustering
grouping

## K-means clustering with 2 clusters of sizes 10178, 2105
##
## Cluster means:
##   administrative administrative_duration informational
informational_duration
## 1     -0.2869788              -0.2330162    -0.2615324             -
0.2002143
## 2      1.3875870               1.1266695     1.2645494
0.9680672
##   productrelated productrelated_duration bouncerates  exitrates
pagevalues
## 1     -0.2573956               -0.239908  0.06822025  0.1021581 -
0.07503018
## 2      1.2445474                1.159992 -0.32985544 -0.4939504
0.36278250
##    specialday       month operatingsystems     browser      region
traffictype
## 1  0.03420667 -0.03212765      0.002660684  0.01358711  0.01238067
0.01990431
## 2 -0.16539455  0.15534217     -0.012864820 -0.06569575 -0.05986245 -
0.09624041
##   visitortype      weekend    revenue
## 1 -0.04348151 -0.009185608 -0.1019877
## 2  0.21023982  0.044413832  0.4931263
##
## Clustering vector:
##     1     2     4     5     6     9    10    11    12    13    14    15
16
##     1     1     1     1     1     1     1     1     1     1     1     1
1
##    18    19    20    21    23    24    26    27    28    29    30    31
32
##     1     1     1     1     1     1     1     1     1     1     1     1
1
##    33    34    35    36    37    38    39    40    41    42    43    44
45
##     1     1     1     1     1     1     1     1     1     1     1     1
1
##    46    47    48    49    52    53    54    55    56    57    58    59
60
##     1     1     1     1     1     1     1     1     1     1     1     1
1
##    61    62    63    64    66    67    68    69    70    71    72    73
74
##     1     1     2     1     1     2     1     1     1     1     1     1
1
##    75    76    77    78    79    80    81    82    83    84    85    86
```

```
87
##     1     1     2     1     1     1     1     1     1     1     1     1
1
##    88    89    90    91    92    93    94    95    96    97    98    99
100
##     1     1     1     1     1     1     1     1     1     1     1     1
1
##   101   102   103   104   105   106   107   108   109   110   111   112
113
##     1     1     1     1     1     1     1     1     1     2     1     1
1
##   114   115   116   117   118   119   120   121   122   123   124   125
126
##     1     1     1     1     1     1     1     1     1     1     1     1
1
##   127   128   129   130   131   132   134   135   136   137   138   139
140
##     1     1     1     1     1     1     1     1     1     1     1     1
1
##   142   143   144   145   146   147   148   149   150   151   152   153
154
##     1     1     1     1     1     1     1     1     1     1     1     1
1
##   155   156   157   158   159   160   161   162   163   164   165   166
167
##     1     1     1     1     1     1     1     1     1     1     1     1
1
##   168   169   170   171   172   173   174   175   176   177   178   179
180
##     1     1     1     1     1     1     1     1     1     1     1     1
1
##   181   184   185   186   187   188   189   190   191   192   193   194
195
##     1     1     2     1     1     2     2     2     1     2     1     1
1
##   196   197   198   199   200   201   202   203   204   205   206   207
208
##     1     2     1     1     2     2     1     1     1     1     1     1
1
##   209   210   211   212   213   214   215   216   217   218   219   220
221
##     1     1     1     1     1     1     1     1     1     1     1     1
1
##   222   223   224   225   226   227   228   229   230   231   232   233
234
##     1     1     1     2     1     1     1     1     1     1     2     1
2
##   235   236   237   238   239   240   241   242   243   244   245   246
247
##     1     2     1     1     1     1     1     1     1     2     1     1
```

```
1
##   248   249   250   251   252   254   255   256   257   258   259   260
261
##     1     2     1     1     1     1     1     1     1     2     1     1
1
##   262   263   264   265   266   267   268   269   270   271   272   273
274
##     1     1     1     1     2     1     1     1     1     1     1     1
1
##   275   276   277   278   279   280   281   282   283   284   285   286
287
##     1     1     1     1     1     1     1     1     2     1     1     1
1
##   288   289   290   291   292   293   294   295   296   297   298   299
300
##     1     2     1     1     1     1     1     1     1     1     1     1
1
##   301   302   303   304   305   306   307   308   309   310   311   312
313
##     1     1     1     1     1     1     1     1     1     1     1     1
1
##   314   315   316   317   318   319   320   321   322   323   324   325
326
##     1     2     2     1     1     1     1     1     1     1     1     2
1
##   327   328   329   330   331   332   333   334   335   336   337   338
339
##     1     1     1     1     1     1     1     1     2     1     1     1
1
##   340   341   342   343   344   345   346   347   348   349   350   351
352
##     1     1     1     1     1     1     1     1     1     1     1     1
1
##   353   354   355   356   357   358   359   360   361   362   363   364
365
##     1     2     1     1     1     1     1     1     1     1     1     1
1
##   366   367   368   369   370   371   372   373   374   375   376   377
378
##     1     1     1     1     1     1     1     1     2     1     1     1
1
##   379   380   381   382   383   385   386   387   388   389   390   391
392
##     1     2     1     1     1     2     1     1     1     1     1     1
1
##   393   394   395   396   397   398   399   400   401   402   403   404
405
##     1     1     1     1     1     1     1     2     1     1     2     1
1
##   406   407   408   409   410   411   412   413   414   415   416   417
```

```
418
##     1     1     1     2     1     1     1     1     1     1     1     1
1
##   419   420   421   422   423   424   425   426   427   428   429   430
431
##     1     1     1     1     1     1     2     1     1     1     1     1
1
##   432   433   434   435   436   437   438   439   440   441   442   443
444
##     1     1     1     1     1     1     1     1     1     1     1     1
1
##   445   446   447   448   449   450   451   452   453   454   455   456
457
##     1     1     1     1     1     1     1     1     1     1     1     1
1
##   458   459   460   461   462   463   464   465   466   467   468   469
470
##     1     1     1     1     1     1     1     1     1     1     1     1
1
##   471   472   473   474   475   476   477   478   479   480   481   482
483
##     1     1     1     1     1     1     1     2     2     1     1     1
1
##   484   485   486   487   488   489   490   491   492   493   494   495
496
##     1     1     1     1     1     1     1     1     1     1     1     1
1
##   497   498   499   500   501   502   503   504   505   506   507   508
509
##     2     1     1     2     1     1     2     2     1     1     1     1
1
##   510   511   512   513   514   515   516   517   518   519   520   521
522
##     1     2     2     1     2     1     1     1     1     1     1     1
1
##   523   524   525   526   527   528   529   530   531   532   534   535
536
##     1     1     1     1     1     1     1     1     1     1     1     1
1
##   537   538   539   540   542   543   544   545   546   547   548   549
550
##     2     1     1     1     1     1     1     2     1     1     1     1
1
##   551   552   553   554   555   556   557   558   559   560   561   562
564
##     1     1     2     1     1     1     1     1     1     1     1     1
1
##   565   566   567   568   569   570   571   572   573   574   575   576
577
##     1     1     1     1     1     1     1     1     1     1     2     2
```

```
1
##   578   579   580   581   582   583   584   585   586   587   588   589
590
##     1     1     1     1     1     1     1     1     1     1     1     1
1
##   591   593   594   595   596   597   598   599   600   601   602   603
604
##     1     1     1     1     2     1     1     1     1     1     2     1
1
##   605   606   607   608   609   610   611   612   613   614   615   616
617
##     1     1     1     1     1     1     2     2     2     1     1     1
1
##   618   619   620   621   622   623   624   625   626   627   628   629
630
##     1     2     2     1     1     1     1     1     1     1     1     1
1
##   631   632   633   634   635   636   637   638   640   641   642   643
644
##     2     1     1     1     1     2     1     1     1     1     2     1
1
##   645   646   647   648   649   650   651   652   653   654   655   656
657
##     1     1     1     1     1     1     1     1     1     1     1     1
1
##   658   659   660   661   662   663   664   665   666   667   668   669
670
##     1     1     1     1     1     1     1     1     2     1     1     1
1
##   671   672   673   674   675   676   677   678   679   680   681   682
683
##     1     1     1     1     1     1     1     1     1     1     1     1
1
##   684   685   686   687   688   689   690   691   692   693   694   695
696
##     1     1     1     1     1     1     2     1     1     1     1     2
2
##   697   698   699   700   701   702   703   704   705   706   707   708
709
##     2     1     2     1     1     1     1     1     2     1     1     1
1
##   710   711   712   713   714   715   716   717   718   719   720   721
722
##     1     1     1     1     1     1     1     1     1     1     1     1
1
##   723   724   725   726   727   728   729   730   731   732   733   734
735
##     2     1     1     1     1     1     1     1     1     1     1     1
1
##   736   737   738   739   740   741   742   743   744   745   746   747
```

```
748
##     1     1     1     1     1     2     1     1     1     1     1     1
1
##   749   750   751   752   753   754   755   756   757   758   759   760
761
##     1     1     1     1     2     1     1     1     1     1     1     1
2
##   762   763   764   765   766   767   768   769   770   771   772   773
774
##     1     1     1     1     1     1     1     1     2     1     1     2
1
##   775   776   777   778   779   780   781   782   783   784   785   786
787
##     1     1     1     2     1     1     1     1     1     1     1     1
1
##   788   789   790   791   792   793   794   795   796   797   798   799
800
##     1     1     1     1     1     1     1     1     1     2     1     1
2
##   801   802   803   804   805   806   807   808   809   810   811   812
813
##     1     1     2     1     1     1     1     1     1     1     2     1
1
##   814   815   816   817   818   819   820   821   822   823   824   825
826
##     1     1     1     1     1     1     1     1     1     1     1     1
1
##   827   828   829   830   831   832   833   834   835   836   837   838
839
##     1     1     2     1     1     1     1     1     1     1     1     1
1
##   840   841   842   843   844   845   846   847   848   849   850   851
852
##     1     1     1     1     1     2     1     1     1     2     1     1
1
##   853   854   855   856   857   858   859   860   861   862   863   864
865
##     1     2     1     2     1     1     1     1     1     1     1     2
1
##   866   867   868   869   870   871   872   873   874   875   876   877
878
##     1     2     1     1     1     1     1     1     1     1     1     1
2
##   879   880   881   882   883   884   885   886   887   888   889   890
891
##     1     1     1     1     1     1     2     1     1     1     1     1
1
##   892   893   894   895   896   897   898   899   900   901   902   903
904
##     1     1     1     2     1     1     1     1     1     1     1     1
```

```
1
##   905   906   907   908   909   910   911   912   913   914   915   916
917
##     1     2     2     1     1     1     1     1     1     1     1     1
2
##   918   919   920   921   922   923   924   925   926   927   928   929
930
##     1     2     1     1     1     1     1     2     2     1     1     1
1
##   931   932   933   934   935   936   937   938   939   940   941   942
943
##     1     2     2     1     1     1     1     1     1     1     1     1
1
##   944   945   946   947   948   949   950   951   952   953   954   955
956
##     1     2     1     1     1     2     1     1     1     2     1     1
2
##   957   958   959   960   961   962   963   964   965   966   967   968
969
##     1     1     1     1     1     1     1     1     1     1     2     1
1
##   970   971   972   973   974   975   976   977   978   979   980   981
982
##     1     1     1     1     1     1     1     1     1     1     2     1
1
##   983   984   985   986   987   988   989   990   991   992   993   994
995
##     1     1     1     1     1     1     1     1     1     1     1     1
1
##   996   997   998   999  1000  1001  1002  1003  1004  1005  1006  1007
1008
##     1     2     1     1     1     1     1     1     1     1     1     1
1
##  1009  1010  1011  1012  1013  1014  1015  1016  1017  1018  1019  1020
1021
##     1     1     1     1     1     1     1     1     1     1     1     1
1
##  1022  1023  1024  1025  1026  1027  1028  1029  1030  1031  1032  1033
1034
##     1     1     1     1     1     2     1     1     1     1     1     1
1
##  1035  1036  1037  1038  1039  1040  1041  1042  1043  1044  1045  1046
1047
##     1     1     2     2     1     1     1     2     1     1     1     1
1
##  1048  1049  1050  1051  1052  1053  1054  1055  1056  1057  1058  1059
1060
##     1     1     1     2     2     1     1     1     1     1     1     1
1
##  1061  1062  1063  1064  1065  1067  1068  1069  1070  1071  1072  1073
```

```
1074
##     1     1     1     1     1     1     1     1     2     1     1     1
1
##  1075  1076  1077  1078  1079  1080  1081  1082  1083  1084  1085  1086
1087
##     1     1     1     1     1     1     1     1     1     1     1     1
1
##  1088  1089  1090  1091  1092  1093  1094  1095  1096  1097  1098  1099
1100
##     1     1     1     1     1     1     1     1     1     2     1     1
1
##  1101  1102  1103  1104  1105  1106  1107  1108  1109  1110  1111  1112
1113
##     1     1     2     1     1     2     2     1     1     1     1     1
1
##  1114  1115  1116  1117  1118  1119  1120  1121  1122  1123  1124  1125
1126
##     1     1     2     1     1     1     1     1     1     1     1     1
1
##  1127  1128  1129  1130  1131  1132  1138  1139  1140  1141  1142  1143
1144
##     1     1     1     1     1     2     1     1     1     1     2     1
1
##  1145  1146  1147  1148  1149  1150  1151  1152  1153  1154  1155  1156
1157
##     1     1     2     1     1     1     1     1     1     1     1     1
1
##  1158  1159  1160  1161  1162  1163  1164  1165  1166  1167  1168  1169
1170
##     1     1     1     1     1     1     1     1     1     1     1     1
1
##  1171  1172  1173  1174  1175  1176  1177  1178  1179  1180  1181  1182
1183
##     1     1     1     1     1     1     1     1     1     1     1     1
2
##  1184  1185  1186  1187  1188  1189  1190  1191  1192  1193  1194  1195
1196
##     1     1     2     1     1     2     1     1     1     1     1     1
1
##  1197  1198  1199  1200  1201  1202  1203  1204  1205  1206  1207  1208
1209
##     1     1     1     1     1     1     2     1     1     1     1     2
1
##  1210  1211  1212  1213  1214  1215  1216  1217  1218  1219  1220  1221
1222
##     1     1     1     1     1     1     1     1     1     2     1     1
1
##  1223  1224  1225  1226  1227  1228  1229  1230  1231  1232  1233  1234
1235
##     1     1     1     1     1     1     1     1     1     2     1     2
```

```
1
##  1236  1237  1238  1239  1240  1241  1242  1243  1244  1245  1246  1247
1248
##     1     1     1     1     1     1     1     1     1     1     1     1
1
##  1249  1250  1251  1252  1253  1254  1255  1256  1257  1258  1259  1260
1261
##     1     1     1     2     1     1     1     1     1     1     1     1
1
##  1262  1263  1264  1265  1266  1267  1268  1269  1270  1271  1272  1273
1274
##     1     1     1     1     1     1     1     1     1     1     1     2
2
##  1275  1276  1277  1278  1279  1280  1281  1282  1283  1284  1285  1286
1287
##     1     1     2     2     1     1     1     2     1     2     1     1
1
##  1288  1289  1290  1291  1292  1293  1294  1295  1296  1297  1298  1299
1300
##     1     1     1     1     1     1     1     1     1     1     1     1
1
##  1301  1302  1303  1304  1305  1306  1307  1308  1309  1310  1311  1312
1313
##     1     1     2     2     1     1     1     1     1     1     1     1
1
##  1314  1315  1316  1317  1318  1319  1320  1321  1322  1323  1324  1325
1326
##     1     1     1     1     1     1     1     2     1     1     2     2
1
##  1327  1328  1329  1330  1331  1332  1333  1334  1335  1336  1337  1338
1339
##     1     1     1     1     1     1     1     1     1     1     1     1
1
##  1340  1341  1342  1343  1344  1345  1346  1347  1348  1349  1350  1351
1352
##     2     1     1     2     1     1     1     2     1     1     1     1
2
##  1353  1354  1355  1356  1357  1358  1359  1360  1361  1362  1363  1364
1365
##     1     1     1     1     1     1     1     1     1     1     2     1
1
##  1366  1367  1368  1369  1370  1371  1372  1373  1374  1375  1376  1377
1378
##     1     1     1     2     1     1     1     1     1     1     1     1
1
##  1379  1380  1381  1382  1383  1384  1385  1386  1387  1388  1389  1390
1391
##     1     2     1     1     1     1     1     1     1     1     2     1
1
##  1392  1393  1394  1395  1396  1397  1398  1399  1400  1401  1402  1403
```

```
1404
##     1     1     1     1     1     1     1     1     1     1     1     1
1
##  1405  1406  1407  1408  1409  1410  1411  1412  1413  1414  1415  1416
1417
##     1     1     1     1     1     1     1     1     1     1     1     1
1
##  1418  1419  1420  1421  1422  1423  1424  1425  1426  1427  1428  1429
1430
##     1     1     1     1     1     1     1     1     1     1     2     1
1
##  1431  1432  1433  1434  1435  1436  1437  1438  1439  1440  1441  1442
1443
##     1     1     1     1     1     1     1     1     1     1     1     1
1
##  1444  1445  1446  1447  1448  1449  1450  1451  1452  1453  1454  1455
1456
##     1     1     1     1     1     2     1     1     1     1     1     1
1
##  1457  1458  1459  1460  1461  1462  1463  1464  1465  1466  1467  1468
1469
##     1     1     1     1     1     1     1     2     1     1     1     1
1
##  1470  1471  1472  1473  1478  1479  1480  1481  1482  1483  1484  1485
1486
##     1     1     1     1     1     1     1     1     1     1     1     2
1
##  1487  1488  1489  1490  1491  1492  1493  1494  1495  1496  1497  1498
1499
##     1     1     1     1     1     2     2     1     1     2     2     1
1
##  1500  1501  1502  1503  1504  1505  1506  1507  1508  1509  1510  1511
1512
##     1     1     1     1     1     1     1     1     1     1     2     1
1
##  1513  1514  1515  1516  1517  1518  1519  1520  1521  1522  1523  1524
1525
##     2     1     1     1     2     1     1     2     1     1     1     1
1
##  1526  1527  1528  1529  1530  1531  1532  1533  1534  1535  1536  1537
1538
##     1     1     1     1     2     1     1     1     1     1     1     1
1
##  1539  1540  1541  1542  1543  1544  1545  1546  1547  1548  1549  1550
1551
##     1     1     1     1     1     1     1     1     1     1     1     1
1
##  1552  1553  1554  1555  1556  1557  1558  1559  1560  1561  1562  1563
1564
##     1     1     1     2     1     2     1     1     1     1     1     1
```

```
1
##  1565  1566  1567  1568  1569  1570  1571  1572  1573  1574  1575  1576
1577
##     2     1     1     1     1     1     1     1     2     1     1     1
1
##  1578  1579  1580  1581  1582  1583  1584  1585  1586  1587  1588  1589
1590
##     1     1     2     1     1     2     1     1     1     1     1     1
1
##  1591  1592  1593  1594  1595  1596  1597  1598  1599  1600  1601  1602
1603
##     1     1     1     1     1     1     1     1     1     1     1     1
1
##  1604  1605  1606  1607  1608  1609  1610  1611  1612  1613  1614  1615
1616
##     1     1     2     1     1     1     1     1     1     1     1     1
1
##  1617  1618  1619  1620  1621  1622  1623  1624  1625  1626  1627  1628
1629
##     1     1     1     1     1     1     1     1     1     1     1     1
1
##  1630  1631  1632  1633  1634  1635  1636  1637  1638  1639  1640  1641
1642
##     2     1     1     1     1     1     2     1     1     1     1     1
1
##  1643  1644  1645  1646  1647  1648  1649  1650  1651  1652  1653  1654
1655
##     1     1     2     1     2     1     1     1     1     1     2     1
2
##  1656  1657  1658  1659  1660  1661  1662  1663  1664  1665  1666  1667
1668
##     1     1     1     1     1     1     1     1     1     2     1     2
1
##  1669  1670  1671  1672  1673  1674  1675  1676  1677  1678  1679  1680
1681
##     1     1     1     1     1     1     1     1     1     1     2     1
1
##  1682  1683  1684  1685  1686  1687  1688  1689  1690  1691  1692  1693
1694
##     1     1     1     1     2     1     1     1     1     1     1     1
1
##  1695  1696  1697  1698  1699  1700  1701  1702  1703  1704  1705  1706
1707
##     1     1     1     1     1     1     1     1     1     1     1     1
1
##  1708  1709  1710  1711  1712  1713  1714  1715  1716  1717  1718  1719
1720
##     1     1     1     1     1     1     1     1     1     1     1     1
1
##  1721  1722  1723  1724  1725  1726  1727  1728  1729  1730  1731  1732
```

```
1733
##     1     1     2     1     1     1     1     1     1     1     1     2
2
##  1734  1735  1736  1737  1738  1739  1740  1741  1742  1743  1744  1745
1746
##     1     1     1     1     1     1     1     1     1     1     2     1
1
##  1747  1748  1749  1750  1751  1752  1753  1754  1755  1756  1757  1758
1759
##     1     1     1     1     1     1     1     1     1     1     1     1
1
##  1760  1761  1762  1763  1764  1765  1766  1767  1768  1769  1770  1771
1772
##     1     1     2     1     1     1     1     1     1     1     1     1
1
##  1773  1774  1775  1776  1777  1778  1779  1780  1781  1782  1783  1784
1785
##     1     2     1     1     1     1     1     1     1     1     2     1
1
##  1786  1787  1788  1789  1790  1791  1792  1793  1794  1795  1796  1797
1798
##     1     2     1     1     2     1     1     1     2     1     1     2
1
##  1799  1800  1801  1802  1803  1804  1805  1806  1807  1808  1809  1810
1811
##     1     1     1     1     1     1     1     1     1     1     1     1
1
##  1812  1813  1814  1815  1816  1817  1818  1819  1820  1821  1822  1823
1824
##     1     1     1     1     2     1     1     1     1     1     1     2
2
##  1825  1826  1827  1828  1829  1830  1831  1832  1833  1834  1835  1836
1837
##     1     1     2     1     1     1     1     1     1     2     1     1
1
##  1838  1839  1840  1841  1842  1843  1844  1845  1846  1847  1848  1849
1850
##     2     1     1     1     1     2     1     1     1     2     1     1
1
##  1851  1852  1853  1854  1855  1856  1857  1858  1859  1860  1861  1862
1863
##     1     2     1     1     1     2     2     1     1     1     1     1
1
##  1864  1865  1866  1867  1868  1869  1870  1871  1872  1873  1874  1875
1876
##     1     1     2     1     1     1     1     1     1     1     1     1
1
##  1877  1878  1879  1880  1881  1882  1883  1884  1885  1886  1887  1888
1889
##     1     1     1     1     1     1     1     1     1     1     1     1
```

```
1
##  1890  1891  1892  1893  1894  1895  1896  1897  1898  1899  1900  1901
1902
##     1     1     1     1     1     1     2     1     1     1     1     1
2
##  1903  1904  1905  1906  1907  1908  1909  1910  1911  1912  1913  1914
1915
##     1     1     2     1     1     1     1     1     1     1     1     2
1
##  1916  1917  1918  1919  1920  1921  1922  1923  1924  1925  1926  1927
1928
##     1     1     1     1     2     1     1     1     2     1     1     1
1
##  1929  1930  1931  1932  1933  1934  1935  1936  1937  1938  1939  1940
1941
##     1     1     1     1     1     1     1     2     1     1     1     1
1
##  1942  1943  1944  1945  1946  1947  1948  1949  1950  1951  1952  1953
1954
##     1     1     1     1     1     1     1     1     1     1     1     1
1
##  1955  1956  1957  1958  1959  1960  1961  1962  1963  1964  1965  1966
1967
##     1     1     1     2     2     1     1     1     1     1     1     1
1
##  1968  1969  1970  1971  1972  1973  1974  1975  1976  1977  1978  1979
1980
##     1     1     1     1     1     1     1     1     2     1     1     1
1
##  1981  1982  1983  1984  1985  1986  1987  1988  1989  1990  1991  1992
1993
##     1     1     1     1     2     1     1     1     2     2     1     1
1
##  1994  1995  1996  1997  1998  1999  2000  2001  2002  2003  2004  2005
2006
##     1     1     1     2     1     1     1     2     1     1     1     1
1
##  2007  2008  2009  2010  2011  2012  2013  2014  2015  2016  2017  2018
2019
##     2     1     2     1     2     2     2     1     1     2     2     1
1
##  2020  2021  2022  2023  2024  2025  2026  2027  2028  2029  2030  2031
2032
##     1     1     1     1     1     1     1     1     1     1     1     2
1
##  2033  2034  2035  2036  2037  2041  2042  2043  2044  2045  2046  2048
2049
##     1     1     1     1     1     2     2     1     1     1     2     1
1
##  2050  2051  2052  2054  2055  2056  2057  2058  2059  2060  2061  2063
```

