Week14Ip

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Define the question

You are a Data analyst at Carrefour Kenya and are currently undertaking a project that will inform the marketing department on the most relevant marketing strategies that will result in the highest no. of sales (total price including tax).

Metric for success

In order to work on the above problem, you need to do the following:

- Define the question- the metric for success, the context,experimental design taken and the appropriateness of the available data to answer the given question.
- Find and deal with outliers, anomalies, and missing data within the dataset.
- Perform univariate and bivariate analysis.
- From your insights provide a conclusion and recommendation.
- Build an associative model and visualize some of the rules
- Create a plot of anomalies using the dataset provided.

Data Understanding (the context)

Your project has been divided into four parts where you'll explore a recent marketing dataset by performing various unsupervised learning techniques and later providing recommendations based on your insights. 1. Part 1: Dimensionality Reduction 2. Part 2: Feature Selection 3. Part 3: Association Rules 4. Part 4: Anomaly Detection

In order to work on the above problem, you need to do the following:

- Define the question, the metric for success, the context, experimental design taken and the appropriateness of the available data to answer the given question.
- Find and deal with outliers, anomalies, and missing data within the dataset.
- Perform univariate and bivariate analysis.
- From your insights provide a conclusion and recommendation.
- Build the associative model and inspect the rules.

Experimental design

1. Import the data to R
2. Perform data exploration
3. Define metrics for success
4. Perform Univariate and Bivariate data Analysis
5. Build an associative model
6. Provide conclusion

loading dataset.

```
#Load the data and preview the head
sales <-read.csv("http://bit.ly/CarreFourDataset")
head(sales)
```

```
##    Invoice.ID Branch Customer.type Gender           Product.line Unit.price
## 1 750-67-8428      A        Member Female      Health and beauty      74.69
## 2 226-31-3081      C        Normal Female Electronic accessories      15.28
## 3 631-41-3108      A        Normal   Male     Home and lifestyle      46.33
## 4 123-19-1176      A        Member   Male      Health and beauty      58.22
## 5 373-73-7910      A        Normal   Male      Sports and travel      86.31
## 6 699-14-3026      C        Normal   Male Electronic accessories      85.39
##   Quantity     Tax      Date  Time     Payment   cogs gross.margin.percentage
## 1        7 26.1415  1/5/2019 13:08     Ewallet 522.83               4.761905
## 2        5  3.8200  3/8/2019 10:29        Cash  76.40               4.761905
## 3        7 16.2155  3/3/2019 13:23 Credit card 324.31               4.761905
## 4        8 23.2880 1/27/2019 20:33     Ewallet 465.76               4.761905
## 5        7 30.2085  2/8/2019 10:37     Ewallet 604.17               4.761905
## 6        7 29.8865 3/25/2019 18:30     Ewallet 597.73               4.761905
##   gross.income Rating    Total
## 1      26.1415    9.1 548.9715
## 2       3.8200    9.6  80.2200
## 3      16.2155    7.4 340.5255
## 4      23.2880    8.4 489.0480
## 5      30.2085    5.3 634.3785
## 6      29.8865    4.1 627.6165
```

```
#check the structure of the data
str(sales)
```

```
## 'data.frame':    1000 obs. of  16 variables:
##  $ Invoice.ID            : chr  "750-67-8428" "226-31-3081" "631-41-3108" "123-19-1176" ...
##  $ Branch                : chr  "A" "C" "A" "A" ...
##  $ Customer.type         : chr  "Member" "Normal" "Normal" "Member" ...
##  $ Gender                : chr  "Female" "Female" "Male" "Male" ...
##  $ Product.line          : chr  "Health and beauty" "Electronic accessories" "Home and lifestyle" "
##  $ Unit.price            : num  74.7 15.3 46.3 58.2 86.3 ...
##  $ Quantity              : int  7 5 7 8 7 7 6 10 2 3 ...
##  $ Tax                   : num  26.14 3.82 16.22 23.29 30.21 ...
##  $ Date                  : chr  "1/5/2019" "3/8/2019" "3/3/2019" "1/27/2019" ...
```

```
##  $ Time                   : chr  "13:08" "10:29" "13:23" "20:33" ...
##  $ Payment                : chr  "Ewallet" "Cash" "Credit card" "Ewallet" ...
##  $ cogs                   : num  522.8 76.4 324.3 465.8 604.2 ...
##  $ gross.margin.percentage: num  4.76 4.76 4.76 4.76 4.76 ...
##  $ gross.income           : num  26.14 3.82 16.22 23.29 30.21 ...
##  $ Rating                 : num  9.1 9.6 7.4 8.4 5.3 4.1 5.8 8 7.2 5.9 ...
##  $ Total                  : num  549 80.2 340.5 489 634.4 ...
```

```
#Preview the tail
tail(sales)
```

```
##       Invoice.ID Branch Customer.type Gender           Product.line Unit.price
## 995  652-49-6720      C        Member Female Electronic accessories      60.95
## 996  233-67-5758      C        Normal   Male      Health and beauty      40.35
## 997  303-96-2227      B        Normal Female     Home and lifestyle      97.38
## 998  727-02-1313      A        Member   Male     Food and beverages      31.84
## 999  347-56-2442      A        Normal   Male     Home and lifestyle      65.82
## 1000 849-09-3807      A        Member Female    Fashion accessories      88.34
##      Quantity     Tax      Date  Time Payment   cogs gross.margin.percentage
## 995         1  3.0475 2/18/2019 11:40 Ewallet  60.95                4.761905
## 996         1  2.0175 1/29/2019 13:46 Ewallet  40.35                4.761905
## 997        10 48.6900  3/2/2019 17:16 Ewallet 973.80                4.761905
## 998         1  1.5920  2/9/2019 13:22    Cash  31.84                4.761905
## 999         1  3.2910 2/22/2019 15:33    Cash  65.82                4.761905
## 1000        7 30.9190 2/18/2019 13:28    Cash 618.38                4.761905
##      gross.income Rating     Total
## 995        3.0475    5.9   63.9975
## 996        2.0175    6.2   42.3675
## 997       48.6900    4.4 1022.4900
## 998        1.5920    7.7   33.4320
## 999        3.2910    4.1   69.1110
## 1000      30.9190    6.6  649.2990
```

```
#check shape
dim(sales)
```

```
## [1] 1000   16
```