```
2064
##     1     1     1     1     1     1     1     1     1     1     1     1
1
##  2065  2066  2067  2068  2069  2070  2071  2072  2073  2074  2075  2076
2077
##     2     1     1     1     1     1     2     2     1     2     1     1
1
##  2078  2079  2080  2081  2082  2083  2084  2085  2086  2087  2088  2089
2090
##     1     1     1     1     1     1     1     1     2     1     1     1
1
##  2091  2092  2093  2094  2095  2096  2097  2098  2099  2100  2101  2102
2103
##     1     1     1     2     1     1     1     1     1     1     1     1
1
##  2104  2105  2106  2107  2108  2109  2110  2111  2112  2113  2114  2115
2116
##     2     1     1     1     1     1     1     2     2     1     1     1
1
##  2117  2118  2119  2120  2121  2122  2123  2124  2125  2126  2127  2128
2129
##     1     1     1     1     1     1     1     1     1     1     1     1
1
##  2130  2131  2132  2133  2134  2135  2136  2137  2138  2139  2140  2141
2142
##     1     1     1     2     2     1     1     1     1     1     1     1
1
##  2143  2144  2145  2146  2147  2148  2149  2150  2151  2152  2153  2154
2155
##     1     1     1     1     1     1     1     1     1     1     1     1
1
##  2156  2157  2158  2159  2160  2161  2162  2163  2164  2165  2166  2167
2168
##     1     1     1     1     1     1     1     1     1     1     1     1
1
##  2169  2170  2171  2172  2173  2174  2175  2176  2177  2178  2179  2180
2181
##     1     1     1     1     1     1     1     1     1     1     2     1
1
##  2182  2183  2184  2185  2186  2187  2188  2189  2190  2191  2192  2193
2194
##     1     1     1     1     2     1     1     2     1     1     1     1
2
##  2195  2196  2197  2198  2199  2200  2201  2202  2203  2204  2205  2206
2207
##     1     1     1     1     1     1     1     1     2     2     1     1
1
##  2208  2209  2210  2211  2212  2213  2214  2215  2216  2217  2218  2219
2220
##     1     1     2     1     1     1     2     2     1     2     1     1
```

```
2
##  2221  2222  2223  2224  2225  2226  2227  2228  2229  2230  2231  2232
2233
##     1     1     1     1     1     1     1     2     1     1     2     1
1
##  2234  2235  2236  2237  2238  2239  2240  2241  2242  2243  2244  2245
2246
##     1     2     1     1     1     2     1     1     1     1     1     1
1
##  2247  2248  2249  2250  2251  2252  2253  2254  2255  2256  2257  2258
2259
##     1     2     1     2     1     1     1     1     2     2     2     1
1
##  2260  2261  2262  2263  2264  2265  2266  2267  2268  2269  2270  2271
2272
##     2     1     1     2     1     1     1     1     1     1     1     1
1
##  2273  2274  2275  2276  2277  2278  2279  2280  2281  2282  2283  2284
2285
##     1     2     1     2     1     2     1     1     1     1     1     1
2
##  2286  2287  2288  2289  2290  2291  2292  2293  2294  2295  2296  2297
2298
##     1     1     1     1     1     1     1     2     1     1     1     1
1
##  2299  2300  2301  2302  2303  2304  2305  2306  2307  2308  2309  2310
2311
##     1     1     1     2     1     1     1     1     1     1     1     1
1
##  2312  2313  2314  2315  2316  2317  2318  2319  2320  2321  2322  2323
2324
##     1     2     2     1     1     1     1     1     1     1     1     1
1
##  2325  2326  2327  2328  2329  2330  2331  2332  2333  2334  2335  2336
2337
##     1     1     1     1     1     1     1     1     1     1     1     1
1
##  2338  2339  2340  2341  2342  2343  2344  2345  2346  2347  2348  2349
2350
##     1     1     1     1     1     1     1     1     1     1     1     1
1
##  2351  2352  2353  2354  2355  2356  2357  2358  2359  2360  2361  2362
2363
##     1     1     1     1     1     1     1     1     1     1     1     1
1
##  2364  2365  2366  2367  2368  2369  2370  2371  2372  2373  2374  2375
2376
##     1     1     1     2     1     1     2     1     2     1     1     1
1
##  2377  2378  2379  2380  2381  2382  2383  2384  2385  2386  2387  2388
```

```
2389
##     1     1     1     1     1     1     1     1     1     1     1     1
1
##  2390  2391  2392  2393  2394  2395  2396  2397  2398  2399  2400  2401
2402
##     2     1     1     1     1     1     1     1     2     1     2     2
1
##  2403  2404  2405  2406  2407  2408  2409  2410  2411  2412  2413  2414
2415
##     1     1     1     1     1     1     1     1     1     1     1     1
2
##  2416  2417  2418  2419  2420  2421  2422  2423  2424  2425  2426  2427
2428
##     2     1     1     1     1     1     1     1     1     1     1     1
1
##  2429  2430  2431  2432  2433  2434  2435  2436  2437  2438  2439  2440
2441
##     2     1     1     1     1     1     1     1     1     1     1     1
1
##  2442  2443  2444  2445  2446  2447  2448  2449  2450  2451  2452  2453
2454
##     2     1     1     1     2     2     1     1     1     1     2     1
1
##  2455  2456  2457  2458  2459  2460  2461  2462  2463  2464  2465  2466
2467
##     1     1     1     2     1     1     1     1     1     1     2     1
2
##  2468  2469  2470  2471  2472  2473  2474  2475  2476  2477  2478  2479
2480
##     1     1     1     1     1     2     2     1     1     2     1     2
1
##  2481  2482  2483  2484  2485  2486  2487  2488  2489  2490  2491  2492
2493
##     1     1     1     1     2     1     2     1     1     1     1     1
1
##  2494  2495  2496  2497  2498  2499  2500  2501  2502  2503  2504  2505
2506
##     1     1     1     1     1     1     1     1     1     1     1     1
1
##  2507  2508  2509  2510  2511  2512  2513  2514  2515  2516  2517  2518
2519
##     1     1     1     1     1     1     1     1     1     1     1     1
1
##  2520  2521  2522  2523  2524  2525  2526  2527  2528  2529  2530  2531
2532
##     1     1     1     2     1     1     2     1     1     1     1     1
1
##  2533  2534  2535  2536  2537  2538  2539  2540  2541  2542  2543  2544
2545
##     1     1     1     1     1     1     2     2     1     1     2     1
```

```
1
##  2546  2547  2548  2549  2550  2551  2552  2553  2554  2555  2556  2557
2558
##     1     1     1     1     1     1     1     1     1     1     1     1
2
##  2559  2560  2561  2562  2563  2564  2565  2566  2567  2568  2569  2570
2571
##     1     1     2     2     1     1     2     1     2     1     2     1
1
##  2572  2573  2574  2575  2576  2577  2578  2579  2580  2581  2582  2583
2584
##     1     1     1     1     1     1     1     1     1     1     2     1
1
##  2585  2586  2587  2588  2589  2590  2591  2592  2593  2594  2595  2596
2597
##     1     1     1     1     1     1     2     1     1     1     1     1
1
##  2598  2599  2600  2601  2602  2603  2604  2605  2606  2607  2608  2609
2610
##     1     1     2     1     1     2     1     1     1     2     1     2
1
##  2611  2612  2613  2614  2615  2616  2617  2618  2619  2620  2621  2622
2623
##     1     1     1     1     1     1     1     2     1     1     1     1
1
##  2624  2625  2626  2627  2628  2629  2630  2631  2632  2633  2634  2635
2636
##     2     1     1     2     1     1     1     1     1     1     2     1
1
##  2637  2638  2639  2640  2641  2642  2643  2644  2645  2646  2647  2648
2649
##     1     2     1     1     1     1     1     1     1     2     1     1
2
##  2650  2651  2652  2653  2654  2655  2656  2657  2658  2659  2660  2661
2662
##     1     2     1     1     1     1     1     1     1     1     2     1
1
##  2663  2664  2665  2666  2667  2668  2669  2670  2671  2672  2673  2674
2675
##     1     2     1     1     1     1     2     1     1     1     1     1
1
##  2676  2677  2678  2679  2680  2681  2682  2683  2684  2685  2686  2687
2688
##     1     1     1     1     1     1     1     1     1     1     1     1
1
##  2689  2690  2691  2692  2693  2694  2695  2696  2697  2698  2699  2700
2701
##     1     1     1     1     1     1     1     1     1     1     1     1
1
##  2702  2703  2704  2705  2706  2707  2708  2709  2710  2711  2712  2713
```

```
2714
##    1    1    2    1    1    1    1    1    1    2    1    1
1
##  2715  2716  2717  2718  2719  2720  2721  2722  2723  2724  2725  2726
2727
##    1    1    1    1    1    1    1    1    1    1    1    2
2
##  2728  2729  2730  2731  2732  2733  2734  2735  2736  2737  2738  2739
2740
##    1    1    1    1    1    1    1    1    1    1    1    2
1
##  2741  2742  2743  2744  2745  2746  2747  2748  2749  2750  2751  2752
2753
##    1    1    1    1    1    1    2    1    1    1    1    1
1
##  2755  2756  2757  2758  2759  2760  2761  2762  2763  2764  2765  2766
2767
##    1    1    1    2    1    2    1    1    1    1    1    1
1
##  2768  2769  2770  2771  2772  2773  2774  2775  2776  2777  2778  2779
2780
##    1    1    1    1    1    1    1    1    1    2    1    1
1
##  2781  2782  2783  2784  2785  2786  2787  2788  2789  2790  2791  2792
2793
##    1    1    2    1    1    1    1    1    1    1    1    1
1
##  2794  2795  2796  2797  2798  2799  2800  2801  2802  2803  2804  2805
2806
##    1    1    1    1    1    1    1    1    1    1    1    1
1
##  2807  2808  2809  2810  2811  2812  2813  2814  2815  2816  2817  2818
2819
##    1    1    1    1    1    1    1    2    1    1    1    1
1
##  2820  2821  2822  2823  2824  2825  2826  2827  2828  2829  2830  2831
2832
##    1    1    2    1    1    2    1    1    1    1    1    1
1
##  2833  2834  2835  2836  2837  2838  2839  2840  2841  2842  2843  2844
2845
##    1    1    1    1    1    1    1    2    1    1    2    1
2
##  2846  2847  2848  2849  2850  2851  2852  2853  2854  2855  2856  2857
2858
##    1    1    1    1    1    1    1    1    1    1    1    2
1
##  2859  2860  2861  2862  2863  2864  2865  2866  2867  2868  2869  2870
2871
##    1    2    2    1    1    1    1    1    1    1    1    1
```

```
1
##  2872  2873  2874  2875  2876  2877  2878  2879  2880  2881  2882  2883
2884
##     1     1     1     1     1     1     1     2     1     1     1     1
1
##  2885  2886  2887  2888  2889  2890  2891  2892  2893  2894  2895  2896
2897
##     1     1     1     1     1     1     2     1     1     1     1     1
1
##  2898  2899  2900  2901  2902  2903  2904  2905  2906  2907  2908  2909
2910
##     1     1     1     1     1     2     1     1     2     1     1     1
1
##  2911  2912  2913  2914  2915  2916  2917  2918  2919  2920  2921  2922
2923
##     1     1     1     1     1     1     1     1     1     1     1     1
1
##  2924  2925  2926  2927  2928  2929  2930  2931  2932  2933  2934  2935
2936
##     1     1     1     1     1     1     1     1     1     1     1     1
1
##  2937  2938  2939  2940  2941  2942  2943  2944  2945  2946  2947  2948
2949
##     1     1     1     2     1     2     2     1     1     1     1     1
1
##  2950  2951  2952  2953  2954  2955  2956  2957  2958  2959  2960  2961
2962
##     1     1     1     1     1     1     1     1     1     1     1     1
1
##  2963  2964  2965  2966  2967  2968  2969  2970  2971  2972  2973  2974
2975
##     1     1     1     1     1     2     2     2     2     1     1     1
2
##  2976  2977  2978  2979  2980  2981  2982  2983  2984  2985  2986  2987
2988
##     1     1     1     1     1     1     1     1     1     1     1     1
1
##  2989  2990  2991  2992  2993  2994  2995  2996  2997  2998  2999  3000
3001
##     1     1     1     1     1     1     1     1     2     1     1     1
1
##  3002  3003  3004  3005  3006  3007  3008  3009  3010  3011  3012  3013
3014
##     1     1     1     1     1     1     1     1     1     1     2     1
1
##  3015  3016  3017  3018  3019  3020  3021  3022  3023  3024  3025  3026
3027
##     1     1     1     1     1     2     1     2     1     2     1     1
1
##  3028  3029  3030  3031  3032  3033  3034  3035  3036  3037  3038  3039
```

```
3040
##     1     1     2     1     1     1     1     1     1     1     1     1
2
##  3041  3042  3043  3044  3045  3046  3047  3048  3049  3050  3051  3052
3053
##     1     1     1     1     1     1     1     1     1     1     1     1
1
##  3054  3055  3056  3057  3058  3059  3060  3061  3062  3063  3064  3065
3066
##     1     1     1     1     1     1     2     1     1     1     1     1
1
##  3067  3068  3069  3070  3071  3072  3073  3074  3075  3076  3077  3078
3079
##     1     1     1     1     1     1     1     1     1     1     1     1
1
##  3080  3081  3082  3083  3084  3085  3086  3087  3088  3089  3090  3091
3092
##     2     1     1     1     1     1     1     1     1     1     1     1
2
##  3093  3094  3095  3096  3097  3098  3099  3100  3101  3102  3103  3104
3105
##     2     1     2     1     1     1     1     1     1     1     1     1
1
##  3106  3107  3108  3109  3110  3111  3112  3113  3114  3115  3116  3117
3118
##     2     1     1     1     1     1     1     1     1     1     1     1
1
##  3119  3120  3121  3122  3123  3124  3125  3126  3127  3128  3129  3130
3131
##     1     1     1     1     2     1     1     1     1     2     1     1
1
##  3132  3133  3134  3135  3136  3137  3138  3139  3140  3141  3142  3143
3144
##     1     1     1     1     1     1     1     1     1     1     1     1
2
##  3145  3146  3147  3148  3149  3150  3151  3152  3153  3154  3155  3156
3157
##     1     1     1     1     2     2     1     1     1     1     1     1
2
##  3158  3159  3160  3161  3162  3163  3164  3165  3166  3167  3168  3169
3170
##     1     1     1     1     1     2     1     2     1     1     1     1
2
##  3171  3172  3173  3174  3175  3176  3177  3178  3179  3180  3181  3182
3183
##     1     2     2     1     1     1     1     1     1     2     1     1
1
##  3184  3185  3186  3187  3188  3189  3190  3191  3192  3193  3194  3195
3196
##     1     1     2     1     1     1     1     1     2     1     2     1
```

```
2
##  3197  3198  3199  3200  3201  3202  3203  3204  3205  3206  3207  3208
3209
##     1     1     1     1     2     1     2     1     1     1     1     1
1
##  3210  3211  3212  3213  3214  3215  3216  3217  3218  3219  3220  3221
3222
##     1     1     1     1     2     1     2     1     1     1     2     1
1
##  3223  3224  3225  3226  3227  3228  3229  3230  3231  3232  3233  3234
3235
##     1     1     1     1     1     2     2     1     1     1     1     1
2
##  3236  3237  3238  3239  3240  3241  3242  3243  3244  3245  3246  3247
3248
##     1     1     1     1     1     1     1     1     1     2     1     1
1
##  3249  3250  3251  3252  3253  3254  3255  3256  3257  3258  3259  3260
3261
##     2     1     1     1     1     1     1     1     1     1     1     1
2
##  3262  3263  3264  3265  3266  3267  3268  3269  3270  3271  3272  3273
3274
##     1     1     1     1     1     2     1     2     1     1     2     1
1
##  3275  3276  3277  3278  3279  3280  3281  3282  3283  3284  3285  3286
3287
##     1     1     1     1     1     1     1     1     1     1     1     1
1
##  3288  3289  3290  3291  3292  3293  3294  3295  3296  3297  3298  3299
3300
##     1     1     1     1     1     1     2     1     1     1     1     1
1
##  3301  3302  3303  3304  3305  3306  3307  3308  3309  3310  3311  3312
3313
##     1     1     1     1     1     1     1     1     2     1     1     1
1
##  3314  3315  3316  3317  3318  3319  3320  3321  3322  3323  3324  3325
3326
##     2     1     1     1     1     1     1     1     1     1     1     1
1
##  3327  3328  3329  3330  3331  3332  3333  3334  3335  3336  3337  3338
3339
##     1     1     2     1     1     1     1     1     1     1     1     1
2
##  3340  3341  3342  3343  3344  3345  3346  3347  3348  3349  3350  3351
3352
##     1     1     2     1     1     1     2     1     1     2     1     1
1
##  3353  3354  3355  3356  3357  3358  3359  3360  3361  3362  3363  3364
```

```
3365
##     1     1     1     1     1     1     1     2     1     1     1     1
1
##  3366  3367  3368  3369  3370  3371  3372  3373  3374  3375  3376  3377
3378
##     1     1     1     1     2     2     1     1     1     1     1     1
1
##  3379  3380  3381  3382  3383  3384  3385  3386  3387  3388  3389  3390
3391
##     1     1     1     1     1     1     1     1     1     1     1     1
1
##  3392  3393  3394  3395  3396  3397  3398  3399  3400  3401  3402  3403
3404
##     1     2     1     1     1     1     2     2     1     1     1     1
1
##  3405  3406  3407  3408  3409  3410  3411  3412  3413  3414  3415  3416
3417
##     1     1     1     2     1     1     1     1     1     1     1     1
1
##  3418  3419  3420  3421  3422  3423  3424  3425  3426  3427  3428  3429
3430
##     1     1     1     2     1     2     1     1     1     1     1     1
2
##  3431  3432  3433  3434  3435  3436  3437  3438  3439  3440  3441  3442
3443
##     1     1     1     1     1     1     1     1     1     2     1     1
1
##  3444  3445  3446  3447  3448  3449  3450  3451  3452  3453  3454  3455
3456
##     1     1     1     1     1     1     1     1     1     1     2     1
1
##  3457  3458  3459  3460  3461  3462  3463  3464  3465  3466  3467  3468
3469
##     1     1     1     1     1     1     1     1     1     1     1     1
1
##  3470  3471  3472  3473  3474  3475  3476  3477  3478  3479  3480  3481
3482
##     1     1     1     1     1     1     1     1     1     1     1     1
1
##  3483  3484  3485  3486  3487  3488  3489  3490  3491  3492  3493  3494
3495
##     2     1     1     1     1     1     1     1     1     2     1     1
1
##  3496  3497  3498  3499  3500  3501  3502  3503  3504  3505  3506  3507
3508
##     1     1     1     1     1     1     1     1     2     1     1     1
1
##  3509  3510  3511  3512  3513  3514  3515  3516  3517  3518  3519  3520
3521
##     1     1     2     1     2     1     1     1     1     1     1     1
```

```
1
##  3522  3523  3524  3525  3526  3527  3528  3529  3530  3531  3532  3533
3534
##     1     1     1     2     1     2     1     1     2     1     1     1
1
##  3535  3536  3537  3538  3539  3540  3541  3542  3543  3544  3545  3546
3547
##     1     1     1     1     1     1     1     2     2     1     1     1
1
##  3548  3549  3550  3551  3552  3553  3554  3555  3556  3557  3558  3559
3560
##     1     2     1     1     2     1     1     1     1     1     1     1
1
##  3561  3562  3563  3564  3565  3566  3567  3568  3569  3570  3571  3572
3573
##     1     2     1     1     1     1     1     1     1     1     1     1
1
##  3574  3575  3576  3577  3578  3579  3580  3581  3582  3583  3584  3585
3586
##     1     2     1     1     1     1     1     1     1     1     1     1
1
##  3587  3588  3589  3590  3591  3592  3593  3594  3595  3596  3597  3598
3599
##     1     1     1     1     1     2     1     1     1     1     2     1
1
##  3600  3601  3602  3603  3604  3605  3606  3607  3608  3609  3610  3611
3612
##     1     1     1     2     1     1     1     1     1     1     1     1
1
##  3613  3614  3615  3616  3617  3618  3619  3620  3621  3622  3623  3624
3625
##     1     1     1     1     1     1     1     2     1     1     1     1
1
##  3626  3627  3628  3629  3630  3631  3632  3633  3634  3635  3636  3637
3638
##     1     1     1     2     1     2     1     1     1     1     1     2
1
##  3639  3640  3641  3642  3643  3644  3645  3646  3647  3648  3649  3650
3651
##     1     1     1     1     1     1     1     1     1     1     1     1
1
##  3652  3653  3654  3655  3656  3657  3658  3659  3660  3661  3662  3663
3664
##     1     1     1     2     1     1     1     1     1     1     1     1
1
##  3665  3666  3667  3668  3669  3670  3671  3672  3673  3674  3675  3676
3677
##     1     1     1     1     1     1     1     1     1     1     1     1
1
##  3678  3679  3680  3681  3682  3683  3684  3685  3686  3687  3688  3689
```

```
3690
##     1     1     1     2     1     2     1     1     1     1     1     1
2
##  3691  3692  3693  3694  3695  3696  3697  3698  3699  3700  3701  3702
3703
##     1     1     1     1     1     1     1     1     1     1     1     1
1
##  3704  3705  3706  3707  3708  3709  3710  3711  3712  3713  3714  3715
3716
##     1     1     1     1     1     1     1     1     1     2     2     1
1
##  3717  3718  3719  3720  3721  3722  3723  3724  3725  3726  3727  3728
3729
##     1     1     1     1     1     1     1     1     1     1     1     1
1
##  3730  3731  3732  3733  3734  3735  3736  3737  3738  3739  3740  3741
3742
##     1     1     1     1     1     1     1     1     1     1     1     1
1
##  3743  3744  3745  3746  3747  3748  3749  3750  3751  3752  3753  3754
3755
##     1     1     1     1     1     1     1     2     1     1     2     1
1
##  3756  3757  3758  3759  3760  3761  3762  3763  3764  3765  3766  3767
3768
##     1     1     1     1     2     1     1     1     1     1     2     1
1
##  3769  3770  3771  3772  3773  3774  3775  3776  3777  3778  3779  3780
3781
##     1     1     1     1     1     1     1     1     1     1     1     2
1
##  3782  3783  3784  3785  3786  3787  3788  3789  3790  3791  3792  3793
3794
##     1     1     1     1     1     1     1     1     1     1     1     1
1
##  3795  3796  3797  3798  3799  3800  3801  3802  3803  3804  3805  3806
3807
##     1     1     1     1     1     1     1     2     1     1     1     1
2
##  3808  3809  3810  3811  3812  3813  3814  3815  3816  3817  3818  3819
3820
##     2     1     1     1     2     2     1     1     1     1     2     1
1
##  3821  3822  3823  3824  3825  3826  3827  3828  3829  3830  3831  3832
3833
##     1     1     1     2     1     1     1     1     1     1     1     1
1
##  3834  3835  3836  3837  3838  3839  3840  3841  3842  3843  3844  3845
3846
##     1     1     1     1     1     1     1     1     1     1     1     1
```

```
1
##  3847  3848  3849  3850  3851  3852  3853  3854  3855  3856  3857  3858
3859
##     1     1     1     1     1     1     1     1     1     1     1     1
1
##  3860  3861  3862  3863  3864  3865  3866  3867  3868  3869  3870  3871
3872
##     1     1     1     1     2     2     1     1     1     1     1     1
1
##  3873  3874  3875  3876  3877  3878  3879  3880  3881  3882  3883  3884
3885
##     1     1     1     1     2     1     1     1     2     1     1     1
2
##  3886  3887  3888  3889  3890  3891  3892  3893  3894  3895  3896  3897
3898
##     1     1     1     2     2     1     1     1     1     1     1     2
2
##  3899  3900  3901  3902  3903  3904  3905  3906  3907  3908  3909  3910
3911
##     2     1     1     1     1     1     1     1     1     1     1     1
1
##  3912  3913  3914  3915  3916  3917  3918  3919  3920  3921  3922  3923
3924
##     1     2     1     1     1     2     1     1     1     1     1     1
1
##  3925  3926  3927  3928  3929  3930  3931  3932  3933  3934  3935  3936
3937
##     1     1     1     1     1     1     2     1     1     1     1     1
2
##  3938  3939  3940  3941  3942  3943  3944  3945  3946  3947  3948  3949
3950
##     1     1     1     1     1     1     1     1     1     1     1     1
1
##  3951  3952  3953  3954  3955  3956  3957  3958  3959  3960  3961  3962
3963
##     1     1     1     1     1     2     1     1     1     1     1     1
1
##  3964  3965  3966  3967  3968  3969  3970  3971  3972  3973  3974  3975
3976
##     1     1     1     2     2     1     2     1     1     1     1     1
1
##  3977  3978  3979  3980  3981  3982  3983  3984  3985  3986  3987  3988
3989
##     1     1     1     1     1     1     1     1     1     1     1     1
1
##  3990  3991  3992  3993  3994  3995  3996  3997  3998  3999  4000  4001
4002
##     1     1     1     1     1     1     1     1     1     1     1     2
1
##  4003  4004  4005  4006  4007  4008  4009  4010  4011  4012  4013  4014
```

```
4015
##     1     1     1     1     1     1     1     1     1     1     1     1
1
##  4016  4017  4018  4019  4020  4021  4022  4023  4024  4025  4026  4027
4028
##     1     1     1     1     1     1     1     1     2     1     1     2
2
##  4029  4030  4031  4032  4033  4034  4035  4036  4037  4038  4039  4040
4041
##     1     1     2     1     1     1     1     1     1     1     1     1
1
##  4042  4043  4044  4045  4046  4047  4048  4049  4050  4051  4052  4053
4054
##     1     1     1     1     1     1     1     1     2     1     1     1
1
##  4055  4056  4057  4058  4059  4060  4061  4062  4063  4064  4065  4066
4067
##     1     1     2     1     1     1     1     2     2     1     1     2
1
##  4068  4069  4070  4071  4072  4073  4074  4075  4076  4077  4078  4079
4080
##     1     1     1     1     1     2     1     2     1     1     1     1
1
##  4081  4082  4083  4084  4085  4086  4087  4088  4089  4090  4091  4092
4093
##     1     1     1     1     1     1     1     1     1     1     1     1
1
##  4094  4095  4096  4097  4098  4099  4100  4101  4102  4103  4104  4105
4106
##     1     1     1     1     1     1     1     1     1     1     1     1
2
##  4107  4108  4109  4110  4111  4112  4113  4114  4115  4116  4117  4118
4119
##     1     1     2     2     1     1     2     1     2     2     1     1
1
##  4120  4121  4122  4123  4124  4125  4126  4127  4128  4129  4130  4131
4132
##     2     2     1     1     1     1     1     1     1     1     1     2
1
##  4133  4134  4135  4136  4137  4138  4139  4140  4141  4142  4143  4144
4145
##     1     1     2     1     1     1     1     1     1     1     1     1
1
##  4146  4147  4148  4149  4150  4151  4152  4153  4154  4155  4156  4157
4158
##     1     2     1     1     1     2     1     1     1     1     1     1
2
##  4159  4160  4161  4162  4163  4164  4165  4166  4167  4168  4169  4170
4171
##     1     1     1     1     2     1     1     1     1     1     1     1
```

```
1
##  4172  4173  4174  4175  4176  4177  4178  4179  4180  4181  4182  4183
4184
##     1     1     2     1     1     1     1     1     1     2     2     1
1
##  4185  4186  4187  4188  4189  4190  4191  4192  4193  4194  4195  4196
4197
##     2     1     1     1     1     1     1     1     1     2     1     1
1
##  4198  4199  4200  4201  4202  4203  4204  4205  4206  4207  4208  4209
4210
##     1     1     2     1     1     1     1     1     1     2     1     1
1
##  4211  4212  4213  4214  4215  4216  4217  4218  4219  4220  4221  4222
4223
##     1     1     1     1     1     1     1     1     1     1     1     1
1
##  4224  4225  4226  4227  4228  4229  4230  4231  4232  4233  4234  4235
4236
##     1     1     1     2     1     1     1     2     1     1     1     2
1
##  4237  4238  4239  4240  4241  4242  4243  4244  4245  4246  4247  4248
4249
##     1     1     1     1     1     1     1     1     1     2     1     1
1
##  4250  4251  4252  4253  4254  4255  4256  4257  4258  4259  4260  4261
4262
##     1     1     1     1     2     1     1     1     2     1     1     2
1
##  4263  4264  4265  4266  4267  4268  4269  4270  4271  4272  4273  4274
4275
##     1     2     1     1     1     1     2     1     1     1     1     1
1
##  4276  4277  4278  4279  4280  4281  4282  4283  4284  4285  4286  4287
4288
##     2     1     1     2     2     1     1     1     1     1     2     1
1
##  4289  4290  4291  4292  4293  4294  4295  4296  4297  4298  4299  4300
4301
##     1     1     1     1     1     1     1     1     1     1     1     2
1
##  4302  4303  4304  4305  4306  4307  4308  4309  4310  4311  4312  4313
4314
##     2     1     1     1     1     1     1     1     1     1     1     1
1
##  4315  4316  4317  4318  4319  4320  4321  4322  4323  4324  4325  4326
4327
##     1     1     2     1     1     1     1     2     1     1     1     1
2
##  4328  4329  4330  4331  4332  4333  4334  4335  4336  4337  4338  4339
```

```
4340
##    1    1    1    1    1    1    1    1    1    1    1    1
1
##  4341  4342  4343  4344  4345  4346  4347  4348  4349  4350  4351  4352
4353
##    1    2    1    1    1    1    2    1    1    1    1    1
2
##  4354  4355  4356  4357  4358  4359  4360  4361  4362  4363  4364  4365
4366
##    2    1    1    1    1    2    2    1    1    1    1    1
1
##  4367  4368  4369  4370  4371  4372  4373  4374  4375  4376  4377  4378
4379
##    1    1    1    1    1    1    2    1    1    1    1    1
2
##  4380  4381  4382  4383  4384  4385  4386  4387  4388  4389  4390  4391
4392
##    1    1    2    1    1    2    1    1    1    1    1    1
1
##  4393  4394  4395  4396  4397  4398  4399  4400  4401  4402  4403  4404
4405
##    1    1    1    1    1    2    2    1    1    2    1    1
1
##  4406  4407  4408  4409  4410  4411  4412  4413  4414  4415  4416  4417
4418
##    1    1    1    1    1    1    1    1    1    1    1    1
1
##  4419  4420  4421  4422  4423  4424  4425  4426  4427  4428  4429  4430
4431
##    1    2    1    1    1    2    1    1    1    1    1    1
1
##  4432  4433  4434  4435  4436  4437  4438  4439  4440  4441  4442  4443
4444
##    2    2    1    1    1    1    1    1    1    1    1    1
2
##  4445  4446  4447  4448  4449  4450  4451  4452  4453  4454  4455  4456
4457
##    1    1    1    1    1    1    1    1    1    1    1    1
1
##  4458  4459  4460  4461  4462  4463  4464  4465  4466  4467  4468  4469
4470
##    1    1    1    1    1    1    1    1    1    1    1    1
1
##  4471  4472  4473  4474  4475  4476  4477  4478  4479  4480  4481  4482
4483
##    1    1    1    1    1    1    1    1    1    1    1    1
1
##  4484  4485  4486  4487  4488  4489  4490  4491  4492  4493  4494  4495
4496
##    1    1    2    1    1    2    1    1    1    1    2    1
```

```
1
##  4497  4498  4499  4500  4501  4502  4503  4504  4505  4506  4507  4508
4509
##     2     1     1     1     1     1     1     1     1     1     1     1
1
##  4510  4511  4512  4513  4514  4515  4516  4517  4518  4519  4520  4521
4522
##     2     1     1     1     1     1     2     2     1     1     1     1
2
##  4523  4524  4525  4526  4527  4528  4529  4530  4531  4532  4533  4534
4535
##     1     1     1     1     1     1     1     1     1     1     1     1
1
##  4536  4537  4538  4539  4540  4541  4542  4543  4544  4545  4546  4547
4548
##     1     1     1     1     1     2     1     1     1     1     1     2
1
##  4549  4550  4551  4552  4553  4554  4555  4556  4557  4558  4559  4560
4561
##     1     1     1     1     1     1     1     1     2     1     1     1
2
##  4562  4563  4564  4565  4566  4567  4568  4569  4570  4571  4572  4573
4574
##     1     1     1     1     1     1     1     2     1     1     1     1
1
##  4575  4576  4577  4578  4579  4580  4581  4582  4583  4584  4585  4586
4587
##     1     1     2     1     1     1     1     1     1     1     1     2
1
##  4588  4589  4590  4591  4592  4593  4594  4595  4596  4597  4598  4599
4600
##     1     1     1     1     2     1     1     1     1     1     1     1
1
##  4601  4602  4603  4604  4605  4606  4607  4608  4609  4610  4611  4612
4613
##     1     2     1     1     1     1     1     1     1     1     1     1
1
##  4614  4615  4616  4617  4618  4619  4620  4621  4622  4623  4624  4625
4626
##     1     1     1     2     1     1     1     1     1     1     1     1
1
##  4627  4628  4629  4630  4631  4632  4633  4634  4635  4636  4637  4638
4639
##     1     1     1     2     1     1     1     1     1     1     1     1
1
##  4640  4641  4642  4643  4644  4645  4646  4647  4648  4649  4650  4651
4652
##     1     1     1     2     1     1     2     1     1     1     1     1
1
##  4653  4654  4655  4656  4657  4658  4659  4660  4661  4662  4663  4664
```

```
4665
##     1     1     1     2     1     1     2     1     1     1     1     1
2
##  4666  4667  4668  4669  4670  4671  4672  4673  4674  4675  4676  4677
4678
##     1     1     1     1     1     2     1     1     1     2     1     1
1
##  4679  4680  4681  4682  4683  4684  4685  4686  4687  4688  4689  4690
4691
##     1     1     2     2     1     1     1     1     1     1     1     1
1
##  4692  4693  4694  4695  4696  4697  4698  4699  4700  4701  4702  4703
4704
##     1     1     1     1     1     1     2     1     1     2     1     2
1
##  4705  4706  4707  4708  4709  4710  4711  4712  4713  4714  4715  4716
4717
##     1     1     1     1     1     1     1     1     1     1     1     1
1
##  4718  4719  4720  4721  4722  4723  4724  4725  4726  4727  4728  4729
4730
##     1     1     1     1     1     1     1     1     2     1     1     1
1
##  4731  4732  4733  4734  4735  4736  4737  4738  4739  4740  4741  4742
4743
##     1     1     1     1     1     1     1     1     1     1     1     1
1
##  4744  4745  4746  4747  4748  4749  4750  4751  4752  4753  4754  4755
4756
##     1     1     1     1     1     1     2     1     2     1     1     1
1
##  4757  4758  4759  4760  4761  4762  4763  4764  4765  4766  4767  4768
4769
##     1     1     1     1     1     1     1     1     1     1     1     1
1
##  4770  4771  4772  4773  4774  4775  4776  4777  4778  4779  4780  4781
4782
##     2     1     1     1     1     1     1     1     1     2     1     2
1
##  4783  4784  4785  4786  4787  4788  4789  4790  4791  4792  4793  4794
4795
##     1     1     1     1     1     1     2     1     1     1     1     2
1
##  4796  4797  4798  4799  4801  4802  4803  4804  4805  4806  4807  4808
4809
##     1     1     1     1     1     1     2     1     1     1     1     1
1
##  4810  4811  4812  4813  4814  4815  4816  4817  4818  4819  4820  4821
4822
##     1     1     1     1     1     1     1     2     1     1     1     2
```

```
2
##  4823  4824  4825  4826  4827  4828  4829  4830  4831  4832  4833  4834
4835
##     1     1     1     1     1     1     2     1     1     1     1     1
1
##  4836  4837  4838  4839  4840  4841  4842  4843  4844  4845  4846  4847
4848
##     1     1     1     1     1     1     2     1     1     1     1     1
1
##  4849  4850  4851  4852  4853  4854  4855  4856  4857  4858  4859  4860
4861
##     1     1     2     1     1     1     2     1     1     1     1     1
1
##  4862  4863  4864  4865  4866  4867  4868  4869  4870  4871  4872  4873
4874
##     1     1     1     1     1     1     1     1     2     2     2     1
1
##  4875  4876  4877  4878  4879  4880  4881  4882  4883  4884  4885  4886
4887
##     2     1     1     1     1     1     1     1     1     1     2     1
1
##  4888  4889  4890  4891  4892  4893  4894  4895  4896  4897  4898  4899
4900
##     1     1     2     1     1     1     1     1     1     1     2     1
1
##  4901  4902  4903  4904  4905  4906  4907  4908  4909  4910  4911  4912
4913
##     1     1     2     2     2     1     1     1     1     1     1     1
1
##  4914  4915  4917  4918  4919  4920  4921  4922  4923  4924  4925  4926
4927
##     1     1     1     1     1     1     2     1     2     1     1     1
1
##  4928  4929  4930  4931  4932  4933  4934  4935  4936  4937  4938  4939
4940
##     1     2     1     1     1     1     2     1     1     2     2     1
1
##  4941  4942  4943  4944  4945  4946  4947  4948  4949  4950  4951  4952
4953
##     1     1     1     1     1     2     1     1     1     2     2     1
1
##  4954  4955  4956  4957  4958  4959  4960  4961  4962  4963  4964  4965
4966
##     2     1     1     1     1     1     1     1     1     1     1     1
1
##  4967  4968  4969  4970  4971  4972  4973  4974  4975  4976  4977  4978
4979
##     1     1     1     1     1     1     1     1     1     1     1     1
1
##  4980  4981  4982  4983  4984  4985  4986  4987  4988  4989  4990  4991
```

```
4992
##    1    1    1    1    1    1    1    1    1    1    1    1
1
##  4993  4994  4995  4996  4997  4998  4999  5000  5001  5002  5003  5004
5005
##    2    2    1    1    1    1    2    1    1    1    1    1
2
##  5006  5007  5008  5009  5010  5011  5012  5013  5014  5015  5016  5017
5018
##    1    1    1    1    2    1    1    1    1    1    1    1
1
##  5019  5020  5021  5022  5023  5024  5025  5026  5027  5028  5029  5030
5031
##    1    1    1    1    1    1    1    1    1    2    2    1
2
##  5032  5033  5034  5035  5036  5037  5038  5039  5040  5041  5042  5043
5044
##    2    1    1    1    1    1    1    1    2    1    1    1
1
##  5045  5046  5047  5048  5049  5050  5051  5052  5053  5054  5055  5056
5057
##    1    2    1    1    1    1    1    2    1    1    1    1
1
##  5058  5059  5060  5061  5062  5063  5064  5065  5066  5067  5068  5069
5070
##    1    1    1    1    1    1    1    1    1    1    2    1
1
##  5071  5072  5073  5074  5075  5076  5077  5078  5079  5080  5081  5082
5083
##    1    1    1    1    1    1    1    1    1    1    1    1
1
##  5084  5085  5086  5087  5088  5089  5090  5091  5092  5093  5094  5095
5098
##    1    1    1    1    1    1    1    2    1    1    1    1
1
##  5099  5100  5101  5102  5103  5104  5105  5106  5107  5109  5110  5111
5112
##    1    1    1    1    2    1    1    1    1    1    1    1
2
##  5113  5114  5115  5116  5117  5118  5119  5120  5121  5122  5123  5124
5126
##    1    1    1    1    1    1    1    1    1    1    1    1
1
##  5127  5128  5129  5130  5131  5132  5133  5134  5135  5136  5137  5138
5139
##    1    1    1    1    2    1    1    1    1    1    1    1
1
##  5140  5141  5142  5143  5144  5145  5146  5147  5148  5149  5150  5151
5152
##    1    1    1    1    1    1    2    2    1    1    1    2
```

```
1
##  5153  5154  5155  5156  5157  5158  5159  5160  5161  5162  5163  5164
5165
##     2     2     1     1     1     1     1     1     1     2     1     1
1
##  5166  5167  5168  5169  5170  5171  5172  5173  5174  5175  5176  5177
5178
##     1     1     1     1     1     1     1     1     1     2     1     1
1
##  5179  5180  5181  5182  5183  5184  5185  5186  5187  5188  5189  5190
5191
##     2     1     1     1     1     1     1     1     1     1     2     1
1
##  5192  5193  5194  5195  5196  5197  5198  5199  5200  5201  5202  5203
5204
##     1     1     1     2     2     1     1     1     1     1     1     1
2
##  5205  5206  5207  5208  5209  5210  5211  5212  5213  5214  5215  5216
5217
##     1     1     1     2     2     1     1     1     1     1     1     2
1
##  5218  5219  5220  5221  5222  5223  5224  5225  5226  5227  5228  5229
5230
##     2     1     1     1     1     2     1     1     1     1     1     1
1
##  5231  5232  5233  5234  5235  5236  5237  5238  5239  5240  5241  5242
5243
##     1     1     1     1     1     1     1     2     1     2     1     1
1
##  5244  5245  5246  5247  5248  5249  5250  5251  5252  5253  5254  5255
5256
##     1     1     1     1     1     1     1     1     2     1     1     1
1
##  5257  5258  5259  5260  5261  5262  5263  5264  5265  5266  5267  5268
5269
##     1     1     1     1     1     2     1     2     1     1     1     1
1
##  5270  5271  5272  5273  5274  5275  5276  5277  5278  5279  5280  5281
5282
##     1     1     1     1     1     1     2     1     1     1     1     1
1
##  5283  5284  5285  5286  5287  5288  5289  5290  5291  5292  5293  5294
5295
##     1     1     1     1     1     1     1     2     1     1     1     1
1
##  5296  5297  5298  5299  5300  5301  5302  5303  5304  5305  5306  5307
5308
##     1     1     1     1     2     1     1     1     1     1     1     1
1
##  5309  5310  5311  5312  5313  5314  5315  5316  5317  5318  5319  5320
```

```
5321
##     1     1     1     1     1     1     1     1     1     1     2     1
1
##  5322  5323  5324  5325  5326  5327  5328  5329  5330  5331  5332  5333
5334
##     1     1     1     1     1     1     1     1     1     1     1     1
2
##  5335  5336  5337  5338  5339  5340  5341  5342  5343  5344  5345  5346
5347
##     1     1     1     1     2     1     1     1     1     1     1     1
1
##  5348  5349  5350  5351  5352  5353  5354  5355  5356  5357  5358  5359
5360
##     1     1     1     1     1     1     1     1     1     1     1     1
1
##  5361  5362  5363  5364  5365  5366  5367  5368  5369  5370  5371  5372
5373
##     1     1     1     1     1     1     1     1     2     2     1     2
1
##  5374  5375  5376  5377  5378  5379  5380  5381  5382  5383  5384  5385
5386
##     1     2     1     1     1     1     1     1     2     1     1     1
1
##  5387  5388  5389  5390  5391  5392  5393  5394  5395  5396  5397  5398
5399
##     1     1     1     1     1     1     1     1     1     1     1     1
1
##  5400  5401  5402  5403  5404  5405  5406  5407  5408  5409  5410  5411
5412
##     1     1     2     1     1     1     1     1     1     1     1     2
1
##  5413  5414  5415  5416  5417  5418  5419  5420  5421  5422  5423  5424
5425
##     1     2     1     1     1     1     1     2     1     1     1     1
1
##  5426  5427  5428  5429  5430  5431  5432  5433  5434  5435  5436  5437
5438
##     2     1     1     1     1     1     1     1     1     2     1     1
1
##  5439  5440  5441  5442  5443  5444  5445  5446  5447  5448  5449  5450
5451
##     1     1     2     1     1     1     1     1     1     2     1     2
1
##  5452  5453  5454  5455  5456  5457  5458  5459  5460  5461  5462  5463
5464
##     1     1     1     1     1     1     1     2     1     1     1     1
1
##  5465  5466  5467  5468  5469  5470  5471  5472  5473  5474  5475  5476
5477
##     2     1     1     1     2     1     1     1     1     2     1     2
```

```
1
##  5478  5479  5480  5481  5482  5483  5484  5485  5486  5487  5488  5489
5490
##     1     1     1     1     1     1     1     1     1     1     1     2
1
##  5491  5492  5493  5494  5495  5496  5497  5498  5499  5500  5501  5502
5503
##     1     1     1     1     1     1     1     2     1     1     2     1
1
##  5504  5505  5506  5507  5508  5509  5510  5511  5512  5513  5514  5515
5516
##     1     1     1     1     1     1     2     1     1     2     2     1
1
##  5517  5518  5519  5520  5521  5522  5523  5524  5525  5526  5527  5528
5529
##     1     2     1     2     1     1     1     2     1     1     2     1
1
##  5530  5531  5532  5533  5534  5535  5536  5537  5538  5539  5540  5541
5542
##     1     1     1     1     1     1     2     2     1     1     1     1
1
##  5543  5544  5545  5546  5547  5548  5549  5550  5551  5552  5553  5554
5555
##     1     1     1     1     2     1     1     1     1     1     1     1
2
##  5556  5557  5558  5559  5560  5561  5562  5563  5564  5565  5566  5567
5568
##     2     1     1     1     1     1     2     1     1     1     1     1
1
##  5569  5570  5571  5572  5573  5574  5575  5576  5577  5578  5579  5580
5581
##     1     2     1     2     1     1     1     2     1     1     1     1
1
##  5582  5583  5584  5585  5586  5587  5588  5589  5590  5591  5592  5593
5594
##     1     1     1     1     2     1     1     1     1     1     1     1
1
##  5595  5596  5597  5598  5599  5600  5601  5602  5603  5604  5605  5606
5607
##     1     1     2     2     1     1     2     1     1     1     1     1
1
##  5608  5609  5610  5611  5612  5613  5614  5615  5616  5617  5618  5619
5620
##     1     2     1     1     1     1     1     1     1     1     2     1
1
##  5621  5622  5623  5624  5625  5626  5627  5628  5629  5630  5631  5632
5633
##     1     1     1     1     1     1     1     1     1     1     1     1
1
##  5634  5635  5636  5637  5638  5639  5640  5641  5642  5643  5644  5645
```

```
5646
##     1     1     1     1     2     1     2     1     1     1     1     1
1
##  5647  5648  5649  5650  5651  5652  5653  5654  5655  5656  5657  5658
5659
##     1     1     1     1     2     1     1     1     1     1     1     1
2
##  5660  5661  5662  5663  5664  5665  5666  5667  5668  5669  5670  5671
5672
##     1     1     1     1     1     1     1     1     2     1     1     1
1
##  5673  5674  5675  5676  5677  5678  5679  5680  5681  5682  5683  5684
5685
##     1     1     2     1     1     1     1     2     1     1     1     1
2
##  5686  5687  5688  5689  5690  5691  5692  5693  5694  5695  5696  5697
5698
##     1     1     1     1     2     2     1     1     1     1     1     1
1
##  5699  5700  5701  5702  5703  5704  5705  5706  5707  5708  5709  5710
5711
##     2     1     1     1     1     2     1     1     1     2     1     1
1
##  5712  5713  5714  5715  5716  5717  5718  5719  5720  5721  5722  5723
5724
##     2     1     1     1     1     1     1     1     1     1     1     1
1
##  5725  5726  5727  5728  5729  5730  5731  5732  5733  5734  5735  5736
5737
##     1     1     1     1     1     1     2     1     1     1     1     1
1
##  5738  5739  5740  5741  5742  5743  5744  5745  5746  5747  5748  5749
5750
##     1     1     1     1     1     1     1     1     1     1     1     1
1
##  5751  5752  5753  5754  5755  5756  5757  5758  5759  5760  5761  5762
5763
##     1     2     1     1     2     2     2     2     2     1     1     1
1
##  5764  5765  5766  5767  5768  5769  5770  5771  5772  5773  5774  5775
5776
##     1     1     1     1     1     1     2     1     1     1     2     1
1
##  5777  5778  5779  5780  5781  5782  5783  5784  5785  5786  5787  5788
5789
##     2     1     1     1     1     1     1     1     1     1     1     1
1
##  5790  5791  5792  5793  5794  5795  5796  5797  5798  5799  5800  5801
5802
##     1     1     1     1     1     1     1     1     2     1     1     1
```

```
1
##  5803  5804  5805  5806  5807  5808  5809  5810  5811  5812  5813  5814
5815
##     1     1     1     1     2     2     1     2     1     1     2     1
1
##  5816  5817  5818  5819  5820  5821  5822  5823  5824  5825  5826  5827
5828
##     2     1     2     1     1     1     1     1     2     1     1     1
2
##  5829  5830  5831  5832  5833  5834  5835  5836  5837  5838  5839  5840
5841
##     1     2     1     1     1     1     1     1     2     1     1     1
1
##  5842  5843  5844  5845  5846  5847  5848  5849  5850  5851  5852  5853
5854
##     1     1     1     2     2     1     1     1     1     1     1     1
1
##  5855  5856  5857  5858  5859  5860  5861  5862  5863  5864  5865  5866
5867
##     1     1     1     1     1     1     1     2     1     1     1     1
1
##  5868  5869  5870  5871  5872  5873  5874  5875  5876  5877  5878  5879
5880
##     1     1     1     1     1     1     1     1     1     1     2     1
2
##  5881  5882  5883  5884  5885  5886  5887  5888  5889  5890  5891  5892
5893
##     1     1     1     1     1     1     1     1     1     1     1     2
1
##  5894  5895  5896  5897  5898  5899  5900  5901  5902  5903  5904  5905
5906
##     2     1     2     1     1     1     1     2     1     2     1     1
1
##  5907  5908  5909  5910  5911  5912  5913  5914  5915  5916  5917  5918
5919
##     1     1     2     1     1     1     1     1     1     1     2     2
2
##  5920  5921  5922  5923  5924  5925  5926  5927  5928  5929  5930  5931
5932
##     1     1     1     1     1     1     1     2     1     1     1     1
1
##  5933  5934  5935  5936  5937  5938  5939  5940  5941  5942  5943  5944
5945
##     1     1     1     1     1     2     1     2     1     1     2     1
1
##  5946  5947  5948  5949  5950  5951  5952  5953  5954  5955  5956  5957
5958
##     1     1     1     1     1     1     1     2     1     1     1     2
1
##  5959  5960  5961  5962  5963  5964  5965  5966  5967  5968  5969  5970
```