Our dataset has 1000 rows and 16 columns with eight of which have a character data type, one is an integer and the other seven are numerical.

Data Cleaning

```
#check for missing values
sum(is.na(sales))
```

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

There are no missing values in the data

```r
#Check for duplicates
 sum(duplicated(sales))
```

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

There are no duplicated values.

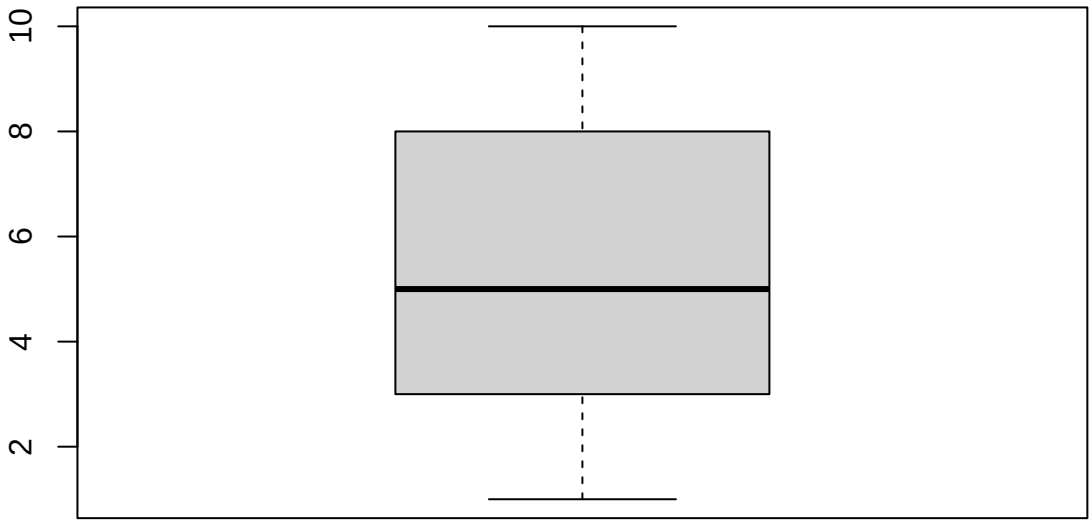
```r
### Identify numeric cols
num <- unlist(lapply(sales, is.numeric))
y<- colnames(sales[num])
y
```

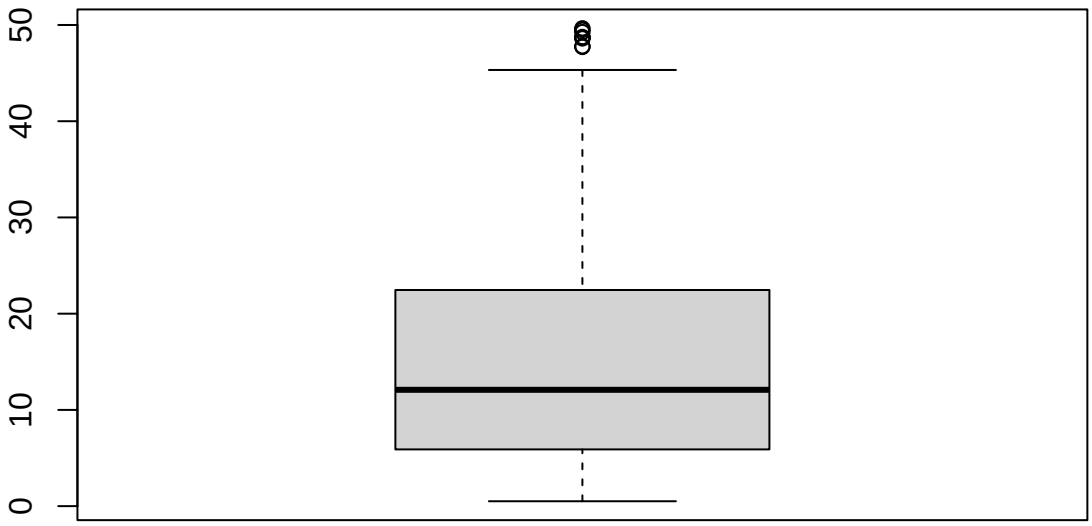
```
## [1] "Unit.price"              "Quantity"
## [3] "Tax"                     "cogs"
## [5] "gross.margin.percentage" "gross.income"
## [7] "Rating"                  "Total"
```

```r
#Create a dataframe of the numeric cols
num <-sales[y]
head(num)
```