```
5971
##     1     1     1     1     1     1     1     1     1     1     1     1
1
##  5972  5973  5974  5975  5976  5977  5978  5979  5980  5981  5982  5983
5984
##     2     1     1     1     1     1     1     2     1     1     2     1
1
##  5985  5986  5987  5988  5989  5990  5991  5992  5993  5994  5995  5996
5997
##     1     1     1     1     1     1     2     1     1     2     1     1
2
##  5998  5999  6000  6001  6002  6003  6004  6005  6006  6007  6008  6009
6010
##     1     2     1     1     1     2     1     1     2     1     1     1
1
##  6011  6012  6013  6014  6015  6016  6017  6018  6019  6020  6021  6022
6023
##     1     2     1     1     1     1     1     1     1     1     2     1
2
##  6024  6025  6026  6027  6028  6029  6030  6031  6032  6033  6034  6035
6036
##     1     1     1     1     1     1     1     2     1     1     1     1
1
##  6037  6038  6039  6040  6041  6042  6043  6044  6045  6046  6047  6048
6049
##     1     1     1     1     1     1     1     1     1     1     2     1
1
##  6050  6051  6052  6053  6054  6055  6056  6057  6058  6059  6060  6061
6062
##     1     1     2     1     2     1     1     1     1     1     2     1
1
##  6063  6064  6065  6066  6067  6068  6069  6070  6071  6072  6073  6074
6075
##     1     2     1     1     2     2     1     1     1     1     2     1
2
##  6076  6077  6078  6079  6080  6081  6082  6083  6084  6085  6086  6087
6088
##     1     1     1     2     1     2     1     2     1     1     1     2
1
##  6089  6090  6091  6092  6093  6094  6095  6096  6097  6098  6099  6100
6101
##     1     1     1     1     2     1     1     1     1     1     2     1
1
##  6102  6103  6104  6105  6106  6107  6108  6109  6110  6111  6112  6113
6114
##     1     1     2     1     1     1     1     1     1     2     1     1
1
##  6115  6116  6117  6118  6119  6120  6121  6122  6123  6124  6125  6126
6127
##     1     1     1     1     1     1     1     1     1     1     2     1
```

```
1
##  6128  6129  6130  6131  6132  6133  6134  6135  6136  6137  6138  6139
6140
##     2     1     1     1     1     1     2     1     1     2     1     1
1
##  6141  6142  6143  6144  6145  6146  6147  6148  6149  6150  6151  6152
6153
##     1     1     1     1     2     1     1     1     1     1     1     2
2
##  6154  6155  6156  6157  6158  6159  6160  6161  6162  6163  6164  6165
6166
##     1     1     1     1     1     1     2     1     2     2     1     1
2
##  6167  6168  6169  6170  6171  6172  6173  6174  6175  6176  6177  6178
6179
##     2     2     1     1     2     1     1     2     1     1     1     1
2
##  6180  6181  6182  6183  6184  6185  6186  6187  6188  6189  6190  6191
6192
##     1     2     1     1     1     1     1     1     1     1     1     2
2
##  6193  6194  6195  6196  6197  6198  6199  6200  6201  6202  6203  6204
6205
##     1     1     2     1     1     1     1     2     1     1     1     1
2
##  6206  6207  6208  6209  6210  6211  6212  6213  6214  6215  6216  6217
6218
##     1     2     1     2     1     1     1     1     2     2     1     1
1
##  6219  6220  6221  6222  6223  6224  6225  6226  6227  6228  6229  6230
6231
##     1     1     1     1     1     1     1     1     1     1     2     2
1
##  6232  6233  6234  6235  6236  6237  6238  6239  6240  6241  6242  6243
6244
##     1     1     1     1     1     1     1     2     1     1     2     1
2
##  6245  6246  6247  6248  6249  6250  6251  6252  6253  6254  6255  6256
6257
##     1     1     1     1     2     1     1     1     2     2     1     1
1
##  6258  6259  6260  6262  6263  6264  6265  6266  6267  6268  6269  6270
6271
##     1     1     1     2     1     1     1     1     1     1     1     1
1
##  6272  6273  6274  6275  6276  6277  6278  6279  6280  6281  6282  6283
6284
##     2     1     2     1     1     1     2     2     1     1     1     1
1
##  6285  6286  6287  6288  6289  6290  6291  6292  6293  6294  6295  6296
```

```
6297
##     1     1     1     1     2     1     1     1     2     1     1     1
2
##  6298  6299  6300  6301  6302  6303  6304  6305  6306  6307  6308  6309
6310
##     2     1     1     1     2     1     2     2     1     2     1     1
1
##  6311  6312  6313  6314  6315  6316  6317  6318  6319  6320  6321  6322
6323
##     1     2     1     1     1     1     1     1     1     1     1     1
2
##  6324  6325  6326  6327  6328  6329  6330  6331  6332  6333  6334  6335
6336
##     1     2     1     1     1     2     1     1     1     2     1     1
2
##  6337  6338  6339  6340  6341  6342  6343  6344  6345  6346  6347  6348
6349
##     1     2     1     1     2     1     1     1     1     1     1     2
1
##  6350  6351  6352  6353  6354  6355  6356  6357  6358  6359  6360  6361
6362
##     1     1     1     1     1     1     1     1     1     1     1     1
1
##  6363  6364  6365  6366  6367  6368  6369  6370  6371  6372  6373  6374
6375
##     2     1     1     1     1     1     1     1     2     2     1     1
1
##  6376  6377  6378  6379  6380  6381  6382  6383  6384  6385  6386  6387
6388
##     1     1     1     1     1     1     1     1     1     1     1     1
1
##  6389  6390  6391  6392  6393  6394  6395  6396  6397  6398  6399  6400
6401
##     1     2     1     1     1     1     1     1     1     1     1     1
1
##  6402  6403  6404  6405  6406  6407  6408  6409  6410  6411  6412  6413
6414
##     1     1     2     1     1     2     1     1     1     1     2     1
2
##  6415  6416  6417  6418  6419  6420  6421  6422  6423  6424  6425  6426
6427
##     1     1     1     1     1     1     1     2     2     2     1     2
1
##  6428  6429  6430  6431  6432  6433  6434  6435  6436  6437  6438  6439
6440
##     1     1     1     1     1     1     1     1     1     1     1     1
1
##  6441  6442  6443  6444  6445  6446  6447  6448  6449  6450  6451  6452
6453
##     1     1     1     1     2     1     1     1     1     1     1     1
```

```
2
##  6454  6455  6456  6457  6458  6459  6460  6461  6462  6463  6464  6465
6466
##     1     2     1     1     2     1     1     1     1     2     1     1
1
##  6467  6468  6469  6470  6471  6472  6473  6474  6475  6476  6477  6478
6479
##     1     2     1     1     1     1     1     2     2     1     2     2
1
##  6480  6481  6482  6483  6484  6485  6486  6487  6488  6489  6490  6491
6492
##     1     1     1     1     1     1     1     1     2     2     1     2
1
##  6493  6494  6495  6496  6497  6498  6499  6500  6501  6502  6503  6504
6505
##     1     1     1     1     1     1     1     2     2     1     1     1
1
##  6506  6507  6508  6509  6510  6511  6512  6513  6514  6515  6516  6517
6518
##     1     1     1     1     1     1     2     1     2     1     1     1
1
##  6519  6520  6521  6522  6523  6524  6525  6526  6527  6528  6529  6530
6531
##     1     2     2     1     1     1     1     1     1     1     1     1
1
##  6532  6533  6534  6535  6536  6537  6538  6539  6540  6541  6542  6543
6544
##     1     1     1     2     1     1     1     1     1     1     1     1
1
##  6545  6546  6547  6548  6549  6550  6551  6552  6553  6554  6555  6556
6557
##     1     2     1     2     1     2     2     1     1     1     1     1
1
##  6558  6559  6560  6561  6562  6563  6564  6565  6566  6567  6568  6569
6570
##     2     1     2     1     1     1     1     1     1     2     2     2
1
##  6571  6572  6573  6574  6575  6576  6577  6578  6579  6580  6581  6582
6583
##     1     1     1     1     1     1     1     1     1     1     1     1
1
##  6584  6585  6586  6587  6588  6589  6590  6591  6592  6593  6594  6595
6596
##     1     1     2     1     1     1     1     1     1     2     1     1
1
##  6597  6598  6599  6600  6601  6602  6603  6604  6605  6606  6607  6608
6609
##     2     1     2     1     1     2     1     2     1     1     1     2
1
##  6610  6611  6612  6613  6614  6615  6616  6617  6618  6619  6620  6621
```

```
6622
##     1     1     1     1     2     1     1     2     1     2     2     1
1
##  6623  6624  6625  6626  6627  6628  6629  6630  6631  6632  6633  6634
6635
##     1     1     1     1     1     1     1     1     1     1     1     1
1
##  6636  6637  6638  6639  6640  6641  6642  6643  6644  6645  6646  6647
6648
##     1     1     1     1     1     2     2     1     1     2     2     1
2
##  6649  6650  6651  6652  6653  6654  6655  6656  6657  6658  6659  6660
6661
##     1     1     1     1     1     1     2     1     1     1     1     1
1
##  6662  6663  6664  6665  6666  6667  6668  6669  6670  6671  6672  6673
6674
##     1     1     1     1     1     2     1     1     1     1     2     1
1
##  6675  6676  6677  6678  6679  6680  6681  6682  6683  6684  6685  6686
6687
##     2     1     1     1     1     1     1     1     1     1     2     2
1
##  6688  6689  6690  6691  6692  6693  6694  6695  6696  6697  6698  6699
6700
##     2     1     2     1     2     1     1     1     1     1     1     1
1
##  6701  6702  6703  6704  6705  6706  6707  6708  6709  6710  6711  6712
6713
##     1     1     1     1     1     1     1     1     2     1     2     2
1
##  6714  6715  6716  6717  6718  6719  6720  6721  6722  6723  6724  6725
6726
##     2     1     1     1     1     1     2     1     1     1     1     1
1
##  6727  6728  6729  6730  6731  6732  6733  6734  6735  6736  6737  6738
6739
##     2     2     2     1     1     1     1     2     1     1     1     1
1
##  6740  6741  6742  6743  6744  6745  6746  6747  6748  6749  6750  6751
6752
##     1     1     2     2     1     1     1     1     1     2     2     1
1
##  6753  6754  6755  6756  6757  6758  6759  6760  6761  6762  6763  6764
6765
##     2     1     1     1     2     2     1     1     1     1     2     1
1
##  6766  6767  6768  6769  6770  6771  6772  6773  6774  6775  6776  6777
6778
##     1     1     1     1     2     2     2     1     1     1     1     1
```

```
1
##  6779  6780  6781  6782  6783  6784  6785  6786  6787  6788  6789  6790
6791
##     1     2     1     2     1     1     1     1     1     2     1     1
1
##  6792  6793  6794  6795  6796  6797  6798  6799  6800  6801  6802  6803
6804
##     2     1     2     1     1     1     2     1     1     1     1     2
1
##  6805  6806  6807  6808  6809  6810  6811  6812  6813  6814  6815  6816
6817
##     1     1     1     1     1     2     1     1     2     1     1     1
1
##  6818  6819  6820  6821  6822  6823  6824  6825  6826  6827  6828  6829
6830
##     1     1     2     2     1     1     1     2     1     1     1     1
1
##  6831  6832  6833  6834  6835  6836  6837  6838  6839  6840  6841  6842
6843
##     1     2     1     2     2     1     2     1     2     1     1     1
1
##  6844  6845  6846  6847  6848  6849  6850  6851  6852  6853  6854  6855
6856
##     1     1     1     1     1     2     1     1     1     2     1     2
1
##  6857  6858  6859  6860  6861  6862  6863  6864  6865  6866  6867  6868
6869
##     1     1     1     1     2     1     2     1     1     1     1     1
2
##  6870  6871  6872  6873  6874  6875  6876  6877  6878  6879  6880  6881
6882
##     2     2     1     1     1     1     1     1     2     1     1     1
1
##  6883  6884  6885  6886  6887  6888  6889  6890  6891  6892  6893  6894
6895
##     2     2     1     2     2     1     1     1     1     2     1     2
1
##  6896  6897  6898  6899  6900  6901  6902  6903  6904  6905  6906  6907
6908
##     1     1     1     2     1     2     1     1     1     1     2     2
1
##  6909  6910  6911  6912  6913  6914  6915  6916  6917  6918  6919  6920
6921
##     1     1     1     1     1     1     2     1     1     1     2     1
1
##  6922  6923  6924  6925  6926  6927  6928  6929  6930  6931  6932  6933
6934
##     2     1     1     2     1     1     1     1     1     2     1     1
1
##  6935  6936  6937  6938  6939  6940  6941  6942  6943  6944  6945  6946
```

```
6947
##     2     1     2     1     1     2     1     2     2     1     1     1
1
##  6948  6949  6950  6951  6952  6953  6954  6955  6956  6957  6958  6959
6960
##     1     2     1     1     1     1     1     1     1     2     1     2
2
##  6961  6962  6963  6964  6965  6966  6967  6968  6969  6970  6971  6972
6973
##     1     2     1     1     1     1     1     1     1     2     1     1
1
##  6974  6975  6976  6977  6978  6979  6980  6981  6982  6983  6984  6985
6986
##     1     1     1     1     1     1     2     1     1     1     1     1
1
##  6987  6988  6989  6990  6991  6992  6993  6994  6995  6996  6997  6998
6999
##     1     1     1     1     1     1     2     1     1     1     1     2
2
##  7000  7001  7002  7003  7004  7005  7006  7007  7008  7009  7010  7011
7012
##     1     1     1     1     1     1     1     1     2     1     1     2
2
##  7013  7014  7015  7016  7017  7018  7019  7020  7021  7022  7023  7024
7025
##     1     1     1     1     1     1     1     1     1     1     1     1
1
##  7026  7027  7028  7029  7030  7031  7032  7033  7034  7035  7036  7037
7038
##     1     1     1     1     1     2     1     1     1     1     1     2
1
##  7039  7040  7041  7042  7043  7044  7045  7046  7047  7048  7049  7050
7051
##     1     2     1     1     1     1     1     2     1     1     1     1
1
##  7052  7053  7054  7055  7056  7057  7058  7059  7060  7061  7062  7063
7064
##     1     1     2     1     1     1     2     1     1     1     1     1
2
##  7065  7066  7067  7068  7069  7070  7071  7072  7073  7074  7075  7076
7077
##     1     2     1     1     1     1     1     1     1     2     1     1
1
##  7078  7079  7080  7081  7082  7083  7084  7085  7086  7087  7088  7089
7090
##     1     1     2     2     1     1     1     1     1     2     2     1
1
##  7091  7092  7093  7094  7095  7096  7097  7098  7099  7100  7101  7102
7103
##     1     2     1     1     2     1     1     1     2     1     1     1
```

```
1
##  7104  7105  7106  7107  7108  7109  7110  7111  7112  7113  7114  7115
7116
##     1     1     1     2     1     1     1     1     1     1     1     1
1
##  7117  7118  7119  7120  7121  7122  7123  7124  7125  7126  7127  7128
7129
##     1     1     1     1     1     2     1     1     1     1     1     1
2
##  7130  7131  7132  7133  7134  7135  7136  7137  7138  7139  7140  7141
7142
##     2     1     1     1     1     2     1     1     1     1     1     2
1
##  7143  7144  7145  7146  7147  7148  7149  7150  7151  7152  7153  7154
7155
##     2     1     1     2     1     1     1     1     1     1     1     1
2
##  7156  7157  7158  7159  7160  7161  7162  7163  7164  7165  7166  7167
7168
##     1     1     1     1     1     2     1     1     1     2     1     1
1
##  7169  7170  7171  7172  7173  7174  7175  7176  7177  7178  7179  7180
7181
##     2     1     1     1     1     1     2     1     1     2     1     1
1
##  7182  7183  7184  7185  7186  7187  7188  7189  7190  7191  7192  7193
7194
##     2     1     1     1     1     2     1     1     1     1     1     1
1
##  7195  7196  7197  7198  7199  7200  7201  7202  7203  7204  7205  7206
7207
##     2     1     1     2     2     1     1     1     1     1     1     1
2
##  7208  7209  7210  7212  7213  7214  7215  7216  7217  7218  7219  7220
7221
##     1     1     2     1     1     1     1     1     1     1     1     1
1
##  7222  7223  7224  7225  7226  7227  7228  7229  7230  7231  7232  7233
7234
##     1     1     1     2     1     1     2     1     1     1     1     1
1
##  7235  7236  7237  7238  7239  7240  7241  7242  7243  7244  7245  7246
7247
##     1     2     2     1     1     1     2     1     1     1     1     1
1
##  7248  7249  7250  7251  7252  7253  7254  7255  7256  7257  7258  7259
7260
##     1     1     1     1     1     1     1     1     1     1     1     2
1
##  7261  7262  7263  7264  7265  7266  7267  7268  7269  7270  7271  7272
```

```
7273
##     1     1     1     2     1     1     1     1     1     1     1     1
2
##  7274  7275  7276  7277  7278  7279  7280  7281  7282  7283  7284  7285
7286
##     1     1     1     1     1     1     1     1     2     1     1     1
1
##  7287  7288  7289  7290  7291  7292  7293  7294  7295  7296  7297  7298
7299
##     2     1     1     1     2     1     2     1     1     1     1     1
1
##  7300  7301  7302  7303  7304  7305  7306  7307  7308  7309  7310  7311
7312
##     1     1     2     1     1     1     1     1     2     1     2     1
1
##  7313  7314  7315  7316  7317  7318  7319  7320  7321  7322  7323  7324
7325
##     1     1     2     2     1     1     1     2     1     2     1     1
1
##  7326  7327  7328  7329  7330  7331  7332  7333  7334  7335  7336  7337
7338
##     1     1     1     1     2     1     1     1     1     1     1     1
1
##  7339  7340  7341  7342  7343  7344  7345  7346  7347  7348  7349  7350
7351
##     1     1     2     2     1     1     1     1     1     1     1     2
2
##  7352  7353  7354  7355  7356  7357  7358  7359  7360  7361  7362  7363
7364
##     1     1     2     1     1     1     2     2     1     1     1     2
2
##  7365  7366  7367  7368  7369  7370  7371  7372  7373  7374  7375  7376
7377
##     1     1     1     1     1     1     2     2     1     1     1     1
1
##  7378  7379  7380  7381  7382  7383  7384  7385  7386  7387  7388  7389
7390
##     2     1     1     1     1     1     1     2     1     1     2     1
1
##  7391  7392  7393  7394  7395  7396  7397  7398  7399  7400  7401  7402
7403
##     2     2     1     1     1     1     1     1     2     1     1     1
2
##  7404  7405  7406  7407  7408  7409  7410  7411  7412  7413  7414  7415
7416
##     1     1     1     1     1     2     1     2     1     1     1     2
1
##  7417  7418  7419  7420  7421  7422  7423  7424  7425  7426  7427  7428
7429
##     1     2     1     1     1     1     1     1     2     1     1     1
```

```
1
##  7430  7431  7432  7433  7434  7435  7436  7437  7438  7439  7440  7441
7442
##     1     1     1     2     1     1     1     1     1     1     1     1
1
##  7443  7444  7445  7446  7447  7448  7449  7450  7451  7452  7453  7454
7455
##     1     2     1     1     1     1     1     2     1     1     1     1
1
##  7456  7457  7458  7459  7460  7461  7462  7463  7464  7465  7466  7467
7468
##     1     1     1     1     1     1     1     1     1     1     1     1
1
##  7469  7470  7471  7472  7473  7474  7475  7476  7477  7478  7479  7480
7481
##     2     1     1     1     2     1     1     1     1     1     1     1
2
##  7482  7483  7484  7485  7486  7487  7488  7489  7490  7491  7492  7493
7494
##     1     1     1     2     1     1     1     1     1     1     1     1
1
##  7495  7496  7497  7498  7499  7500  7501  7502  7503  7504  7505  7506
7507
##     2     1     1     1     1     1     1     1     1     1     2     1
1
##  7508  7509  7510  7511  7512  7513  7514  7515  7516  7517  7518  7519
7520
##     1     2     1     1     1     1     1     1     1     1     1     1
1
##  7521  7522  7523  7524  7525  7526  7527  7528  7529  7530  7531  7532
7533
##     1     1     1     2     1     1     1     1     1     1     1     1
2
##  7534  7535  7536  7537  7538  7539  7540  7541  7542  7543  7544  7545
7546
##     2     1     1     1     1     2     2     1     1     1     1     1
1
##  7547  7548  7549  7550  7551  7552  7553  7554  7555  7556  7557  7558
7559
##     1     1     1     1     2     2     1     2     1     1     2     1
1
##  7560  7561  7562  7563  7564  7565  7566  7567  7568  7569  7570  7571
7572
##     2     1     1     1     2     1     1     1     1     1     1     1
1
##  7573  7574  7575  7576  7577  7578  7579  7580  7581  7582  7583  7584
7585
##     2     1     2     2     2     2     1     1     1     1     1     2
1
##  7586  7587  7588  7589  7590  7591  7592  7593  7594  7595  7596  7597
```

```
7598
##     1     1     1     1     2     1     1     1     1     1     1     1
1
##  7599  7600  7601  7602  7603  7604  7605  7606  7607  7608  7609  7610
7611
##     1     1     1     1     1     1     1     1     2     2     1     1
1
##  7612  7613  7614  7615  7616  7617  7618  7619  7620  7621  7622  7623
7624
##     2     1     1     1     2     2     2     1     1     1     1     2
2
##  7625  7626  7627  7628  7629  7630  7631  7632  7633  7634  7635  7636
7637
##     1     2     1     1     1     1     1     1     1     1     1     1
1
##  7638  7639  7640  7641  7642  7643  7644  7645  7646  7647  7648  7649
7650
##     1     1     1     1     1     1     2     1     1     1     2     1
1
##  7651  7652  7653  7654  7655  7656  7657  7658  7659  7660  7661  7662
7663
##     1     1     1     1     2     1     1     1     1     1     1     1
2
##  7664  7665  7666  7667  7668  7669  7670  7671  7672  7673  7674  7675
7676
##     1     1     1     1     1     1     2     1     1     1     1     1
1
##  7677  7678  7679  7680  7681  7682  7683  7684  7685  7686  7687  7688
7689
##     1     1     1     2     1     1     1     1     1     1     1     1
1
##  7690  7691  7692  7693  7694  7695  7696  7697  7698  7699  7700  7701
7702
##     2     1     1     1     1     1     1     1     1     1     1     1
2
##  7703  7704  7705  7706  7707  7708  7709  7710  7711  7712  7713  7714
7715
##     1     1     1     1     1     1     1     1     1     1     1     1
1
##  7716  7717  7718  7719  7720  7721  7722  7723  7724  7725  7726  7727
7728
##     1     1     1     2     1     1     1     1     1     1     1     1
1
##  7729  7730  7731  7732  7733  7734  7735  7736  7737  7738  7739  7740
7741
##     2     1     1     2     1     1     1     1     2     1     1     2
1
##  7742  7743  7744  7745  7746  7747  7748  7749  7750  7751  7752  7753
7754
##     1     1     2     1     1     2     1     1     1     1     1     1
```

```
1
##  7755  7756  7757  7758  7759  7760  7761  7762  7763  7764  7765  7766
7767
##     1     1     1     2     2     1     1     1     2     2     1     1
1
##  7768  7769  7770  7771  7772  7773  7774  7775  7776  7777  7778  7779
7780
##     1     2     1     2     1     1     1     1     1     1     1     1
1
##  7781  7782  7783  7784  7785  7786  7787  7788  7789  7790  7791  7792
7793
##     2     1     1     1     1     1     1     1     1     1     1     1
1
##  7794  7795  7796  7797  7798  7799  7800  7801  7802  7803  7804  7805
7806
##     1     1     1     1     1     2     1     1     2     1     2     2
1
##  7807  7808  7809  7810  7811  7812  7813  7814  7815  7816  7817  7818
7819
##     1     2     1     1     1     1     2     1     1     1     1     1
1
##  7820  7821  7822  7823  7824  7825  7826  7827  7828  7829  7830  7831
7832
##     2     1     1     1     1     2     1     1     1     2     1     2
1
##  7833  7834  7835  7836  7837  7838  7839  7840  7841  7842  7843  7844
7845
##     1     1     1     1     1     1     1     1     1     1     1     1
1
##  7846  7847  7848  7849  7850  7851  7852  7853  7854  7855  7856  7857
7858
##     1     1     1     1     1     2     1     2     1     1     1     2
2
##  7859  7860  7861  7862  7863  7864  7865  7866  7867  7868  7869  7870
7871
##     2     1     1     2     1     1     2     1     1     1     1     1
1
##  7872  7873  7874  7875  7876  7877  7878  7879  7880  7881  7882  7883
7884
##     2     1     1     2     2     1     1     1     1     1     1     1
1
##  7885  7886  7887  7888  7889  7890  7891  7892  7893  7894  7895  7896
7897
##     1     1     1     1     1     1     2     1     2     2     1     1
1
##  7898  7899  7900  7901  7902  7903  7904  7905  7906  7907  7908  7909
7910
##     1     1     1     2     1     1     1     2     1     1     1     1
1
##  7911  7912  7913  7914  7915  7916  7917  7918  7919  7920  7921  7922
```

```
7923
##     1     1     1     1     1     2     1     1     1     1     1     1
1
##  7924  7925  7926  7927  7928  7929  7930  7931  7932  7933  7934  7935
7936
##     1     1     2     1     2     1     1     2     1     1     1     1
1
##  7937  7938  7939  7940  7941  7942  7943  7944  7945  7946  7947  7948
7949
##     1     1     2     1     1     1     2     1     2     1     1     1
1
##  7950  7951  7952  7953  7954  7955  7956  7957  7958  7959  7960  7961
7962
##     1     1     1     1     2     1     1     1     1     2     1     1
1
##  7963  7964  7965  7966  7967  7968  7969  7970  7971  7972  7973  7974
7975
##     1     1     2     2     1     1     1     1     1     2     1     1
2
##  7976  7977  7978  7979  7980  7981  7982  7983  7984  7985  7986  7987
7988
##     1     2     1     1     1     1     1     1     2     1     1     1
1
##  7989  7990  7991  7992  7993  7994  7995  7996  7997  7998  7999  8000
8001
##     2     1     1     2     1     1     1     1     1     1     1     1
1
##  8002  8003  8004  8005  8006  8007  8008  8009  8010  8011  8012  8013
8014
##     1     1     1     1     1     1     1     1     2     1     1     1
1
##  8015  8016  8017  8018  8019  8020  8021  8022  8023  8024  8025  8026
8027
##     1     1     2     2     1     1     1     1     1     1     1     1
2
##  8028  8029  8030  8031  8032  8033  8034  8035  8036  8037  8038  8039
8040
##     1     1     1     1     1     1     2     1     1     1     1     1
1
##  8041  8042  8043  8044  8045  8046  8047  8048  8049  8050  8051  8052
8054
##     2     1     1     1     1     1     1     1     1     1     2     1
1
##  8055  8056  8057  8058  8059  8060  8061  8062  8063  8064  8065  8066
8067
##     1     1     1     1     1     1     1     1     1     1     1     1
2
##  8068  8069  8070  8071  8072  8073  8074  8075  8076  8077  8078  8079
8080
##     1     1     1     1     2     1     1     1     1     1     1     1
```