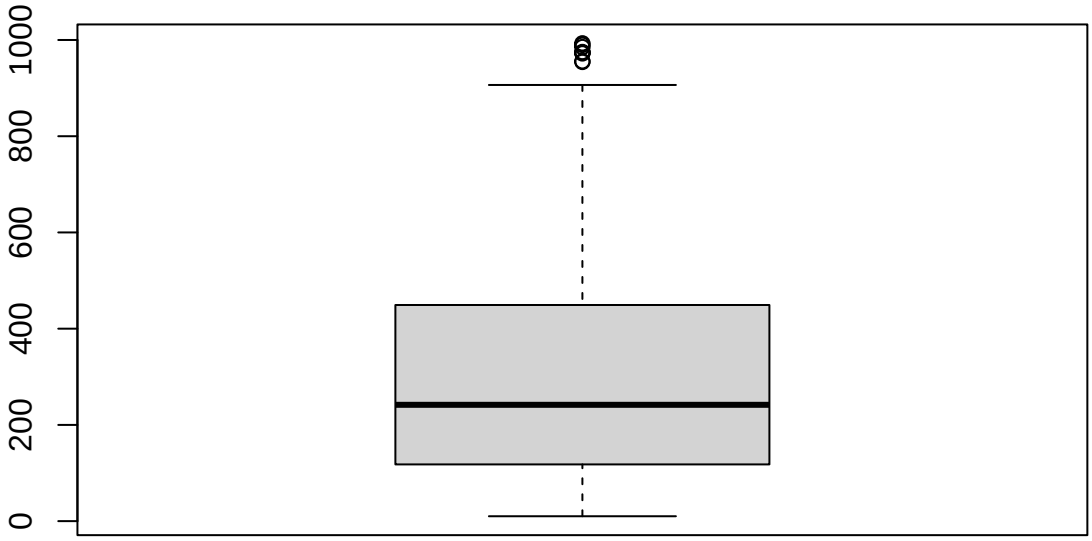
```
##   Unit.price Quantity     Tax   cogs gross.margin.percentage gross.income
## 1      74.69        7 26.1415 522.83                4.761905      26.1415
## 2      15.28        5  3.8200  76.40                4.761905       3.8200
## 3      46.33        7 16.2155 324.31                4.761905      16.2155
## 4      58.22        8 23.2880 465.76                4.761905      23.2880
## 5      86.31        7 30.2085 604.17                4.761905      30.2085
## 6      85.39        7 29.8865 597.73                4.761905      29.8865
##   Rating    Total
## 1    9.1 548.9715
## 2    9.6  80.2200
## 3    7.4 340.5255
## 4    8.4 489.0480
## 5    5.3 634.3785
## 6    4.1 627.6165
```

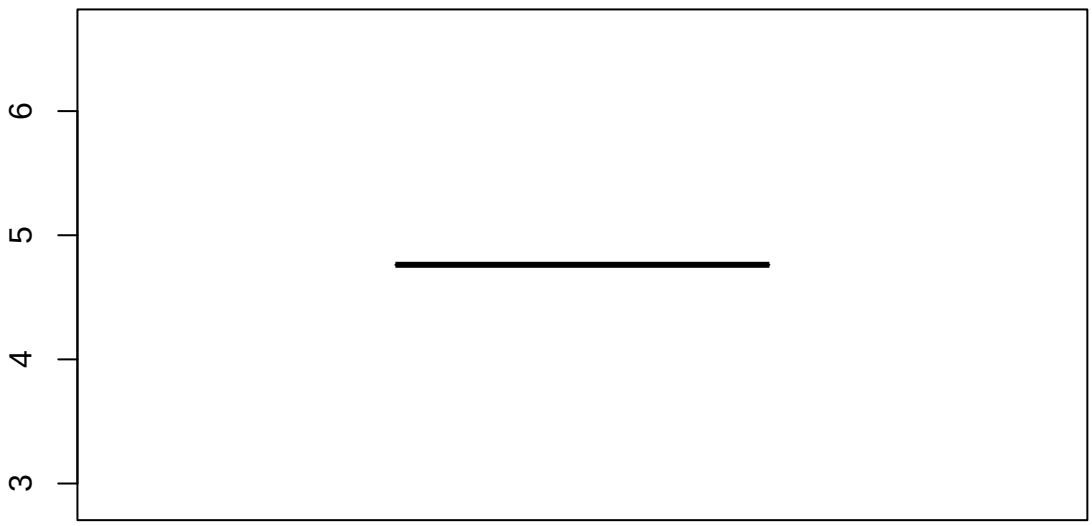
```r
#Check for outliers
for(i in 2:ncol(num)) {
 boxplot(num[i], xlab=colnames(num[i]))
}
```