```
1
##  8081  8082  8083  8084  8085  8086  8087  8088  8089  8090  8091  8092
8093
##     1     1     1     1     1     1     1     1     1     1     1     1
1
##  8094  8095  8096  8097  8098  8099  8100  8101  8102  8103  8104  8105
8106
##     2     2     2     1     1     1     1     1     1     1     1     1
1
##  8107  8108  8109  8110  8111  8112  8113  8114  8115  8116  8117  8118
8119
##     1     1     1     1     1     1     1     1     1     1     2     2
1
##  8120  8121  8122  8123  8124  8125  8126  8127  8128  8129  8130  8131
8132
##     2     2     1     2     1     1     2     1     1     1     1     1
2
##  8133  8134  8135  8136  8137  8138  8139  8140  8141  8142  8143  8144
8145
##     1     1     1     1     1     2     1     1     1     1     1     1
1
##  8146  8147  8148  8149  8150  8151  8152  8153  8154  8155  8156  8157
8158
##     1     1     1     1     1     2     1     1     1     1     1     1
1
##  8159  8160  8161  8162  8163  8164  8165  8166  8167  8168  8169  8170
8171
##     1     1     1     1     1     1     1     1     1     1     1     1
1
##  8172  8173  8174  8175  8176  8177  8178  8179  8180  8181  8182  8183
8184
##     1     2     2     1     1     1     1     1     1     1     1     1
1
##  8185  8186  8187  8188  8189  8190  8191  8192  8193  8194  8195  8196
8197
##     1     1     1     1     2     1     2     1     1     2     1     1
1
##  8198  8199  8200  8201  8202  8203  8204  8205  8206  8207  8208  8209
8210
##     2     1     2     1     1     1     2     1     1     1     1     1
1
##  8211  8212  8213  8214  8215  8216  8217  8218  8219  8220  8221  8222
8223
##     1     1     2     1     1     1     1     1     1     1     1     1
1
##  8224  8225  8226  8227  8228  8229  8230  8231  8232  8233  8234  8235
8236
##     1     1     1     1     1     2     1     2     1     1     1     2
1
##  8237  8238  8239  8240  8241  8242  8243  8244  8245  8246  8247  8248
```

```
8249
##     1     1     2     1     1     1     1     1     1     2     1     1
2
##  8250  8251  8252  8253  8254  8255  8256  8257  8258  8259  8260  8261
8262
##     1     1     1     2     1     1     1     1     1     1     1     2
1
##  8263  8264  8265  8266  8267  8268  8269  8270  8271  8272  8273  8274
8275
##     1     1     2     1     1     1     1     2     2     1     1     1
2
##  8276  8277  8278  8279  8280  8281  8282  8283  8284  8285  8286  8287
8288
##     1     1     2     2     2     1     2     2     1     2     1     1
1
##  8289  8290  8291  8292  8293  8294  8295  8296  8297  8298  8299  8300
8301
##     1     1     1     2     1     1     1     1     1     1     1     1
1
##  8302  8303  8304  8305  8306  8307  8308  8309  8310  8311  8312  8313
8314
##     2     1     2     1     1     2     1     2     1     1     1     1
1
##  8315  8316  8317  8318  8319  8320  8321  8322  8323  8324  8325  8326
8327
##     1     1     1     1     1     1     1     1     1     1     1     1
1
##  8328  8329  8330  8331  8332  8333  8334  8335  8336  8337  8338  8339
8340
##     1     1     1     2     1     2     1     1     1     1     2     2
1
##  8341  8342  8343  8344  8345  8346  8347  8348  8349  8350  8351  8352
8353
##     1     1     1     2     2     1     2     1     1     2     1     1
1
##  8354  8355  8356  8357  8358  8359  8360  8361  8362  8363  8364  8365
8366
##     1     1     2     1     1     1     1     1     1     1     1     1
1
##  8367  8368  8369  8370  8371  8372  8373  8374  8375  8376  8377  8378
8379
##     1     1     2     1     1     2     1     1     2     2     2     2
1
##  8380  8381  8382  8383  8384  8385  8386  8387  8388  8389  8390  8391
8392
##     1     1     1     2     2     1     1     1     1     1     2     2
1
##  8393  8394  8395  8396  8397  8398  8399  8400  8401  8402  8403  8404
8405
##     2     1     1     1     1     1     1     1     1     1     1     1
```

```
1
##  8406  8407  8408  8409  8410  8411  8412  8413  8414  8415  8416  8417
8418
##     1     2     1     1     1     1     1     2     1     1     2     1
2
##  8419  8420  8421  8422  8423  8424  8425  8426  8427  8428  8429  8430
8431
##     2     1     1     1     1     1     1     1     1     1     1     1
1
##  8432  8433  8434  8435  8436  8437  8438  8439  8440  8441  8442  8443
8444
##     1     1     1     1     2     1     1     2     1     1     1     1
1
##  8445  8446  8447  8448  8449  8450  8451  8452  8453  8454  8455  8456
8457
##     1     1     1     2     1     1     1     1     2     1     2     1
1
##  8458  8459  8460  8461  8462  8463  8464  8465  8466  8467  8468  8469
8470
##     1     1     1     1     1     1     1     1     1     1     1     1
1
##  8471  8472  8473  8474  8475  8476  8477  8478  8479  8480  8481  8482
8483
##     1     1     1     1     1     1     2     1     1     2     1     1
2
##  8484  8485  8486  8487  8488  8489  8490  8491  8492  8493  8494  8495
8496
##     1     1     2     2     2     1     1     1     1     1     1     1
1
##  8497  8498  8499  8500  8501  8502  8503  8504  8505  8506  8507  8508
8509
##     2     2     1     1     1     1     1     1     1     2     1     1
1
##  8510  8511  8512  8513  8514  8515  8516  8517  8518  8519  8520  8521
8522
##     1     2     1     1     1     2     1     1     1     1     2     1
2
##  8523  8524  8525  8526  8527  8528  8529  8530  8531  8532  8533  8534
8535
##     1     2     1     1     1     2     1     1     1     1     1     1
1
##  8536  8537  8538  8539  8540  8541  8542  8543  8544  8545  8546  8547
8548
##     2     1     1     1     1     1     1     1     1     1     1     1
1
##  8549  8550  8551  8552  8553  8554  8555  8556  8557  8558  8559  8560
8561
##     2     1     1     1     1     1     1     1     1     2     1     1
2
##  8562  8563  8564  8565  8566  8567  8568  8569  8570  8571  8572  8573
```

```
8574
##     1     1     1     1     1     1     1     1     1     2     1     1
1
##  8575  8576  8577  8578  8579  8580  8581  8582  8583  8584  8585  8586
8587
##     2     1     1     1     1     1     1     1     2     1     2     2
2
##  8588  8589  8590  8591  8592  8593  8594  8595  8596  8597  8598  8599
8600
##     1     2     1     1     1     1     2     2     1     2     1     1
1
##  8601  8602  8603  8604  8605  8606  8607  8608  8609  8610  8611  8612
8613
##     2     1     2     1     1     1     1     1     2     2     1     1
2
##  8614  8615  8616  8617  8618  8619  8620  8621  8622  8623  8624  8625
8626
##     1     1     1     1     1     2     1     1     1     1     2     1
1
##  8627  8628  8629  8630  8631  8632  8633  8634  8635  8636  8638  8639
8640
##     1     1     1     2     2     1     2     1     1     2     1     1
1
##  8641  8642  8643  8644  8645  8646  8647  8648  8649  8650  8651  8652
8653
##     1     1     1     1     1     2     1     1     2     1     1     1
1
##  8654  8655  8656  8657  8658  8659  8660  8661  8662  8663  8664  8665
8666
##     1     1     2     1     1     1     1     2     1     1     1     1
1
##  8667  8668  8669  8670  8671  8672  8673  8674  8675  8676  8677  8678
8679
##     1     1     1     1     2     1     2     2     1     1     1     2
2
##  8680  8681  8682  8683  8684  8685  8686  8687  8688  8689  8690  8691
8692
##     1     1     2     1     2     1     1     1     2     2     1     1
2
##  8693  8694  8695  8696  8697  8698  8699  8700  8701  8702  8703  8704
8705
##     1     1     2     1     1     1     1     1     1     2     1     1
1
##  8706  8707  8708  8709  8710  8711  8712  8713  8714  8715  8716  8717
8718
##     1     1     2     1     1     1     1     1     1     1     1     1
1
##  8719  8720  8721  8722  8723  8724  8725  8726  8727  8728  8729  8730
8731
##     1     1     1     1     1     2     1     2     1     1     1     1
```

```
1
##  8732  8733  8734  8735  8736  8737  8738  8739  8740  8741  8742  8743
8744
##     1     1     1     1     1     1     2     1     1     2     1     1
2
##  8745  8746  8747  8748  8749  8750  8751  8752  8753  8754  8755  8756
8757
##     1     1     1     1     1     1     1     1     1     1     1     1
2
##  8758  8759  8760  8761  8762  8763  8764  8765  8766  8767  8768  8769
8770
##     1     1     1     1     2     1     1     2     1     1     1     2
1
##  8771  8772  8773  8774  8775  8776  8777  8778  8779  8780  8781  8782
8783
##     2     1     1     1     1     1     1     2     2     1     1     1
1
##  8784  8785  8786  8787  8788  8789  8790  8791  8792  8793  8794  8795
8796
##     1     2     1     1     2     1     1     1     1     2     1     2
1
##  8797  8798  8799  8800  8801  8802  8803  8804  8805  8806  8807  8808
8809
##     1     1     2     2     1     1     1     2     1     1     1     1
1
##  8810  8811  8812  8813  8814  8815  8816  8817  8818  8819  8820  8821
8822
##     1     1     1     1     1     2     2     2     1     2     1     2
1
##  8823  8824  8825  8826  8827  8828  8829  8830  8831  8832  8833  8834
8835
##     1     1     1     1     2     2     1     1     2     2     1     2
1
##  8836  8837  8838  8839  8840  8841  8842  8843  8844  8845  8846  8847
8848
##     1     2     1     1     1     1     1     1     1     1     1     2
1
##  8849  8850  8851  8852  8853  8854  8855  8856  8857  8858  8859  8860
8861
##     1     1     2     1     1     1     1     2     1     1     1     1
1
##  8862  8863  8864  8865  8866  8867  8868  8869  8870  8871  8872  8873
8874
##     1     1     1     1     1     1     1     1     2     2     1     2
1
##  8875  8876  8877  8878  8879  8880  8881  8882  8883  8884  8885  8886
8887
##     2     1     1     2     2     1     1     1     1     2     1     2
1
##  8888  8889  8890  8891  8892  8893  8894  8895  8896  8897  8898  8899
```

```
8900
##    1    1    1    1    1    1    1    1    1    1    1    1
2
##  8901  8902  8903  8904  8905  8906  8907  8908  8909  8910  8911  8912
8913
##    2    2    1    1    1    1    2    2    1    1    1    1
1
##  8914  8915  8916  8917  8918  8919  8920  8921  8922  8923  8924  8925
8926
##    1    1    1    1    2    1    2    1    1    1    1    1
2
##  8927  8928  8929  8930  8931  8932  8933  8934  8935  8936  8937  8938
8939
##    1    2    1    2    1    1    1    1    1    1    1    1
1
##  8940  8941  8942  8943  8944  8945  8946  8947  8948  8949  8950  8951
8952
##    1    1    1    1    1    1    1    1    2    1    1    1
2
##  8953  8954  8955  8956  8957  8958  8959  8960  8961  8962  8963  8964
8965
##    1    1    1    1    1    2    1    1    1    1    1    1
1
##  8966  8967  8968  8969  8970  8971  8972  8973  8974  8975  8976  8977
8978
##    2    1    1    1    2    1    1    2    1    1    2    2
1
##  8979  8980  8981  8982  8983  8984  8985  8986  8987  8988  8989  8990
8991
##    1    1    1    1    1    1    1    1    1    1    1    1
1
##  8992  8993  8994  8995  8996  8997  8998  8999  9000  9001  9002  9003
9004
##    1    1    2    1    1    2    1    1    2    1    2    1
2
##  9005  9006  9007  9008  9009  9010  9011  9012  9013  9014  9015  9016
9017
##    1    2    1    1    1    1    1    2    1    1    1    2
1
##  9018  9019  9020  9021  9022  9023  9024  9025  9026  9027  9028  9029
9030
##    1    2    2    1    1    2    1    1    1    1    1    2
1
##  9031  9032  9033  9034  9035  9036  9037  9038  9039  9040  9041  9042
9043
##    1    2    1    1    1    2    1    1    1    1    2    2
1
##  9044  9045  9046  9047  9048  9049  9050  9051  9052  9053  9054  9055
9056
##    2    2    1    1    1    1    1    2    1    2    1    2
```

```
1
##  9057  9058  9059  9060  9061  9062  9063  9064  9065  9066  9067  9068
9069
##     1     1     2     2     1     1     1     1     1     1     2     1
1
##  9070  9071  9072  9073  9074  9075  9076  9077  9078  9079  9080  9081
9082
##     2     2     1     2     1     1     1     1     1     2     1     1
1
##  9083  9084  9085  9086  9087  9088  9089  9090  9091  9092  9093  9094
9095
##     2     1     1     1     1     1     1     1     1     1     1     1
1
##  9096  9097  9098  9099  9100  9101  9102  9103  9104  9105  9106  9107
9108
##     1     1     1     1     1     1     2     2     1     2     1     2
1
##  9109  9110  9111  9112  9113  9114  9115  9116  9117  9118  9119  9120
9121
##     1     1     1     1     1     2     2     2     1     1     1     1
1
##  9122  9123  9124  9125  9126  9127  9128  9129  9130  9131  9132  9133
9134
##     1     2     1     2     1     1     1     1     1     2     1     1
1
##  9135  9136  9137  9138  9139  9140  9141  9142  9143  9144  9145  9146
9147
##     1     1     1     1     1     1     1     1     1     1     1     1
2
##  9148  9149  9150  9151  9152  9153  9154  9155  9156  9157  9158  9159
9160
##     2     1     1     1     1     1     2     2     1     2     1     1
2
##  9161  9162  9163  9164  9165  9166  9167  9168  9169  9170  9171  9172
9173
##     2     1     1     2     2     1     1     1     2     1     1     1
1
##  9174  9175  9176  9177  9178  9179  9180  9181  9182  9183  9184  9185
9186
##     1     1     1     1     2     1     1     1     2     2     1     1
1
##  9187  9188  9189  9190  9191  9192  9193  9194  9195  9196  9197  9198
9199
##     1     1     1     1     1     1     1     1     1     2     1     2
1
##  9200  9201  9202  9203  9204  9205  9206  9207  9208  9209  9210  9211
9212
##     1     1     1     2     1     1     1     1     1     2     1     2
1
##  9213  9214  9215  9216  9217  9218  9219  9220  9221  9222  9223  9224
```

```
9225
##     1     2     2     1     1     1     2     1     1     1     1     2
2
##  9226  9227  9228  9229  9230  9231  9232  9233  9234  9235  9236  9237
9238
##     1     1     1     1     2     1     1     1     2     1     1     1
1
##  9239  9240  9241  9242  9243  9244  9245  9246  9247  9248  9249  9250
9251
##     2     2     1     1     2     1     1     1     1     1     2     2
2
##  9252  9253  9254  9255  9256  9257  9258  9259  9260  9261  9262  9263
9264
##     1     2     2     2     2     1     1     1     1     1     1     1
2
##  9265  9266  9267  9268  9269  9270  9271  9272  9273  9274  9275  9276
9277
##     1     1     1     1     2     1     1     1     1     2     1     1
1
##  9278  9279  9280  9281  9282  9283  9284  9285  9286  9287  9288  9289
9290
##     1     1     2     1     1     1     1     1     1     1     1     1
1
##  9291  9292  9293  9294  9295  9296  9297  9298  9299  9300  9301  9302
9303
##     1     2     1     2     1     1     1     1     2     1     1     1
1
##  9304  9305  9306  9307  9308  9309  9310  9311  9312  9313  9314  9315
9316
##     1     1     1     1     2     1     1     1     2     1     1     1
1
##  9317  9318  9319  9320  9321  9322  9323  9324  9325  9326  9327  9328
9329
##     1     1     1     1     1     1     1     1     1     1     1     1
1
##  9330  9331  9332  9333  9334  9335  9336  9337  9338  9339  9340  9341
9342
##     1     2     1     2     1     2     1     2     1     1     1     1
2
##  9343  9344  9345  9346  9347  9348  9349  9350  9351  9352  9353  9354
9355
##     1     1     2     1     1     2     1     1     1     1     1     2
1
##  9356  9357  9358  9359  9360  9361  9362  9363  9364  9365  9366  9367
9368
##     2     1     1     1     1     1     1     1     1     1     1     1
1
##  9369  9370  9371  9372  9373  9374  9375  9376  9377  9378  9379  9380
9381
##     2     1     1     2     2     1     2     1     1     1     2     1
```

```
1
##  9382  9383  9384  9385  9386  9387  9388  9389  9390  9391  9392  9393
9394
##     1     2     2     1     1     2     1     1     2     1     1     1
1
##  9395  9396  9397  9398  9399  9400  9401  9402  9403  9404  9405  9406
9407
##     2     1     1     1     2     2     2     1     2     2     1     1
1
##  9408  9409  9410  9411  9412  9413  9414  9415  9416  9417  9418  9419
9420
##     1     1     1     1     1     2     1     1     1     1     1     1
1
##  9421  9422  9423  9424  9425  9426  9427  9428  9429  9430  9431  9432
9433
##     1     2     1     1     1     1     1     1     1     1     1     1
1
##  9434  9435  9436  9437  9438  9439  9440  9441  9442  9443  9444  9445
9446
##     1     1     1     1     1     1     1     1     1     1     1     1
1
##  9447  9448  9449  9450  9451  9452  9453  9454  9455  9456  9457  9458
9459
##     1     1     2     1     1     1     1     1     1     2     1     2
2
##  9460  9461  9462  9463  9464  9465  9466  9467  9468  9469  9470  9471
9472
##     1     1     1     1     1     1     1     2     2     1     1     1
1
##  9473  9474  9475  9476  9477  9478  9479  9480  9481  9482  9483  9484
9485
##     1     1     1     2     2     1     1     1     1     2     1     2
2
##  9486  9487  9488  9489  9490  9491  9492  9493  9494  9495  9496  9497
9498
##     1     2     2     2     1     2     1     1     1     1     1     1
1
##  9499  9500  9501  9502  9503  9504  9505  9506  9507  9508  9509  9510
9511
##     1     1     1     1     1     1     1     1     1     2     1     2
1
##  9512  9513  9514  9515  9516  9517  9518  9519  9520  9521  9522  9523
9524
##     1     1     1     2     1     1     1     1     1     1     1     1
1
##  9525  9526  9527  9528  9529  9530  9531  9532  9533  9534  9535  9536
9537
##     1     1     1     2     1     1     1     1     1     1     1     1
2
##  9538  9539  9540  9541  9542  9543  9544  9545  9546  9547  9548  9549
```

```
9550
##     2     1     2     1     2     1     2     1     2     1     1     2
1
##  9551  9552  9553  9554  9555  9556  9557  9558  9559  9560  9561  9562
9563
##     1     1     1     1     1     1     1     1     2     2     1     1
2
##  9564  9565  9566  9567  9568  9569  9570  9571  9572  9573  9574  9575
9576
##     2     2     1     1     1     1     1     1     2     2     1     1
1
##  9577  9578  9579  9580  9581  9582  9583  9584  9585  9586  9587  9588
9589
##     2     1     1     1     1     1     1     1     2     1     1     1
1
##  9590  9591  9592  9593  9594  9595  9596  9597  9598  9599  9600  9601
9602
##     1     1     1     1     2     2     2     1     2     2     1     1
2
##  9603  9604  9605  9606  9607  9608  9609  9610  9611  9612  9613  9614
9615
##     1     2     2     1     1     2     1     1     1     1     1     1
1
##  9616  9617  9618  9619  9620  9621  9622  9623  9624  9625  9626  9627
9628
##     2     2     1     1     1     1     1     1     1     1     1     1
1
##  9629  9630  9631  9632  9633  9634  9635  9636  9637  9638  9639  9640
9641
##     1     1     1     1     1     2     1     2     1     1     1     2
1
##  9642  9643  9644  9645  9646  9647  9648  9649  9650  9651  9652  9653
9654
##     1     1     1     1     1     2     1     1     2     1     1     1
1
##  9655  9656  9657  9658  9659  9660  9661  9662  9663  9664  9665  9666
9667
##     2     1     1     1     1     1     1     1     2     1     2     1
1
##  9668  9669  9670  9671  9672  9673  9674  9675  9676  9677  9678  9679
9680
##     1     1     1     1     1     1     1     2     1     1     1     1
1
##  9681  9682  9683  9684  9685  9686  9687  9688  9689  9690  9691  9692
9693
##     1     1     1     2     1     1     1     1     2     2     2     1
1
##  9694  9695  9696  9697  9698  9699  9700  9701  9702  9703  9704  9705
9706
##     1     1     2     1     1     1     1     1     1     1     1     2
```

```
2
##  9707  9708  9709  9710  9711  9712  9713  9714  9715  9716  9717  9718
9719
##     1     2     1     2     1     1     2     2     2     1     1     1
1
##  9720  9721  9722  9723  9724  9725  9726  9727  9728  9729  9730  9731
9732
##     1     2     1     1     1     1     1     1     2     1     1     1
2
##  9733  9734  9735  9736  9737  9738  9739  9740  9741  9742  9743  9744
9745
##     1     2     1     1     2     2     1     2     1     1     2     1
1
##  9746  9747  9748  9749  9750  9751  9752  9753  9754  9755  9756  9757
9758
##     1     2     1     2     2     1     1     1     1     1     2     1
1
##  9759  9760  9761  9762  9763  9764  9765  9766  9767  9768  9769  9770
9771
##     1     2     1     1     1     2     2     1     1     1     1     1
1
##  9772  9773  9774  9775  9776  9777  9778  9779  9780  9781  9782  9783
9784
##     2     1     1     1     1     1     1     1     1     2     1     1
1
##  9785  9786  9787  9788  9789  9790  9791  9792  9793  9794  9795  9796
9797
##     1     1     1     1     1     1     2     1     1     2     1     1
1
##  9798  9799  9800  9801  9802  9803  9804  9805  9806  9807  9808  9809
9810
##     1     1     1     1     1     2     2     1     1     2     1     1
1
##  9811  9812  9813  9814  9815  9816  9817  9818  9819  9820  9821  9822
9823
##     2     1     1     1     1     1     1     1     2     1     1     1
1
##  9824  9825  9826  9827  9828  9829  9830  9831  9832  9833  9834  9835
9836
##     1     1     1     1     1     1     2     1     2     1     1     1
1
##  9837  9838  9839  9840  9841  9842  9843  9844  9845  9846  9847  9848
9849
##     1     2     2     1     1     1     1     1     1     2     2     1
1
##  9850  9851  9852  9853  9854  9855  9856  9857  9858  9859  9860  9861
9862
##     2     1     2     1     1     1     2     1     1     1     2     2
1
##  9863  9864  9865  9866  9867  9868  9869  9870  9871  9872  9873  9874
```

```
9875
##     1     1     1     1     1     1     1     1     1     1     1     2
1
##  9876  9877  9878  9879  9880  9881  9882  9883  9884  9885  9886  9887
9888
##     1     1     2     1     1     2     2     1     1     1     1     1
2
##  9889  9890  9891  9892  9893  9894  9895  9896  9897  9898  9899  9900
9901
##     1     1     1     1     1     1     2     1     1     1     1     1
1
##  9902  9903  9904  9905  9906  9907  9908  9909  9910  9911  9912  9913
9914
##     2     1     1     2     1     1     1     1     1     1     1     1
2
##  9915  9916  9917  9918  9919  9920  9921  9922  9923  9924  9925  9926
9927
##     2     2     1     1     2     2     2     1     2     1     1     1
1
##  9928  9929  9930  9931  9932  9933  9934  9935  9936  9937  9938  9939
9940
##     1     1     1     2     1     1     2     1     1     1     1     1
2
##  9941  9942  9943  9944  9945  9946  9947  9948  9949  9950  9951  9952
9953
##     1     1     1     1     1     1     1     1     1     1     1     2
1
##  9954  9955  9956  9957  9958  9959  9960  9961  9962  9963  9964  9965
9966
##     1     1     1     2     1     2     2     1     1     1     2     1
1
##  9967  9968  9969  9970  9971  9972  9973  9974  9975  9976  9977  9978
9979
##     1     1     1     2     1     2     1     1     1     2     2     1
2
##  9980  9981  9982  9983  9984  9985  9986  9987  9988  9989  9990  9991
9992
##     1     1     2     2     1     1     1     1     1     1     1     1
1
##  9993  9994  9995  9996  9997  9998  9999 10000 10001 10002 10003 10004
10005
##     2     1     1     1     1     1     2     1     2     1     1     1
1
## 10006 10007 10008 10009 10010 10011 10012 10013 10014 10015 10016 10017
10018
##     1     1     1     1     1     1     1     1     1     1     1     1
1
## 10019 10020 10021 10022 10023 10024 10025 10026 10027 10028 10029 10030
10031
##     1     1     1     1     1     1     1     1     1     1     1     1
```