10
8
6
4
2
Quantity

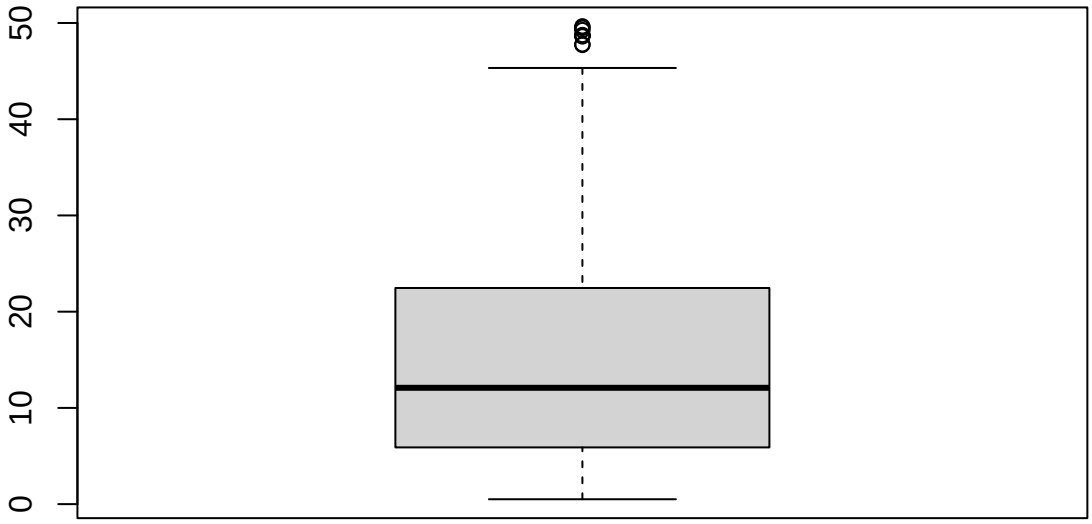


Tax

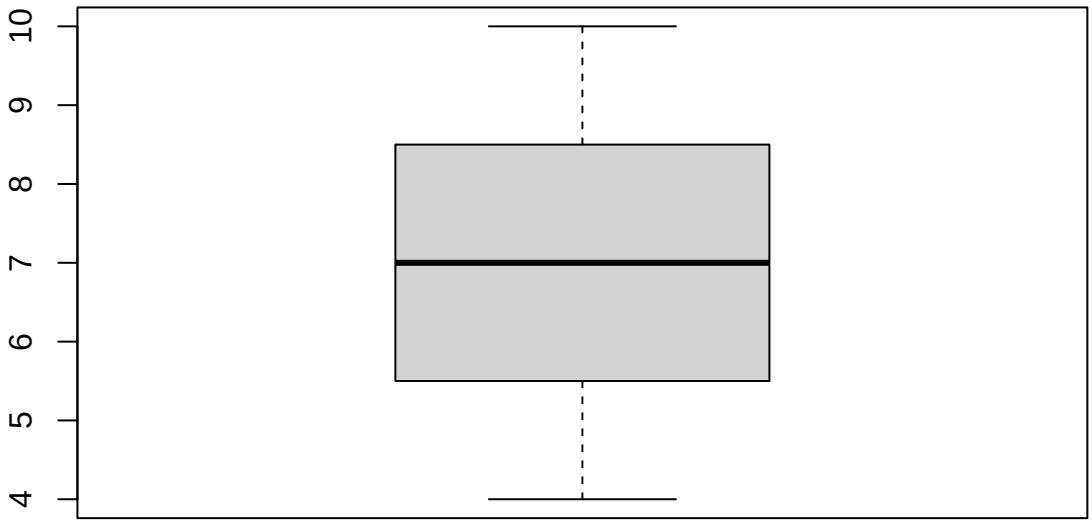

0
200
400
600
800
1000
cogs



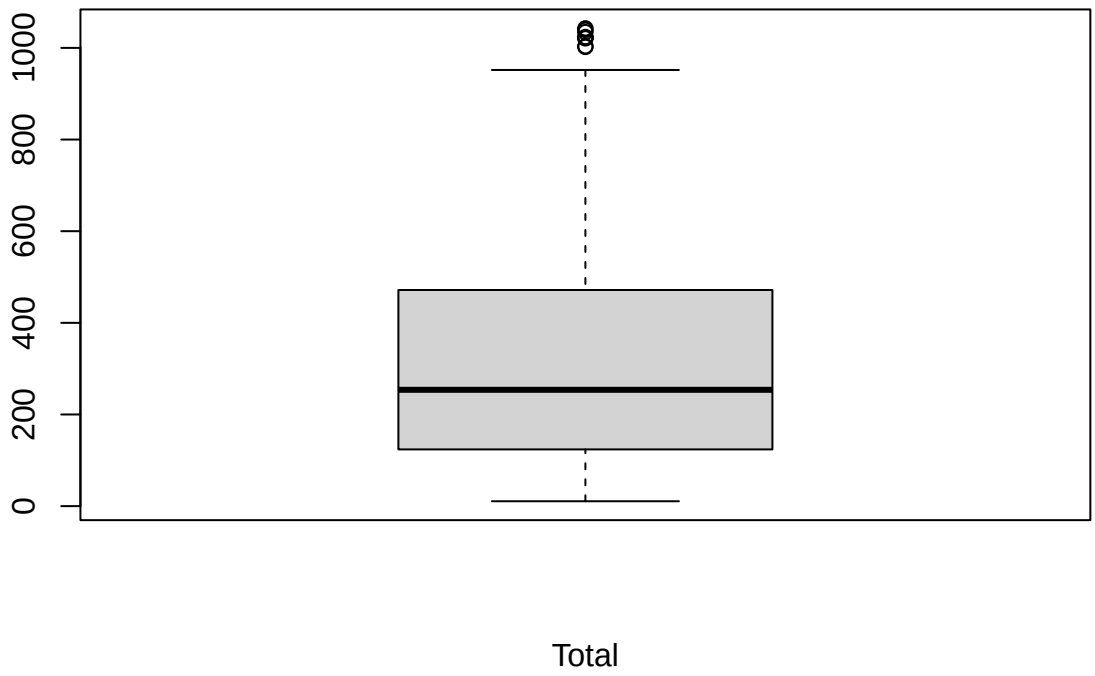
gross.margin.percentage



gross.income

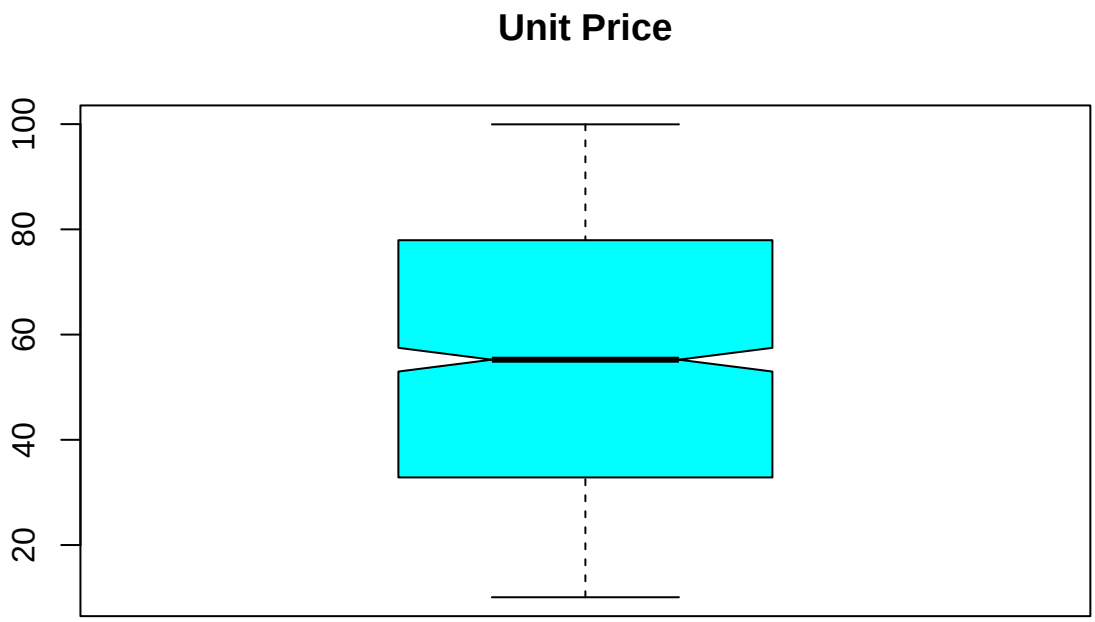


Rating



In our data, there are outliers in Tax, cogs, gross income and Total columns.

```
#Check for outliers
boxplot(sales$Unit.price,
        main ="Unit Price", col = 'cyan',
        notch = TRUE)
```



Unit price has no outliers

Exploratory Data Analysis

Univariate Analysis

```
#Check the statistical summaries of the data
summary(sales)
```

```
##   Invoice.ID          Branch           Customer.type        Gender
##  Length:1000        Length:1000        Length:1000        Length:1000
##  Class :character   Class :character   Class :character   Class :character
##  Mode  :character   Mode  :character   Mode  :character   Mode  :character
##
##
##
##  Product.line         Unit.price       Quantity          Tax
##  Length:1000        Min.   :10.08   Min.   : 1.00   Min.   : 0.5085
##  Class :character   1st Qu.:32.88   1st Qu.: 3.00   1st Qu.: 5.9249
##  Mode  :character   Median :55.23   Median : 5.00   Median :12.0880
##                     Mean   :55.67   Mean   : 5.51   Mean   :15.3794
##                     3rd Qu.:77.94   3rd Qu.: 8.00   3rd Qu.:22.4453
##                     Max.   :99.96   Max.   :10.00   Max.   :49.6500
```

```
##      Date               Time             Payment               cogs
##  Length:1000        Length:1000        Length:1000        Min.   : 10.17
##  Class :character   Class :character   Class :character   1st Qu.:118.50
##  Mode  :character   Mode  :character   Mode  :character   Median :241.76
##                                                           Mean   :307.59
##                                                           3rd Qu.:448.90
##                                                           Max.   :993.00
##  gross.margin.percentage  gross.income         Rating           Total
##  Min.   :4.762           Min.   : 0.5085   Min.   : 4.000   Min.   :  10.68
##  1st Qu.:4.762           1st Qu.: 5.9249   1st Qu.: 5.500   1st Qu.: 124.42
##  Median :4.762           Median :12.0880   Median : 7.000   Median : 253.85
##  Mean   :4.762           Mean   :15.3794   Mean   : 6.973   Mean   : 322.97
##  3rd Qu.:4.762           3rd Qu.:22.4453   3rd Qu.: 8.500   3rd Qu.: 471.35
##  Max.   :4.762           Max.   :49.6500   Max.   :10.000   Max.   :1042.65
```

```
#getting measure of dispersion fro each cols
#create a function
library(moments)
summary.list = function(x)list(
  Mean=mean(x, na.rm=TRUE),
  Median=median(x, na.rm=TRUE),
  Max=max(x, na.rm=TRUE),
  Min=min(x,na.rm = TRUE),
  Skewness=skewness(x, na.rm=TRUE),
  Kurtosis=kurtosis(x, na.rm=TRUE),
  Variance=var(x, na.rm=TRUE),
  Std.Dev=sd(x, na.rm=TRUE),
  Coeff.Variation.Prcnt=sd(x, na.rm=TRUE)/mean(x, na.rm=TRUE)*100,
  Std.Error=sd(x, na.rm=TRUE)/sqrt(length(x[!is.na(x)]))
)
#calling the function
sapply(sales[,c(y)], summary.list)
```

```
##                       Unit.price  Quantity   Tax       cogs
## Mean                  55.67213    5.51       15.37937  307.5874
## Median                55.23       5          12.088    241.76
## Max                   99.96       10         49.65     993
## Min                   10.08       1          0.5085    10.17
## Skewness              0.007066827 0.01292163 0.8912304 0.8912304
## Kurtosis              1.781499    1.784528   2.91253   2.91253
## Variance              701.9653    8.546446   137.0966  54838.64
## Std.Dev               26.49463    2.923431   11.70883  234.1765
## Coeff.Variation.Prcnt 47.59047    53.05682   76.13333  76.13333
## Std.Error             0.8378337   0.09244699 0.3702656 7.405311
##                       gross.margin.percentage gross.income Rating
## Mean                  4.761905                15.37937     6.9727
## Median                4.761905                12.088       7
## Max                   4.761905                49.65        10
## Min                   4.761905                0.5085       4
## Skewness              NaN                     0.8912304    0.008996129
## Kurtosis              NaN                     2.91253      1.848169
## Variance              0                       137.0966     2.953518
## Std.Dev               0                       11.70883     1.71858
## Coeff.Variation.Prcnt 0                       76.13333     24.64727
```

```
## Std.Error             0                       0.3702656    0.05434628
##                       Total
## Mean                  322.9667
## Median                253.848
## Max                   1042.65
## Min                   10.6785
## Skewness              0.8912304
## Kurtosis              2.91253
## Variance              60459.6
## Std.Dev               245.8853
## Coeff.Variation.Prcnt 76.13333
## Std.Error             7.775577
```