```
1
## 10032 10033 10034 10035 10036 10037 10038 10039 10040 10041 10042 10043
10044
##     2     2     2     2     2     2     1     1     1     1     1     1
1
## 10045 10046 10047 10048 10049 10050 10051 10052 10053 10054 10055 10056
10057
##     2     1     2     1     1     1     1     1     1     1     1     1
2
## 10058 10059 10060 10061 10062 10063 10064 10065 10066 10067 10068 10069
10070
##     1     2     1     1     1     1     1     1     1     2     1     1
1
## 10071 10072 10073 10074 10075 10076 10077 10078 10079 10080 10081 10082
10083
##     1     1     2     2     1     1     2     2     1     1     1     1
2
## 10084 10085 10086 10087 10088 10089 10090 10091 10092 10093 10094 10095
10096
##     1     1     1     1     2     1     2     1     1     1     1     1
1
## 10097 10098 10099 10100 10101 10102 10103 10104 10105 10106 10107 10108
10109
##     1     1     1     1     1     2     2     1     1     2     1     1
1
## 10110 10111 10112 10113 10114 10115 10116 10117 10118 10119 10120 10121
10122
##     1     1     1     1     2     1     1     1     2     1     1     1
1
## 10123 10124 10125 10126 10127 10128 10129 10130 10131 10132 10133 10134
10135
##     1     1     1     1     1     1     1     1     1     2     1     1
2
## 10136 10137 10138 10139 10140 10141 10142 10143 10144 10145 10146 10147
10148
##     2     1     2     1     2     1     1     1     1     1     1     1
1
## 10149 10150 10151 10152 10153 10154 10155 10156 10157 10158 10159 10160
10161
##     1     1     1     1     1     1     1     1     1     1     2     2
1
## 10162 10163 10164 10165 10166 10167 10168 10169 10170 10171 10172 10173
10174
##     1     1     2     1     1     1     1     2     1     2     1     2
1
## 10175 10176 10177 10178 10179 10180 10181 10182 10183 10184 10185 10186
10187
##     1     1     2     1     1     1     2     1     2     1     1     1
1
## 10188 10189 10190 10191 10192 10193 10194 10195 10196 10197 10198 10199
```

```
10200
##     1     1     1     1     1     1     1     1     2     1     2     2
1
## 10201 10202 10203 10204 10205 10206 10207 10208 10209 10210 10211 10212
10213
##     1     1     2     1     1     2     1     1     2     1     1     1
2
## 10214 10215 10216 10217 10218 10219 10220 10221 10222 10223 10224 10225
10226
##     1     1     1     1     1     1     1     1     2     1     1     1
2
## 10227 10228 10229 10230 10231 10232 10233 10234 10235 10236 10237 10238
10239
##     1     1     2     1     1     1     1     1     1     1     1     1
2
## 10240 10241 10242 10243 10244 10245 10246 10247 10248 10249 10250 10251
10252
##     1     1     1     1     1     2     2     1     1     1     1     1
2
## 10253 10254 10255 10256 10257 10258 10259 10260 10261 10262 10263 10264
10265
##     1     1     2     1     1     1     1     1     1     1     1     2
1
## 10266 10267 10268 10269 10270 10271 10272 10273 10274 10275 10276 10277
10278
##     1     1     1     1     1     1     1     1     1     2     1     1
1
## 10279 10280 10281 10282 10283 10284 10285 10286 10287 10288 10289 10290
10291
##     1     1     2     1     1     1     2     1     1     1     2     1
1
## 10292 10293 10294 10295 10296 10297 10298 10299 10300 10301 10302 10303
10304
##     1     1     1     2     1     2     1     2     1     2     2     2
2
## 10305 10306 10307 10308 10309 10310 10311 10312 10313 10314 10315 10316
10317
##     1     1     1     1     1     1     1     1     1     2     1     1
1
## 10318 10319 10320 10321 10322 10323 10324 10325 10326 10327 10328 10329
10330
##     1     2     1     1     2     1     2     2     1     1     2     1
2
## 10331 10332 10333 10334 10335 10336 10337 10338 10339 10340 10341 10342
10343
##     1     1     1     2     1     1     1     1     1     2     2     1
1
## 10344 10345 10346 10347 10348 10349 10350 10351 10352 10353 10354 10355
10356
##     1     1     1     1     1     1     1     2     2     2     1     1
```

```
1
## 10357 10358 10359 10360 10361 10362 10363 10364 10365 10366 10367 10368
10369
##     1     2     1     1     2     1     2     2     1     2     1     2
1
## 10370 10371 10372 10373 10374 10375 10376 10377 10378 10379 10380 10381
10382
##     1     2     1     2     1     1     1     1     1     1     1     1
2
## 10383 10384 10385 10386 10387 10388 10389 10390 10391 10392 10393 10394
10395
##     1     2     2     2     1     2     1     1     1     1     2     1
1
## 10396 10397 10398 10399 10400 10401 10402 10403 10404 10405 10406 10407
10408
##     1     1     1     1     2     1     2     2     1     1     2     1
1
## 10409 10410 10411 10412 10413 10414 10415 10416 10417 10418 10419 10420
10421
##     1     2     1     1     2     1     1     1     1     1     1     2
2
## 10422 10423 10424 10425 10426 10427 10428 10429 10430 10431 10432 10433
10434
##     1     1     1     1     1     1     1     1     1     1     1     1
1
## 10435 10436 10437 10438 10439 10440 10441 10442 10443 10444 10445 10446
10447
##     1     1     1     1     2     1     2     1     1     1     1     1
1
## 10448 10449 10450 10451 10452 10453 10454 10455 10456 10457 10458 10459
10460
##     1     1     1     1     2     1     1     1     2     1     1     1
2
## 10461 10462 10463 10464 10465 10466 10467 10468 10469 10470 10471 10472
10473
##     1     1     1     2     1     1     1     1     1     1     1     1
2
## 10474 10475 10476 10477 10478 10479 10480 10481 10482 10483 10484 10485
10486
##     1     1     1     1     1     1     1     1     2     1     1     1
1
## 10487 10488 10489 10490 10491 10492 10493 10494 10495 10496 10497 10498
10499
##     1     1     1     1     1     2     1     1     1     2     1     1
1
## 10500 10501 10502 10503 10504 10505 10506 10507 10508 10509 10510 10511
10512
##     2     1     1     1     1     1     1     1     1     1     2     2
1
## 10513 10514 10515 10516 10517 10518 10519 10520 10521 10522 10523 10524
```

```
10525
##     1     1     1     2     1     2     1     1     1     1     2     1
1
## 10526 10527 10528 10529 10530 10531 10532 10533 10534 10535 10536 10537
10538
##     1     1     1     1     1     2     1     1     1     1     1     1
1
## 10539 10540 10541 10542 10543 10544 10545 10546 10547 10548 10549 10550
10551
##     2     1     2     1     2     1     1     1     1     1     1     1
1
## 10552 10553 10554 10555 10556 10557 10558 10559 10560 10561 10562 10563
10564
##     1     1     1     1     2     1     1     2     1     1     1     1
1
## 10565 10566 10567 10568 10569 10570 10571 10572 10573 10574 10575 10576
10577
##     1     1     1     1     1     1     1     2     1     1     1     1
2
## 10578 10579 10580 10581 10582 10583 10584 10585 10586 10587 10588 10589
10590
##     1     1     1     1     1     1     1     1     1     1     2     1
1
## 10591 10592 10593 10594 10595 10596 10597 10598 10599 10600 10601 10602
10603
##     1     1     2     1     1     1     1     1     1     1     1     1
1
## 10604 10605 10606 10607 10608 10609 10610 10611 10612 10613 10614 10615
10616
##     1     1     1     2     1     1     1     1     1     2     1     1
1
## 10617 10618 10619 10620 10621 10622 10623 10624 10625 10626 10627 10628
10629
##     2     1     1     2     2     2     1     2     1     1     1     1
2
## 10630 10631 10632 10633 10634 10635 10636 10637 10638 10639 10640 10641
10642
##     1     1     1     1     1     1     2     1     1     2     1     2
2
## 10643 10644 10645 10646 10647 10648 10649 10650 10651 10652 10653 10654
10655
##     1     1     2     1     1     1     2     1     1     1     1     1
2
## 10656 10657 10658 10659 10660 10661 10662 10663 10664 10665 10666 10667
10668
##     1     1     2     2     1     2     1     1     2     1     2     1
1
## 10669 10670 10671 10672 10673 10674 10675 10676 10677 10678 10679 10680
10681
##     2     1     1     1     1     1     2     1     1     1     1     1
```

```
1
## 10682 10683 10684 10685 10686 10687 10688 10689 10690 10691 10692 10693
10694
##     1     2     2     1     1     1     1     1     2     1     1     2
1
## 10695 10696 10697 10698 10699 10700 10701 10702 10703 10704 10705 10706
10707
##     1     1     1     1     1     1     1     1     1     1     1     2
1
## 10708 10709 10710 10711 10712 10713 10714 10715 10716 10717 10718 10719
10720
##     1     1     2     1     1     2     1     2     2     1     1     1
1
## 10721 10722 10723 10724 10725 10726 10727 10728 10729 10730 10731 10732
10733
##     2     1     1     1     1     1     1     1     1     1     1     1
2
## 10734 10735 10736 10737 10738 10739 10740 10741 10742 10743 10744 10745
10746
##     1     2     1     1     1     1     1     1     1     1     1     1
1
## 10747 10748 10749 10750 10751 10752 10753 10754 10755 10756 10757 10758
10759
##     1     1     1     1     1     1     1     2     1     1     1     1
2
## 10760 10761 10762 10763 10764 10765 10766 10767 10768 10769 10770 10771
10772
##     1     1     1     2     1     1     1     1     1     1     1     1
1
## 10773 10774 10775 10776 10777 10778 10779 10780 10781 10782 10783 10784
10785
##     1     1     2     1     1     1     2     1     1     1     1     1
1
## 10786 10787 10788 10789 10790 10791 10792 10793 10794 10795 10796 10797
10798
##     1     1     2     1     1     1     1     1     1     1     1     1
1
## 10799 10800 10801 10802 10803 10804 10805 10806 10807 10808 10809 10810
10811
##     1     1     1     2     1     1     1     1     1     1     1     1
1
## 10812 10813 10814 10815 10816 10817 10818 10819 10820 10821 10822 10823
10824
##     1     1     1     1     2     2     2     1     1     1     2     1
1
## 10825 10826 10827 10828 10829 10830 10831 10832 10833 10834 10835 10836
10837
##     2     1     1     2     1     1     1     1     1     2     1     2
1
## 10838 10839 10840 10841 10842 10843 10844 10845 10846 10847 10848 10849
```

```
10850
##     1     1     1     1     1     1     1     1     1     1     1     1
1
## 10851 10852 10853 10854 10855 10856 10857 10858 10859 10860 10861 10862
10863
##     1     1     1     1     1     1     1     1     1     1     1     1
2
## 10864 10865 10866 10867 10868 10869 10870 10871 10872 10873 10874 10875
10876
##     2     1     1     1     1     1     2     1     1     1     1     1
2
## 10877 10878 10879 10880 10881 10882 10883 10884 10885 10886 10887 10888
10889
##     1     2     1     1     1     1     1     1     1     2     1     2
1
## 10890 10891 10892 10893 10894 10895 10896 10897 10898 10899 10900 10901
10902
##     2     1     1     1     1     2     1     1     1     1     1     1
1
## 10903 10904 10905 10906 10907 10908 10909 10910 10911 10912 10913 10914
10915
##     1     1     1     1     1     1     2     1     1     1     2     1
1
## 10916 10917 10918 10919 10920 10921 10922 10923 10924 10925 10926 10927
10928
##     2     2     1     1     2     1     1     1     1     2     1     1
2
## 10929 10930 10931 10932 10933 10934 10935 10936 10937 10938 10939 10940
10941
##     1     1     2     1     1     1     1     1     1     2     1     1
1
## 10942 10943 10944 10945 10946 10947 10948 10949 10950 10951 10952 10953
10954
##     2     1     1     1     1     1     1     2     1     1     1     1
1
## 10955 10956 10957 10958 10959 10960 10961 10962 10963 10964 10965 10966
10967
##     2     1     2     1     1     1     1     1     1     1     1     1
1
## 10968 10969 10970 10971 10972 10973 10974 10975 10976 10977 10978 10979
10980
##     1     1     1     1     1     1     2     1     1     1     2     2
2
## 10981 10982 10983 10984 10985 10986 10987 10988 10989 10990 10991 10992
10993
##     1     1     2     1     1     2     1     2     1     1     1     1
1
## 10994 10995 10996 10997 10998 10999 11000 11001 11002 11003 11004 11005
11006
##     1     1     2     1     1     1     2     2     1     1     1     2
```

```
1
## 11007 11008 11009 11010 11011 11012 11013 11014 11015 11016 11017 11018
11019
##     1     1     1     1     1     1     1     2     1     1     1     1
1
## 11020 11021 11022 11023 11024 11025 11026 11027 11028 11029 11030 11031
11032
##     1     1     1     1     1     2     2     2     1     1     1     1
1
## 11033 11034 11035 11036 11037 11038 11039 11040 11041 11042 11043 11044
11045
##     1     1     2     1     1     1     1     1     1     1     1     1
1
## 11046 11047 11048 11049 11050 11051 11052 11053 11054 11055 11056 11057
11058
##     1     1     1     1     1     1     1     1     1     1     2     2
1
## 11059 11060 11061 11062 11063 11064 11065 11066 11067 11068 11069 11070
11071
##     2     1     1     1     1     1     1     2     1     1     2     1
1
## 11072 11073 11074 11075 11076 11077 11078 11079 11080 11081 11082 11083
11084
##     2     1     1     1     1     1     1     1     1     1     1     1
1
## 11085 11086 11087 11088 11089 11090 11091 11092 11093 11094 11095 11096
11097
##     1     1     1     2     1     2     1     1     1     1     1     1
2
## 11098 11099 11100 11101 11102 11103 11104 11105 11106 11107 11108 11109
11110
##     1     1     2     1     1     1     2     2     1     1     1     2
1
## 11111 11112 11113 11114 11115 11116 11117 11118 11119 11120 11121 11122
11123
##     1     1     1     2     1     1     2     1     2     1     2     1
2
## 11124 11125 11126 11127 11128 11129 11130 11131 11132 11133 11134 11135
11136
##     1     2     1     1     2     2     1     2     1     1     1     1
1
## 11137 11138 11139 11140 11141 11142 11143 11144 11145 11146 11147 11148
11149
##     1     2     1     1     1     1     1     1     1     1     2     1
1
## 11150 11151 11152 11153 11154 11155 11156 11157 11158 11159 11160 11161
11162
##     1     1     1     2     1     1     1     1     1     1     1     1
1
## 11163 11164 11165 11166 11167 11168 11169 11170 11171 11172 11173 11174
```

```
11175
##     1     1     2     1     1     1     2     1     1     2     2     1
1
## 11176 11177 11178 11179 11180 11181 11182 11183 11184 11185 11186 11187
11188
##     1     1     1     1     1     1     1     2     1     1     1     1
1
## 11189 11190 11191 11192 11193 11194 11195 11196 11197 11198 11199 11200
11201
##     1     2     1     1     2     2     1     1     1     1     1     2
2
## 11202 11203 11204 11205 11206 11207 11208 11209 11210 11211 11212 11213
11214
##     2     1     1     1     1     2     2     2     1     1     1     1
1
## 11215 11216 11217 11218 11219 11220 11221 11222 11223 11224 11225 11226
11227
##     2     1     1     1     2     2     1     1     1     1     1     1
1
## 11228 11229 11230 11231 11232 11233 11234 11235 11236 11237 11238 11239
11240
##     2     1     2     1     1     2     1     1     1     1     1     2
1
## 11241 11242 11243 11244 11245 11246 11247 11248 11249 11250 11251 11252
11253
##     1     1     2     1     1     1     2     1     1     2     2     1
2
## 11254 11255 11256 11257 11258 11259 11260 11261 11262 11263 11264 11265
11266
##     1     1     2     2     2     2     1     1     1     1     1     2
1
## 11267 11268 11269 11270 11271 11272 11273 11274 11275 11276 11277 11278
11279
##     1     1     1     1     2     1     1     1     2     1     1     1
2
## 11280 11281 11282 11283 11284 11285 11286 11287 11288 11289 11290 11291
11292
##     1     1     1     1     1     1     1     1     1     1     2     1
1
## 11293 11294 11295 11296 11297 11298 11299 11300 11301 11302 11303 11304
11305
##     1     2     1     2     1     1     2     2     1     2     1     1
1
## 11306 11307 11308 11309 11310 11311 11312 11313 11314 11315 11316 11317
11318
##     2     1     1     2     1     1     2     1     2     1     2     2
1
## 11319 11320 11321 11322 11323 11324 11325 11326 11327 11328 11329 11330
11331
##     1     1     1     1     1     1     1     1     1     1     1     1
```

```
1
## 11332 11333 11334 11335 11336 11337 11338 11339 11340 11341 11342 11343
11344
##     1     2     2     1     2     1     1     1     1     1     1     2
1
## 11345 11346 11347 11348 11349 11350 11351 11352 11353 11354 11355 11356
11357
##     2     2     2     2     1     1     1     2     1     1     1     1
1
## 11358 11359 11360 11361 11362 11363 11364 11365 11366 11367 11368 11369
11370
##     1     1     1     1     1     1     1     2     1     1     2     1
1
## 11371 11372 11373 11374 11375 11376 11377 11378 11379 11380 11381 11382
11383
##     1     2     1     1     1     2     1     1     1     1     1     1
2
## 11384 11385 11386 11387 11388 11389 11390 11391 11392 11393 11394 11395
11396
##     1     1     2     1     1     1     1     1     1     1     1     2
1
## 11397 11398 11399 11400 11401 11402 11403 11404 11405 11406 11407 11408
11409
##     1     1     1     2     2     1     1     1     1     1     2     2
2
## 11410 11411 11412 11413 11414 11415 11416 11417 11418 11419 11420 11421
11422
##     1     1     1     1     1     1     1     1     2     1     1     1
1
## 11423 11424 11425 11426 11427 11428 11429 11430 11431 11432 11433 11434
11435
##     1     1     1     1     1     1     1     1     1     1     1     1
2
## 11436 11437 11438 11439 11440 11441 11442 11443 11444 11445 11446 11447
11448
##     1     1     1     1     1     1     1     2     1     1     1     2
2
## 11449 11450 11451 11452 11453 11454 11455 11456 11457 11458 11459 11460
11461
##     1     1     1     2     1     1     1     1     1     1     1     1
2
## 11462 11463 11464 11465 11466 11467 11468 11469 11470 11471 11472 11473
11474
##     1     1     1     1     1     1     1     2     1     2     1     1
1
## 11475 11476 11477 11478 11479 11480 11481 11482 11483 11484 11485 11486
11487
##     1     1     2     2     1     1     1     1     1     1     2     1
1
## 11488 11489 11490 11491 11492 11493 11494 11495 11496 11497 11498 11499
```

```
11500
##     1     1     1     1     1     1     1     1     2     1     1     1
1
## 11501 11502 11503 11504 11505 11506 11507 11508 11509 11510 11511 11512
11513
##     1     1     1     1     2     1     1     1     1     2     1     2
2
## 11514 11515 11516 11517 11518 11519 11520 11521 11522 11523 11524 11525
11526
##     2     1     2     1     2     2     2     1     1     1     1     1
1
## 11527 11528 11529 11530 11531 11532 11533 11534 11535 11536 11537 11538
11539
##     2     1     1     1     1     1     1     1     1     2     1     2
1
## 11540 11541 11542 11543 11544 11545 11546 11547 11548 11549 11550 11551
11552
##     1     1     2     2     1     1     2     1     1     2     2     1
1
## 11553 11554 11555 11556 11557 11558 11559 11560 11561 11562 11563 11564
11565
##     1     1     2     2     1     2     1     1     1     2     1     1
1
## 11566 11567 11568 11569 11570 11571 11572 11573 11574 11575 11576 11577
11578
##     1     1     1     1     1     1     2     1     2     2     1     2
1
## 11579 11580 11581 11582 11583 11584 11585 11586 11587 11588 11589 11590
11591
##     1     2     1     1     1     1     1     1     2     1     1     1
1
## 11592 11593 11594 11595 11596 11597 11598 11599 11600 11601 11602 11603
11604
##     2     1     1     2     1     2     2     2     1     2     2     1
2
## 11605 11606 11607 11608 11609 11610 11611 11612 11613 11614 11615 11616
11617
##     1     1     1     1     1     1     1     2     1     1     1     1
1
## 11618 11619 11620 11621 11622 11623 11624 11625 11626 11627 11628 11629
11630
##     1     1     1     1     1     1     1     1     1     1     1     1
1
## 11631 11632 11633 11634 11635 11636 11637 11638 11639 11640 11641 11642
11643
##     1     1     1     1     1     1     1     1     2     2     1     1
2
## 11644 11645 11646 11647 11648 11649 11650 11651 11652 11653 11654 11655
11656
##     1     1     1     2     1     1     1     1     1     1     1     1
```

```
1
## 11657 11658 11659 11660 11661 11662 11663 11664 11665 11666 11667 11668
11669
##     1     1     1     1     1     1     1     1     2     1     1     1
1
## 11670 11671 11672 11673 11674 11675 11676 11677 11678 11679 11680 11681
11682
##     1     1     1     1     1     1     1     1     1     1     1     1
1
## 11683 11684 11685 11686 11687 11688 11689 11690 11691 11692 11693 11694
11695
##     1     1     1     1     1     1     1     1     1     1     1     2
1
## 11696 11697 11698 11699 11700 11701 11702 11703 11704 11705 11706 11707
11708
##     1     1     1     1     1     1     2     1     1     1     1     1
1
## 11709 11710 11711 11712 11713 11714 11715 11716 11717 11718 11719 11720
11721
##     1     2     1     1     2     2     2     1     1     1     1     1
1
## 11722 11723 11724 11725 11726 11727 11728 11729 11730 11731 11732 11733
11734
##     1     2     1     1     1     1     1     1     2     1     1     1
1
## 11735 11736 11737 11738 11739 11740 11741 11742 11743 11744 11745 11746
11747
##     1     2     2     1     1     1     2     1     1     2     1     1
1
## 11748 11749 11750 11751 11752 11753 11754 11755 11756 11757 11758 11759
11760
##     1     1     1     2     1     1     2     1     1     1     1     1
1
## 11761 11762 11763 11764 11765 11766 11767 11768 11769 11770 11771 11772
11773
##     1     1     1     1     2     1     1     1     1     1     1     1
1
## 11774 11775 11776 11777 11778 11779 11780 11781 11782 11783 11784 11785
11786
##     2     1     1     1     1     1     2     1     1     1     1     1
1
## 11787 11788 11789 11790 11791 11792 11793 11794 11795 11796 11797 11798
11799
##     1     2     1     1     1     1     1     1     2     2     1     2
1
## 11800 11801 11802 11803 11804 11805 11806 11807 11808 11809 11810 11811
11812
##     2     1     1     1     1     2     1     2     1     1     1     1
1
## 11813 11814 11815 11816 11817 11818 11819 11820 11821 11822 11823 11824
```

```
11825
##     1     1     1     1     1     1     1     1     1     1     2     1
1
## 11826 11827 11828 11829 11830 11831 11832 11833 11834 11835 11836 11837
11838
##     1     2     1     1     2     2     1     2     2     1     1     1
1
## 11839 11840 11841 11842 11843 11844 11845 11846 11847 11848 11849 11850
11851
##     1     2     1     1     1     1     1     2     1     1     1     1
2
## 11852 11853 11854 11855 11856 11857 11858 11859 11860 11861 11862 11863
11864
##     2     2     2     2     2     1     2     2     1     1     2     1
2
## 11865 11866 11867 11868 11869 11870 11871 11872 11873 11874 11875 11876
11877
##     1     1     2     1     1     2     1     2     1     1     1     1
1
## 11878 11879 11880 11881 11882 11883 11884 11885 11886 11887 11888 11889
11890
##     1     1     1     1     1     1     1     1     1     1     1     2
1
## 11891 11892 11893 11894 11895 11896 11897 11898 11899 11900 11901 11902
11903
##     2     1     1     2     1     1     2     1     1     1     1     2
1
## 11904 11905 11906 11907 11908 11909 11910 11911 11912 11913 11914 11915
11916
##     1     2     1     2     2     1     1     1     1     1     1     1
1
## 11917 11918 11919 11920 11921 11922 11923 11924 11925 11926 11927 11928
11929
##     2     2     1     1     2     1     2     1     1     1     1     2
1
## 11930 11931 11932 11933 11934 11935 11936 11937 11938 11939 11940 11941
11942
##     1     1     2     1     1     1     1     2     1     1     1     1
1
## 11943 11944 11945 11946 11947 11948 11949 11950 11951 11952 11953 11954
11955
##     1     1     1     1     1     1     1     1     1     1     1     1
1
## 11956 11957 11958 11959 11960 11961 11962 11963 11964 11965 11966 11967
11968
##     1     1     1     1     1     1     2     1     1     2     2     2
1
## 11969 11970 11971 11972 11973 11974 11975 11976 11977 11978 11979 11980
11981
##     1     1     1     1     1     1     1     1     1     2     1     1
```