The average unit price is 55.67 with the highest being 99.96 and the lowest is 10.08 and is skewed to the left. The maximum quantity sold for any item is 10 with average number being 5. The maximum rating given to any item is 10 with average rating for the products being 6.97. The maximum tax imposed on the items is 49.63 with average tax pr item being 15. #Plot

```
num
```

```
##      Unit.price Quantity     Tax   cogs gross.margin.percentage gross.income
## 1         74.69        7 26.1415 522.83                4.761905      26.1415
## 2         15.28        5  3.8200  76.40                4.761905       3.8200
## 3         46.33        7 16.2155 324.31                4.761905      16.2155
## 4         58.22        8 23.2880 465.76                4.761905      23.2880
## 5         86.31        7 30.2085 604.17                4.761905      30.2085
## 6         85.39        7 29.8865 597.73                4.761905      29.8865
## 7         68.84        6 20.6520 413.04                4.761905      20.6520
## 8         73.56       10 36.7800 735.60                4.761905      36.7800
## 9         36.26        2  3.6260  72.52                4.761905       3.6260
## 10        54.84        3  8.2260 164.52                4.761905       8.2260
## 11        14.48        4  2.8960  57.92                4.761905       2.8960
## 12        25.51        4  5.1020 102.04                4.761905       5.1020
## 13        46.95        5 11.7375 234.75                4.761905      11.7375
## 14        43.19       10 21.5950 431.90                4.761905      21.5950
## 15        71.38       10 35.6900 713.80                4.761905      35.6900
## 16        93.72        6 28.1160 562.32                4.761905      28.1160
## 17        68.93        7 24.1255 482.51                4.761905      24.1255
## 18        72.61        6 21.7830 435.66                4.761905      21.7830
## 19        54.67        3  8.2005 164.01                4.761905       8.2005
## 20        40.30        2  4.0300  80.60                4.761905       4.0300
## 21        86.04        5 21.5100 430.20                4.761905      21.5100
## 22        87.98        3 13.1970 263.94                4.761905      13.1970
## 23        33.20        2  3.3200  66.40                4.761905       3.3200
## 24        34.56        5  8.6400 172.80                4.761905       8.6400
## 25        88.63        3 13.2945 265.89                4.761905      13.2945
## 26        52.59        8 21.0360 420.72                4.761905      21.0360
## 27        33.52        1  1.6760  33.52                4.761905       1.6760
## 28        87.67        2  8.7670 175.34                4.761905       8.7670
## 29        88.36        5 22.0900 441.80                4.761905      22.0900
## 30        24.89        9 11.2005 224.01                4.761905      11.2005
## 31        94.13        5 23.5325 470.65                4.761905      23.5325
## 32        78.07        9 35.1315 702.63                4.761905      35.1315
## 33        83.78        8 33.5120 670.24                4.761905      33.5120
```

```
## 34       96.58        2  9.6580 193.16             4.761905       9.6580
## 35       99.42        4 19.8840 397.68             4.761905      19.8840
## 36       68.12        1  3.4060  68.12             4.761905       3.4060
## 37       62.62        5 15.6550 313.10             4.761905      15.6550
## 38       60.88        9 27.3960 547.92             4.761905      27.3960
## 39       54.92        8 21.9680 439.36             4.761905      21.9680
## 40       30.12        8 12.0480 240.96             4.761905      12.0480
## 41       86.72        1  4.3360  86.72             4.761905       4.3360
## 42       56.11        2  5.6110 112.22             4.761905       5.6110
## 43       69.12        6 20.7360 414.72             4.761905      20.7360
## 44       98.70        8 39.4800 789.60             4.761905      39.4800
## 45       15.37        2  1.5370  30.74             4.761905       1.5370
## 46       93.96        4 18.7920 375.84             4.761905      18.7920
## 47       56.69        9 25.5105 510.21             4.761905      25.5105
## 48       20.01        9  9.0045 180.09             4.761905       9.0045
## 49       18.93        6  5.6790 113.58             4.761905       5.6790
## 50       82.63       10 41.3150 826.30             4.761905      41.3150
## 51       91.40        7 31.9900 639.80             4.761905      31.9900
## 52       44.59        5 11.1475 222.95             4.761905      11.1475
## 53       17.87        4  3.5740  71.48             4.761905       3.5740
## 54       15.43        1  0.7715  15.43             4.761905       0.7715
## 55       16.16        2  1.6160  32.32             4.761905       1.6160
## 56       85.98        8 34.3920 687.84             4.761905      34.3920
## 57       44.34        2  4.4340  88.68             4.761905       4.4340
## 58       89.60        8 35.8400 716.80             4.761905      35.8400
## 59       72.35       10 36.1750 723.50             4.761905      36.1750
## 60       30.61        6  9.1830 183.66             4.761905       9.1830
## 61       24.74        3  3.7110  74.22             4.761905       3.7110
## 62       55.73        6 16.7190 334.38             4.761905      16.7190
## 63       55.07        9 24.7815 495.63             4.761905      24.7815
## 64       15.81       10  7.9050 158.10             4.761905       7.9050
## 65       75.74        4 15.1480 302.96             4.761905      15.1480
## 66       15.87       10  7.9350 158.70             4.761905       7.9350
## 67       33.47        2  3.3470  66.94             4.761905       3.3470