```
1
## 11982 11983 11984 11985 11986 11987 11988 11989 11990 11991 11992 11993
11994
##     1     1     2     1     1     2     1     2     1     1     1     1
1
## 11995 11996 11997 11998 11999 12000 12001 12002 12003 12004 12005 12006
12007
##     2     1     1     1     1     1     1     2     1     1     1     1
1
## 12008 12009 12010 12011 12012 12013 12014 12015 12016 12017 12018 12019
12020
##     1     1     1     1     1     1     2     1     1     1     2     1
2
## 12021 12022 12023 12024 12025 12026 12027 12028 12029 12030 12031 12032
12033
##     1     1     1     2     1     1     1     2     1     1     1     1
1
## 12034 12035 12036 12037 12038 12039 12040 12041 12042 12043 12044 12045
12046
##     2     1     1     2     1     1     1     1     1     2     1     1
1
## 12047 12048 12049 12050 12051 12052 12053 12054 12055 12056 12057 12058
12059
##     1     1     1     1     1     1     1     2     1     1     1     1
1
## 12060 12061 12062 12063 12064 12065 12066 12067 12068 12069 12070 12071
12072
##     1     1     1     1     1     1     2     1     2     1     2     1
1
## 12073 12074 12075 12076 12077 12078 12079 12080 12081 12082 12083 12084
12085
##     1     1     1     1     1     1     2     1     1     1     1     1
1
## 12086 12087 12088 12089 12090 12091 12092 12093 12094 12095 12096 12097
12098
##     1     1     1     1     2     1     1     1     2     1     2     2
1
## 12099 12100 12101 12102 12103 12104 12105 12106 12107 12108 12109 12110
12111
##     1     1     1     1     1     2     1     1     2     1     1     1
2
## 12112 12113 12114 12115 12116 12117 12118 12119 12120 12121 12122 12123
12124
##     2     1     1     2     2     1     1     1     1     2     1     2
1
## 12125 12126 12127 12128 12129 12130 12131 12132 12133 12134 12135 12136
12137
##     1     1     1     1     1     2     2     2     1     2     1     1
1
## 12138 12139 12140 12141 12142 12143 12144 12145 12146 12147 12148 12149
```

```
12150
##     1     1     2     1     2     1     2     1     2     1     1     2
1
## 12151 12152 12153 12154 12155 12156 12157 12158 12159 12160 12161 12162
12163
##     1     1     2     1     1     2     1     1     1     1     1     2
1
## 12164 12165 12166 12167 12168 12169 12170 12171 12172 12173 12174 12175
12176
##     1     1     1     1     1     1     2     2     2     2     1     1
1
## 12177 12178 12179 12180 12181 12182 12183 12184 12185 12186 12187 12188
12189
##     2     1     2     2     1     1     2     1     2     1     1     1
2
## 12190 12191 12192 12193 12194 12195 12196 12197 12198 12199 12200 12201
12202
##     2     2     2     1     1     1     1     1     1     1     1     1
1
## 12203 12204 12205 12206 12207 12208 12209 12210 12211 12212 12213 12214
12215
##     1     1     2     1     1     1     1     2     1     1     1     1
1
## 12216 12217 12218 12219 12220 12221 12222 12223 12224 12225 12226 12227
12228
##     1     2     1     1     1     1     2     1     1     2     1     1
1
## 12229 12230 12231 12232 12233 12234 12235 12236 12237 12238 12239 12240
12241
##     1     1     2     1     1     2     1     1     2     2     1     1
1
## 12242 12243 12244 12245 12246 12247 12248 12249 12250 12251 12252 12253
12254
##     1     1     1     2     1     1     2     1     1     1     1     1
1
## 12255 12256 12257 12258 12259 12260 12261 12262 12263 12264 12265 12266
12267
##     1     2     1     1     1     1     2     2     1     1     1     2
2
## 12268 12269 12270 12271 12272 12273 12274 12275 12276 12277 12278 12279
12280
##     1     1     1     1     1     2     1     1     1     1     1     2
1
## 12281 12282 12283 12284 12285 12286 12287 12288 12289 12290 12291 12292
12293
##     1     2     2     1     1     2     1     2     1     1     1     1
1
## 12294 12295 12296 12297 12298 12299 12300 12301 12302 12303 12304 12305
12306
##     1     1     1     1     1     1     1     1     1     1     1     1
```

```
1
## 12307 12308 12309 12310 12311 12312 12313 12314 12315 12316 12317 12318
12319
##     1     2     1     1     1     2     2     2     1     1     1     1
1
## 12320 12321 12322 12323 12324 12325 12326 12327 12328 12329 12330
##     1     1     1     1     1     1     1     1     1     1     1
##
## Within cluster sum of squares by cluster:
## [1] 135765.64  61258.13
##  (between_SS / total_SS =  10.9 %)
##
## Available components:
##
## [1] "cluster"      "centers"      "totss"        "withinss"
"tot.withinss"
## [6] "betweenss"    "size"         "iter"         "ifault"

print('*****************************************')

## [1] "*****************************************"

#creating df with means of continuous columns by cluster
df_clus_means<- aggregate(subset(df, select=contin),
by=list(cluster=grouping$cluster),mean)
df_clus_means

##   cluster administrative administrative_duration informational
## 1       1       1.369621                39.87144     0.1726272
## 2       2       6.937767               280.59950     2.1140143
##   informational_duration productrelated productrelated_duration
bouncerates
## 1                6.37106       20.38691                739.6049
0.024976627
## 2              171.10167       87.25558               3421.7229
0.005994113
##    exitrates pagevalues
## 1 0.04751047   4.516205
## 2 0.01891893  12.659674

#creating dataframe with cluster column and checking that output matches
above
df_clus <- copy(df)
df_clus$cluster <- grouping$cluster
# df_clus
df_clus %>% group_by(cluster) %>%
 summarise(mean_adm=mean(administrative),
mean_col=mean(administrative_duration))

## # A tibble: 2 × 3
##   cluster mean_adm mean_col
```

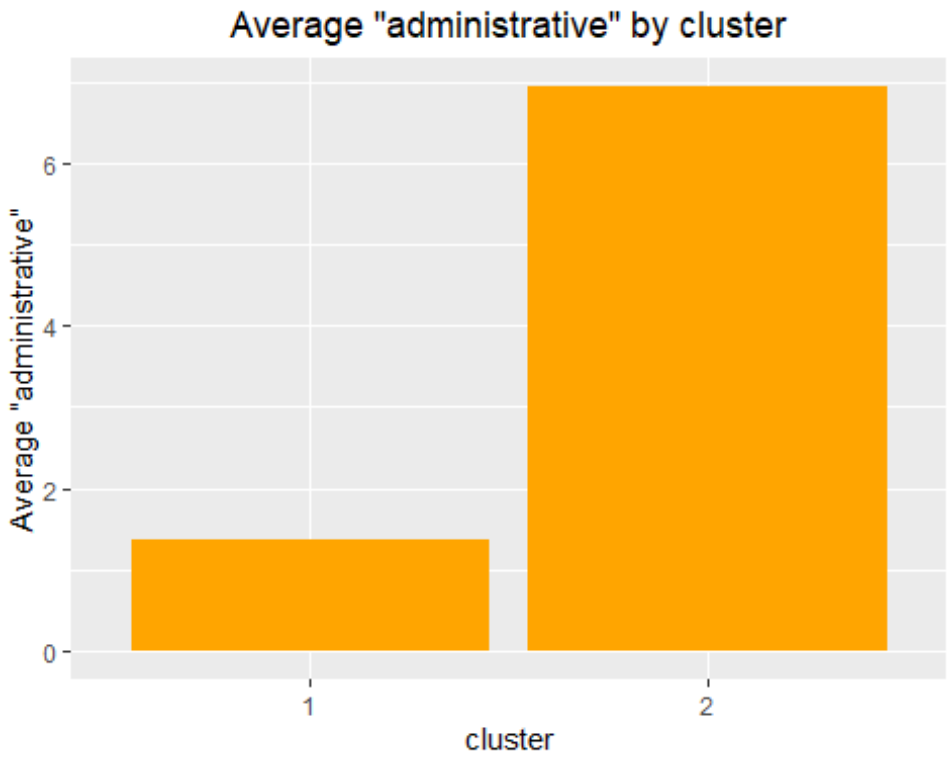
```
##     <int>    <dbl>    <dbl>
## 1       1     1.37     39.9
## 2       2     6.94    281.

#plotting revenue by cluster
ggplot() + geom_bar(
    data=df_clus,
    aes(x=factor(cluster), fill = factor(revenue)
    ), position="dodge") + labs(title = "Revenue by cluster",
           y="count", x="cluster", fill="revenue") + theme(plot.title =
element_text(hjust=0.5))
```

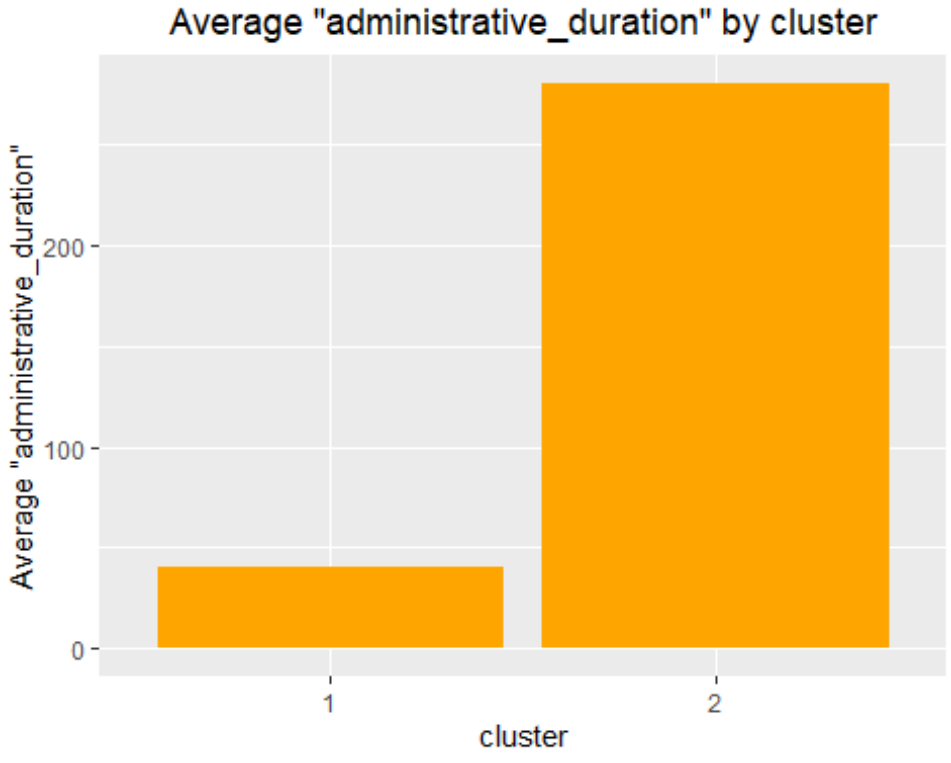

```
prop.table(table(df_clus$cluster, df_clus$revenue), 1)

##
##         FALSE      TRUE
##   1 0.8816074 0.1183926
##   2 0.6660333 0.3339667
```

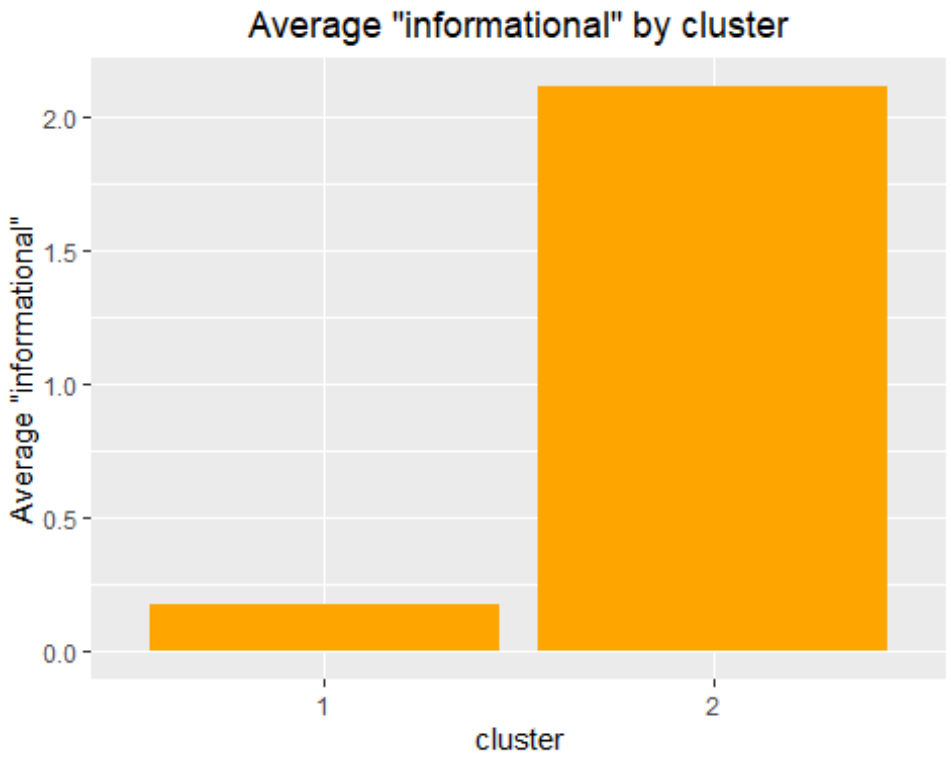
The proportion of customers of cluster 2 who generate revenue (0.33) is higher than the proportion of customers in cluster 1 who generate revenue.

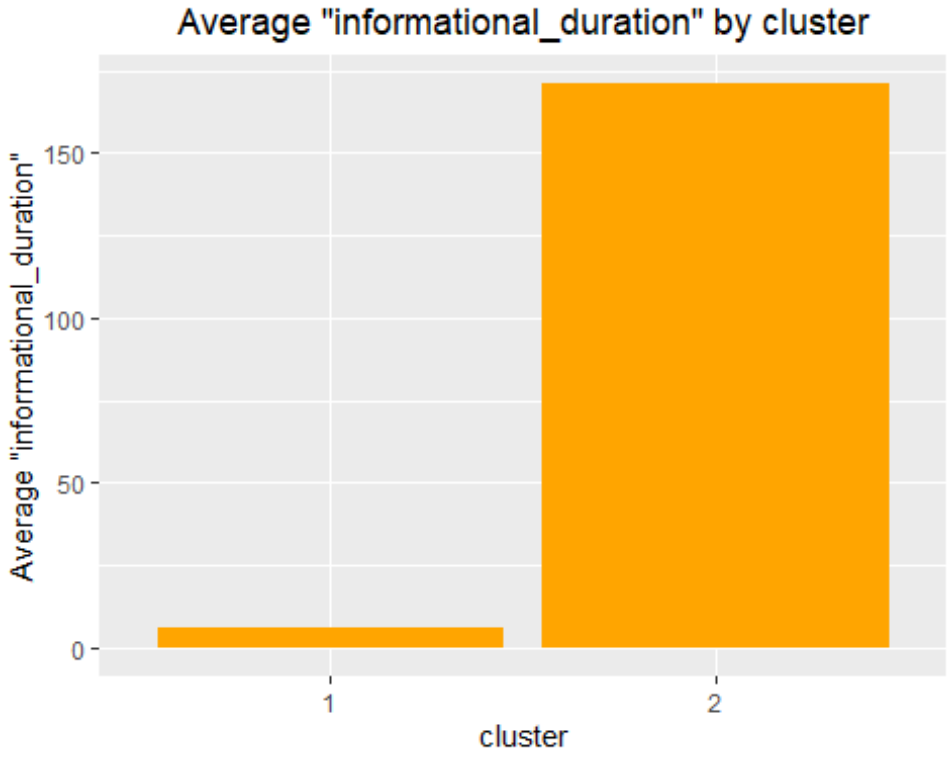
```
library(stringr)

#average values by cluster

for (m in contin){
```

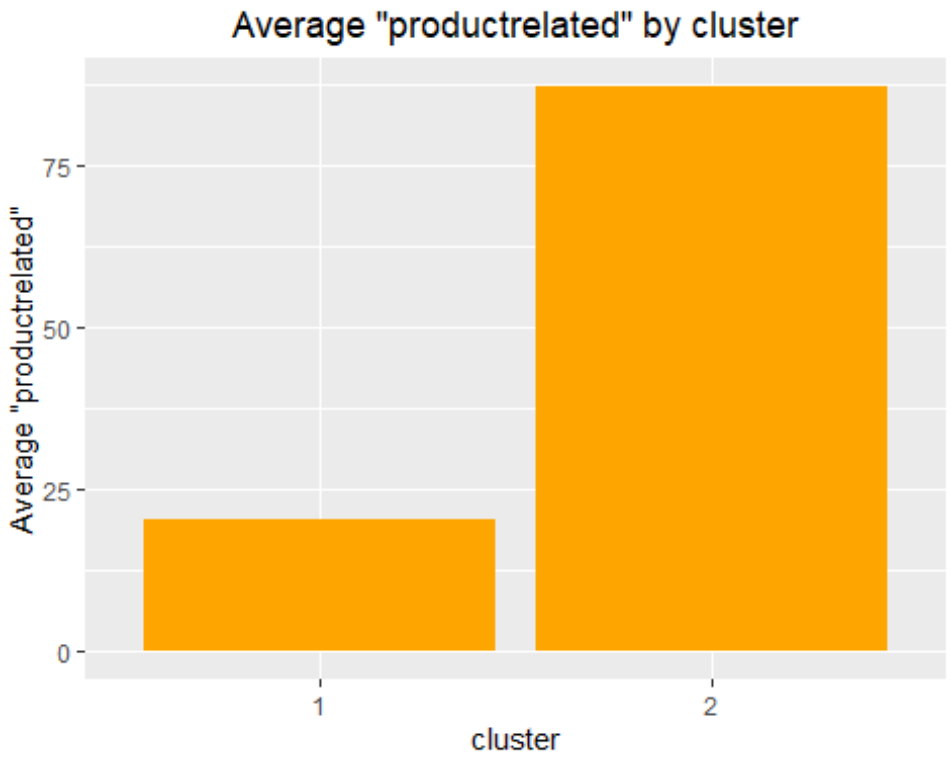
```
  suppressWarnings(print(ggplot() + geom_col(
   data=df_clus_means,
   aes(x=as.factor(cluster), y=df_clus_means[[m]]),
   fill="orange") + labs(title = str_glue('Average "{m}" by cluster'),
   x="cluster", y=str_glue('Average "{m}"')) + theme(plot.title =
  element_text(hjust=0.5))))

}
```

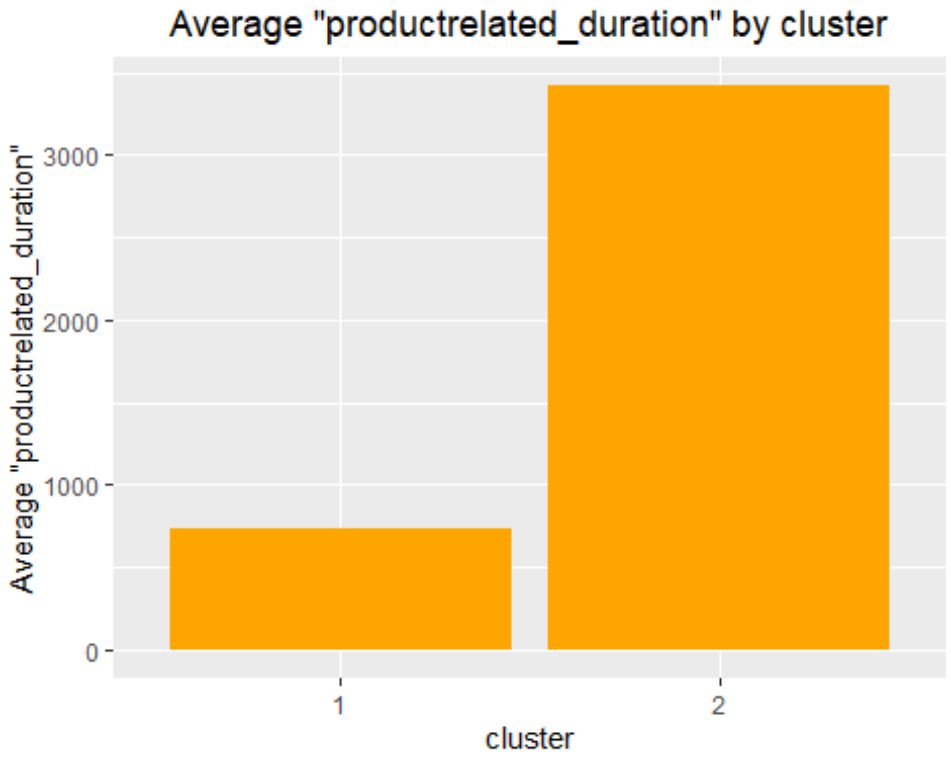

Average "administrative" by cluster
Average "administrative"
0
2
4
6
1
2
cluster

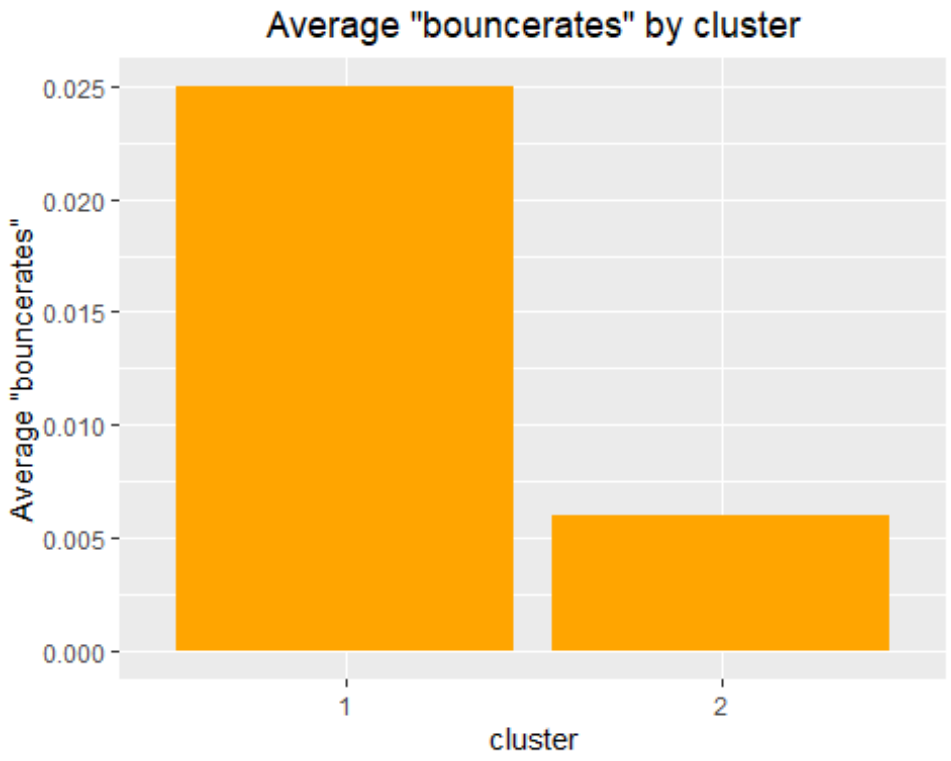

Average "administrative_duration" by cluster
Average "administrative_duration"
0
100
200
1
2
cluster

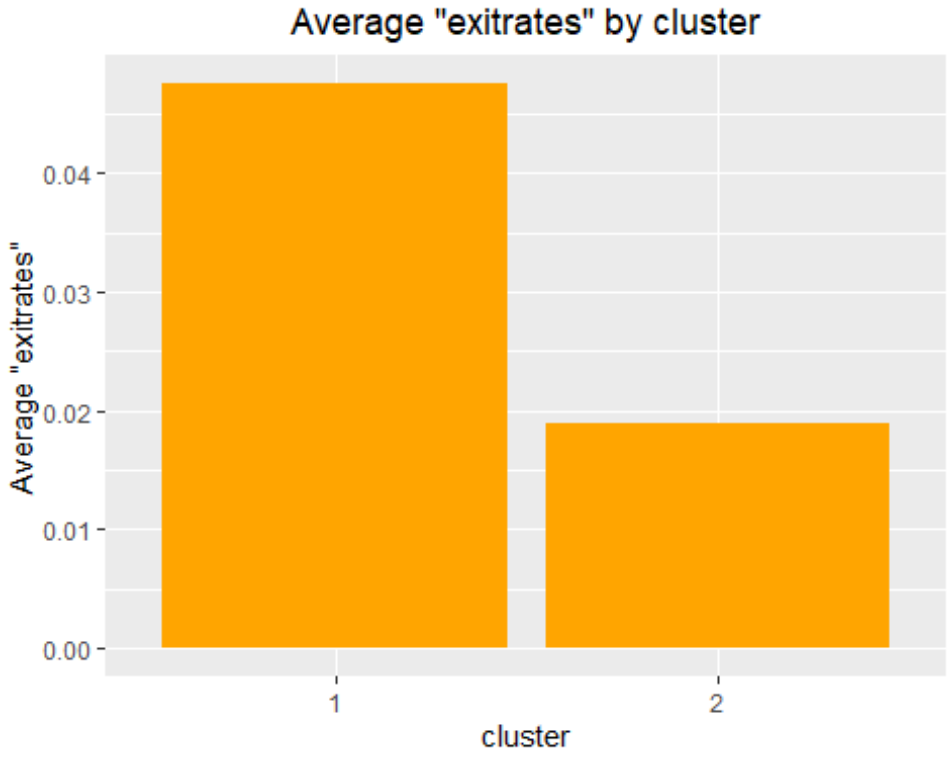

Average "informational" by cluster
Average "informational"
2.0
1.5
1.0
0.5
0.0
1
2
cluster

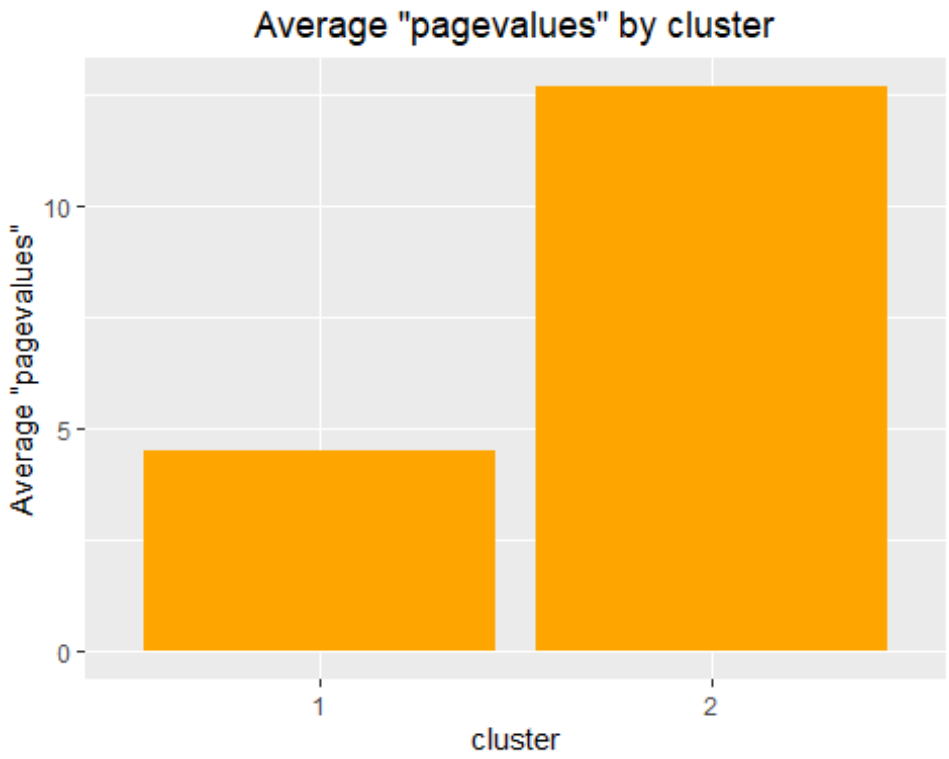

Average "informational_duration" by cluster
Average "informational_duration"
150
100
50
0
1
2
cluster


Average "productrelated" by cluster
Average "productrelated"
75
50
25
0
1
2
cluster


Average "productrelated_duration" by cluster
Average "productrelated_duration"
3000
2000
1000
0
1
2
cluster


Average "bouncerates" by cluster
Average "bouncerates"
0.025
0.020
0.015
0.010
0.005
0.000
1
2
cluster


Average "exitrates" by cluster
Average "exitrates"
0.04
0.03
0.02
0.01
0.00
1
2
cluster



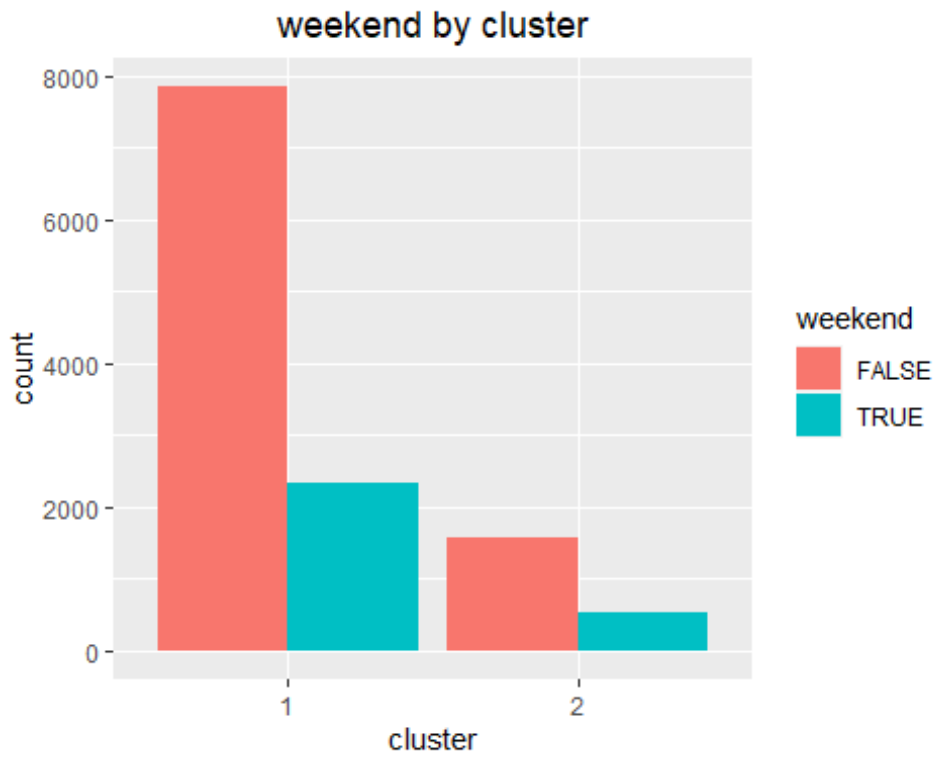
Observations of plots above:

The average number of administrative, informational and product related pages visited in a session, as well as the average durations spent on these different page types, is higher among customers in cluster 2 than in cluster one.

Bouncerates and exit rates are higher among customers in cluster 1.

Average page values are higher in cluster 2

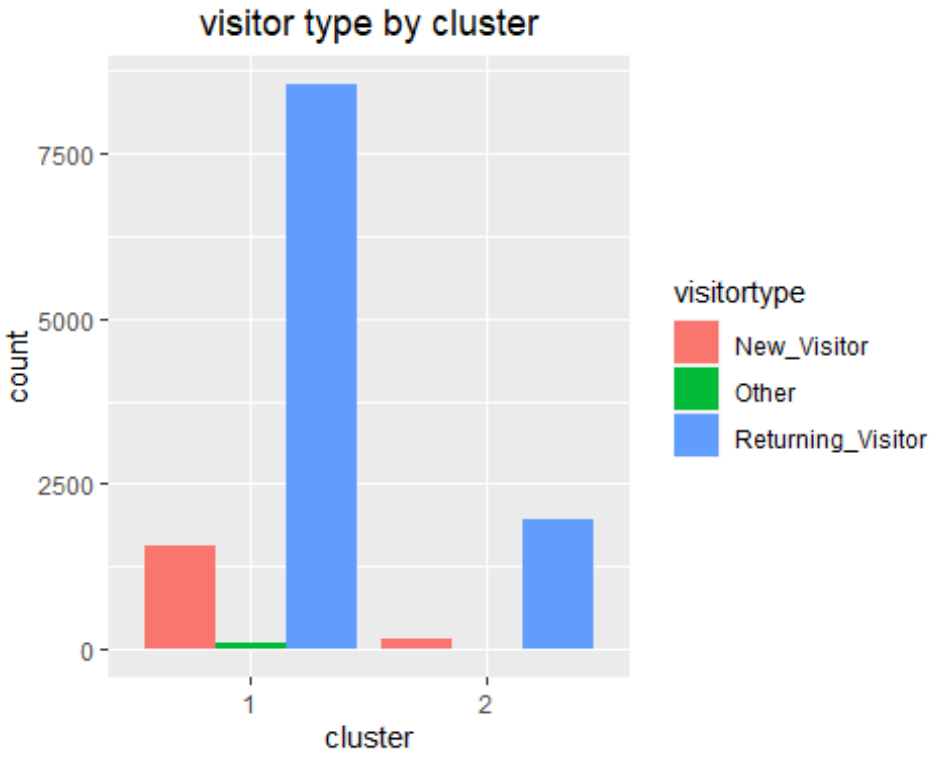
```
#plotting weekend by cluster
ggplot() + geom_bar(
    data=df_clus,
    aes(x=factor(cluster), fill = factor(weekend)
    ), position="dodge") + labs(title = "weekend by cluster",
           y="count", x="cluster", fill="weekend") + theme(plot.title =
element_text(hjust=0.5))
```




```
prop.table(table(df_clus$cluster, df_clus$weekend), 1)

##
##         FALSE      TRUE
##   1 0.7708784 0.2291216
##   2 0.7482185 0.2517815

#columns false true represent weekend
```

The proportion of customers visiting the site over the weekend in cluster 2 is higher than the proportion in cluster one who do so.

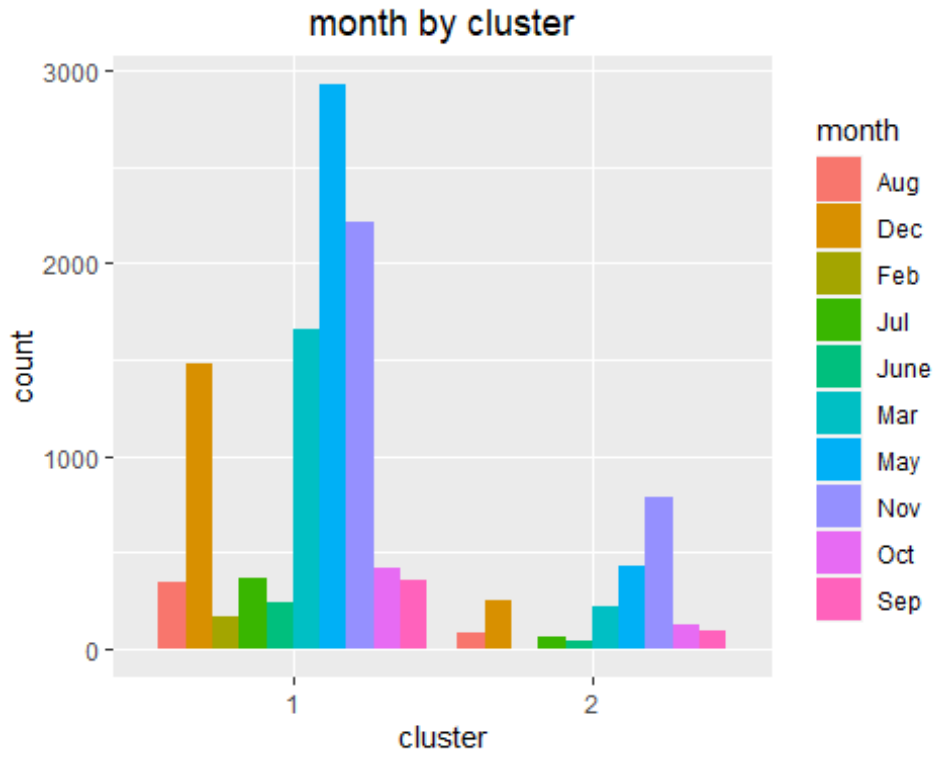
```
#plotting visitortype by cluster
ggplot() + geom_bar(
    data=df_clus,
    aes(x=factor(cluster), fill = factor(visitortype)
    ), position="dodge") + labs(title = "visitor type by cluster",
           y="count", x="cluster", fill="visitortype") + theme(plot.title =
element_text(hjust=0.5))
```




```
prop.table(table(df_clus$cluster, df_clus$visitortype), 1)

##
##     New_Visitor       Other Returning_Visitor
##   1 0.152584005 0.007663588       0.839752407
##   2 0.066983373 0.003325416       0.929691211
```

The proportion of returning visitors among in cluster 2 is higher, while the proportions of new visitor and other is higher in cluster 1.

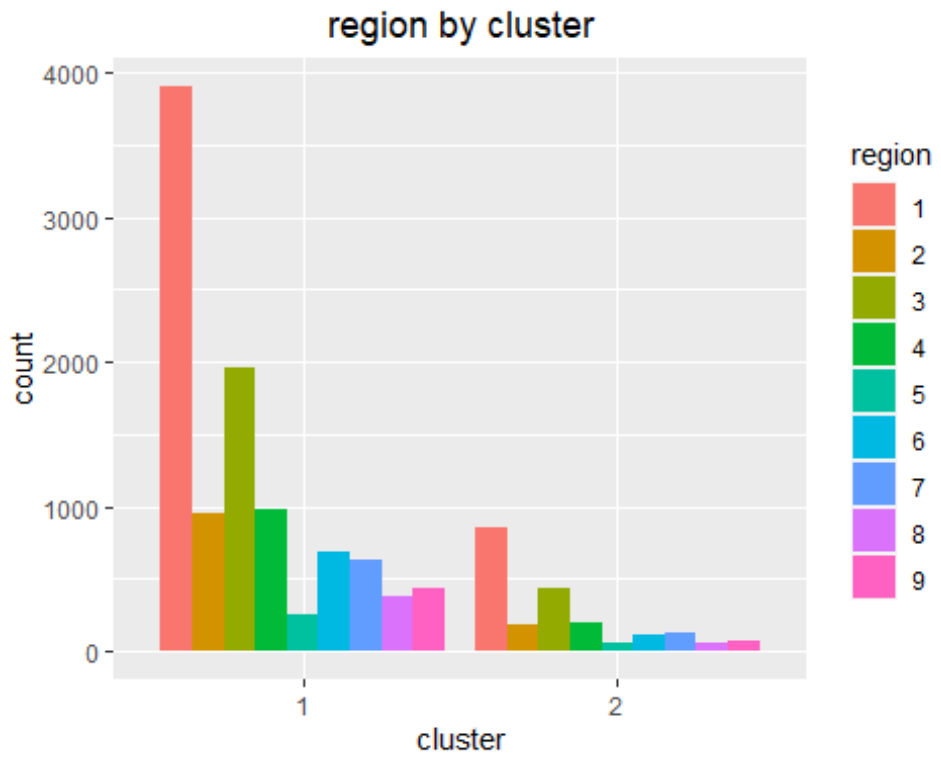
```
#plotting month by cluster
ggplot() + geom_bar(
    data=df_clus,
    aes(x=factor(cluster), fill = factor(month)
    ), position="dodge") + labs(title = "month by cluster",
           y="count", x="cluster", fill="month") + theme(plot.title =
element_text(hjust=0.5))
```




```
prop.table(table(df_clus$cluster, df_clus$month), 1)

##
##             Aug         Dec         Feb         Jul        June
Mar
##   1 0.034289644 0.144920417 0.016407939 0.036058165 0.023973276
0.163096876
##   2 0.039904988 0.119714964 0.001900238 0.030403800 0.020902613
0.106413302
##
##             May         Nov         Oct         Sep
##   1 0.287286304 0.217233248 0.041560228 0.035173904
##   2 0.205700713 0.372446556 0.059857482 0.042755344
```

Most cluster 2 customers visit the site in the month of November, while most in cluster 1 visit in May.

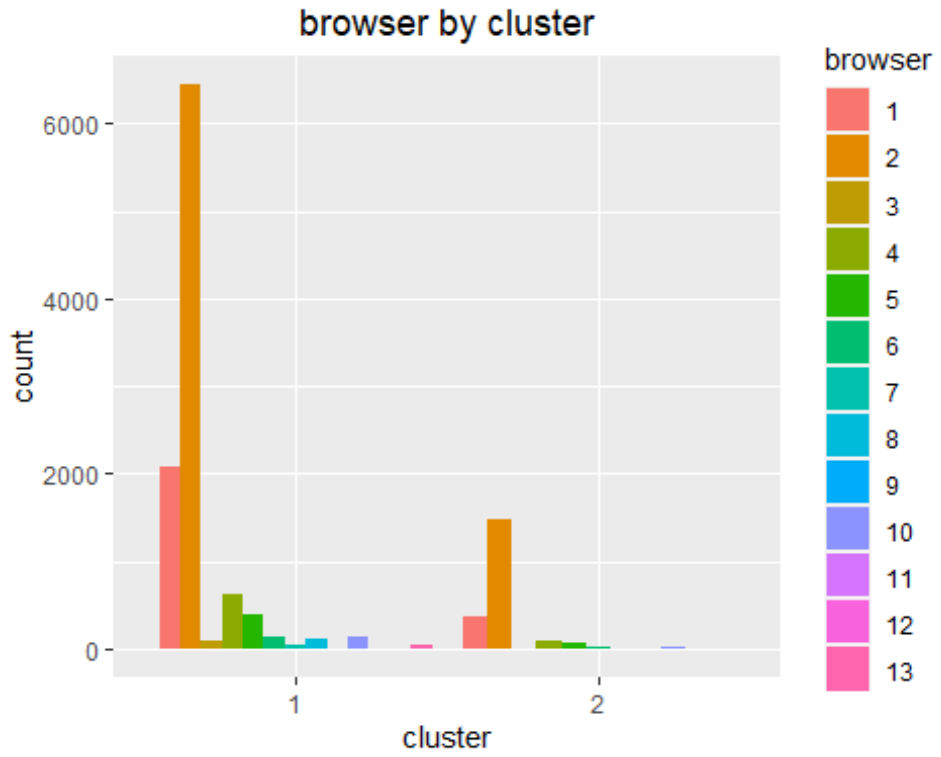
```
#plotting region by cluster
ggplot() + geom_bar(
    data=df_clus,
    aes(x=factor(cluster), fill = factor(region)
    ), position="dodge") + labs(title = "region by cluster",
           y="count", x="cluster", fill="region") + theme(plot.title =
element_text(hjust=0.5))
```




```
prop.table(table(df_clus$cluster, df_clus$region), 1)

##
##              1          2          3          4          5          6
##   1 0.38376891 0.09304382 0.19247396 0.09618786 0.02544704 0.06769503
##   2 0.40807601 0.08693587 0.20665083 0.09311164 0.02660333 0.05463183
##
##              7          8          9
##   1 0.06209471 0.03684417 0.04244449
##   2 0.05985748 0.02802850 0.03610451
```

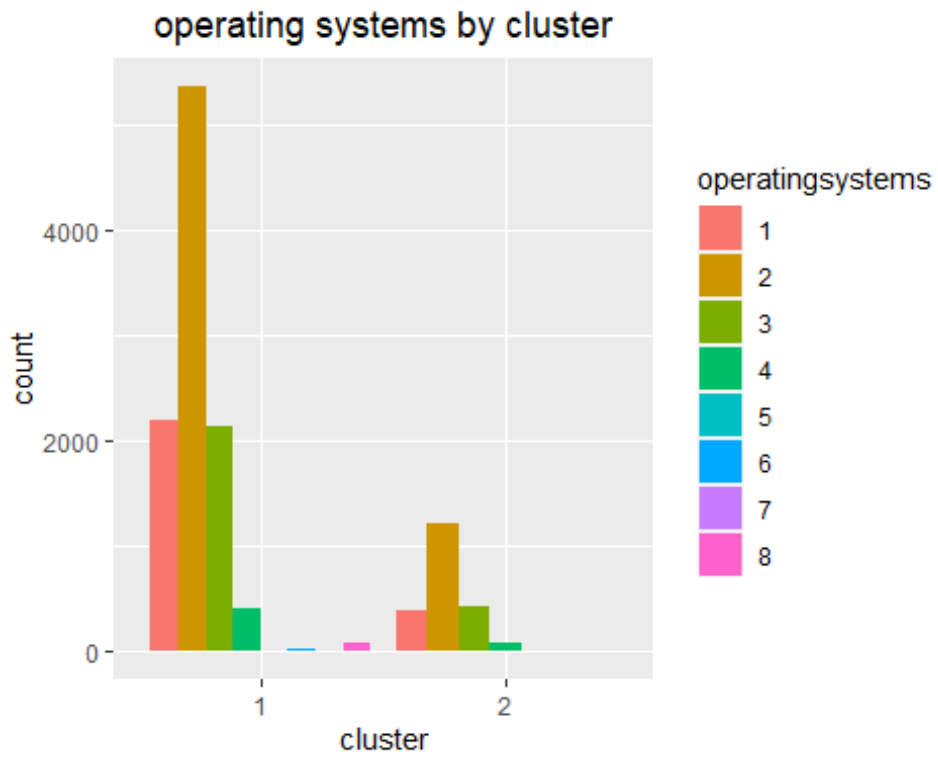
In both clusters, most customers are from region 1

```
#plotting browser by cluster
ggplot() + geom_bar(
    data=df_clus,
    aes(x=factor(cluster), fill = factor(browser)
    ), position="dodge") + labs(title = "browser by cluster",
           y="count", x="cluster", fill="browser") + theme(plot.title =
element_text(hjust=0.5))
```



In both clusters, most customers use browser 2

```
#plotting operatingsystems by cluster
ggplot() + geom_bar(
    data=df_clus,
    aes(x=factor(cluster), fill = factor(operatingsystems)
    ), position="dodge") + labs(title = "operating systems by cluster",
           y="count", x="cluster", fill="operatingsystems") +
theme(plot.title = element_text(hjust=0.5))
```




```
prop.table(table(df_clus$cluster, df_clus$operatingsystems), 1)

##
##                1            2            3            4            5
##   1 0.2148752211 0.5267243073 0.2093731578 0.0391039497 0.0005895068
##   2 0.1833729216 0.5781472684 0.1966745843 0.0370546318 0.0000000000
##
##                6            7            8
##   1 0.0015720181 0.0005895068 0.0071723325
##   2 0.0014251781 0.0004750594 0.0028503563
```

In both clusters, most customers use operating system 2

Comparisons between K Means and Hierarchical

K means clustering

- Advantages: Easy to implement, easily adapts to new examples.
- Disadvantages: The number of clusters has to be predetermined, it is sensitive to scaling, the initial seeds heavily influence the results.

Hierachical clustering:

- Advantages: The number of clusters do not have to be predetermined, ordering of levels in display is informative, easy to implement.

- Disadvantages: Not as suitable for large datasetes due to lower spacial and computational efficiency . This was evident in the duration of time the codes took to run as well as in the structure of the dendrograms.

Conclusion and Recommendations

Conclusion

The objectives of the study were achieved. Following data preparation (where missing values, duplicates, outliers, column creation etc were dealt with accordingly), univariate and bivariate analysis were carried out providing valuable insights on the dataset as a whole.

Some general bivariate analysis insights include: the proportion of visits that generated revenue during weekends was higher than revenue producing visits during the weekdays, the proportion of revenue producing visits was highest among new visitors , the month with the highest proportion of revenue generating visits was November etc.

Modelling:

Two approaches were used in clustering the data: K-means clustering and hierarchical clustering.

Initially k-means was used with an arbitrary value of 3. After comparing the average silhouette score at different levels of k, 2 was determined to be the optimal number of clusters.

For hierarchical clustering, complete linkage method was used initially, and average and wards methods also tested. The dendrogram using ward's method was the best structured. 2 clusters were highlighted on the dendrogram

Customer group characteristics comparisons

Further analysis was carried out on the 2 customer groups that were identified while using kmeans to compare the characteristics of the different groups.

Highlights:

- The proportion of customers of cluster 2 who generate revenue is higher than the proportion of customers in cluster 1 who generate revenue.
- The average number of administrative, informational and product related pages visited in a session, as well as the average durations spent on these different page types, is higher among customers in cluster 2 than in cluster one.
- Bouncerates and exit rates are higher among customers in cluster 1.
- Average page values are higher in cluster 2

- The proportion of customers visiting the site over the weekend in cluster 2 is higher than the proportion in cluster one who do so.
- The proportion of returning visitors among in cluster 2 is higher, while the proportions of new visitor and other is higher in cluster
- Most cluster 2 customers visit the site in the month of November, while most in cluster 1 visit in May.
- In both clusters, most customers are from region 1.
- In both clusters, most customers use operating system 2
- In both clusters, most customers use browser system 2

Recommendations

- Cluster 2 had a higher proprtion of revenue-generating customers compared to cluster 1.
- Cluster 1 had higher bounce rates and exit rates, indicating that more customers in this category are likely to leave without making a transaction. Optional targeted surveys could pop up to customers falling in this category to discover possible causes of dissatisfaction with the site or service. Similarly, since more customers in cluster 2 spent a longer duration on the site and visited more pages, targeted surveys to customers in this categories on what they are satisfied with will help the company know what to keep doing.
- The proportion of returning visitors among cluster 2 is higher. The company should prioritise quality products, services, and presentation from the get go, enabling them to have more returning visitors on the site.
- Although there is more traffic during the week, the proportion of revenue generating visits is higher over the weekend. More ads should be run during the weekends compared to weekdays.

- Future recommendations - Further information such as the gender and age of visitors, specific product categories visited etc should be obtained as they will aid in better understanding customer behaviour and in grouping further.