## 68       97.61        6 29.2830 585.66             4.761905      29.2830
## 69       78.77       10 39.3850 787.70             4.761905      39.3850
## 70       18.33        1  0.9165  18.33             4.761905       0.9165
## 71       89.48       10 44.7400 894.80             4.761905      44.7400
## 72       62.12       10 31.0600 621.20             4.761905      31.0600
## 73       48.52        3  7.2780 145.56             4.761905       7.2780
## 74       75.91        6 22.7730 455.46             4.761905      22.7730
## 75       74.67        9 33.6015 672.03             4.761905      33.6015
## 76       41.65       10 20.8250 416.50             4.761905      20.8250
## 77       49.04        9 22.0680 441.36             4.761905      22.0680
## 78       20.01        9  9.0045 180.09             4.761905       9.0045
## 79       78.31       10 39.1550 783.10             4.761905      39.1550
## 80       20.38        5  5.0950 101.90             4.761905       5.0950
## 81       99.19        6 29.7570 595.14             4.761905      29.7570
## 82       96.68        3 14.5020 290.04             4.761905      14.5020
## 83       19.25        8  7.7000 154.00             4.761905       7.7000
## 84       80.36        4 16.0720 321.44             4.761905      16.0720
## 85       48.91        5 12.2275 244.55             4.761905      12.2275
## 86       83.06        7 29.0710 581.42             4.761905      29.0710
## 87       76.52        5 19.1300 382.60             4.761905      19.1300
```

```
## 88       49.38        7 17.2830 345.66              4.761905      17.2830
## 89       42.47        1  2.1235  42.47              4.761905       2.1235
## 90       76.99        6 23.0970 461.94              4.761905      23.0970
## 91       47.38        4  9.4760 189.52              4.761905       9.4760
## 92       44.86       10 22.4300 448.60              4.761905      22.4300
## 93       21.98        7  7.6930 153.86              4.761905       7.6930
## 94       64.36        9 28.9620 579.24              4.761905      28.9620
## 95       89.75        1  4.4875  89.75              4.761905       4.4875
## 96       97.16        1  4.8580  97.16              4.761905       4.8580
## 97       87.87       10 43.9350 878.70              4.761905      43.9350
## 98       12.45        6  3.7350  74.70              4.761905       3.7350
## 99       52.75        3  7.9125 158.25              4.761905       7.9125
## 100      82.70        6 24.8100 496.20              4.761905      24.8100
## 101      48.71        1  2.4355  48.71              4.761905       2.4355
## 102      78.55        9 35.3475 706.95              4.761905      35.3475
## 103      23.07        9 10.3815 207.63              4.761905      10.3815
## 104      58.26        6 17.4780 349.56              4.761905      17.4780
## 105      30.35        7 10.6225 212.45              4.761905      10.6225
## 106      88.67       10 44.3350 886.70              4.761905      44.3350
## 107      27.38        6  8.2140 164.28              4.761905       8.2140
## 108      62.13        6 18.6390 372.78              4.761905      18.6390
## 109      33.98        9 15.2910 305.82              4.761905      15.2910
## 110      81.97       10 40.9850 819.70              4.761905      40.9850
## 111      16.49        2  1.6490  32.98              4.761905       1.6490
## 112      98.21        3 14.7315 294.63              4.761905      14.7315
## 113      72.84        7 25.4940 509.88              4.761905      25.4940
## 114      58.07        9 26.1315 522.63              4.761905      26.1315
## 115      80.79        9 36.3555 727.11              4.761905      36.3555
## 116      27.02        3  4.0530  81.06              4.761905       4.0530
## 117      21.94        5  5.4850 109.70              4.761905       5.4850
## 118      51.36        1  2.5680  51.36              4.761905       2.5680
## 119      10.96       10  5.4800 109.60              4.761905       5.4800
## 120      53.44        2  5.3440 106.88              4.761905       5.3440
## 121      99.56        8 39.8240 796.48              4.761905      39.8240
## 122      57.12        7 19.9920 399.84              4.761905      19.9920
## 123      99.96        9 44.9820 899.64              4.761905      44.9820
## 124      63.91        8 25.5640 511.28              4.761905      25.5640
## 125      56.47        8 22.5880 451.76              4.761905      22.5880
## 126      93.69        7 32.7915 655.83              4.761905      32.7915
## 127      32.25        5  8.0625 161.25              4.761905       8.0625
## 128      31.73        9 14.2785 285.57              4.761905      14.2785
## 129      68.54        8 27.4160 548.32              4.761905      27.4160
## 130      90.28        9 40.6260 812.52              4.761905      40.6260
## 131      39.62        7 13.8670 277.34              4.761905      13.8670
## 132      92.13        6 27.6390 552.78              4.761905      27.6390
## 133      34.84        4  6.9680 139.36              4.761905       6.9680
## 134      87.45        6 26.2350 524.70              4.761905      26.2350
## 135      81.30        6 24.3900 487.80              4.761905      24.3900
## 136      90.22        3 13.5330 270.66              4.761905      13.5330
## 137      26.31        5  6.5775 131.55              4.761905       6.5775
## 138      34.42        6 10.3260 206.52              4.761905      10.3260
## 139      51.91       10 25.9550 519.10              4.761905      25.9550
## 140      72.50        8 29.0000 580.00              4.761905      29.0000
## 141      89.80       10 44.9000 898.00              4.761905      44.9000
```

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## 142       90.50       10 45.2500 905.00             4.761905      45.2500
## 143       68.60       10 34.3000 686.00             4.761905      34.3000
## 144       30.41        1  1.5205  30.41             4.761905       1.5205
## 145       77.95        6 23.3850 467.70             4.761905      23.3850
## 146       46.26        6 13.8780 277.56             4.761905      13.8780
## 147       30.14       10 15.0700 301.40             4.761905      15.0700
## 148       66.14        4 13.2280 264.56             4.761905      13.2280
## 149       71.86        8 28.7440 574.88             4.761905      28.7440
## 150       32.46        8 12.9840 259.68             4.761905      12.9840
## 151       91.54        4 18.3080 366.16             4.761905      18.3080
## 152       34.56        7 12.0960 241.92             4.761905      12.0960
## 153       83.24        9 37.4580 749.16             4.761905      37.4580
## 154       16.48        6  4.9440  98.88             4.761905       4.9440
## 155       80.97        8 32.3880 647.76             4.761905      32.3880
## 156       92.29        5 23.0725 461.45             4.761905      23.0725
## 157       72.17        1  3.6085  72.17             4.761905       3.6085
## 158       50.28        5 12.5700 251.40             4.761905      12.5700
## 159       97.22        9 43.7490 874.98             4.761905      43.7490
## 160       93.39        6 28.0170 560.34             4.761905      28.0170
## 161       43.18        8 17.2720 345.44             4.761905      17.2720
## 162       63.69        1  3.1845  63.69             4.761905       3.1845
## 163       45.79        7 16.0265 320.53             4.761905      16.0265
## 164       76.40        2  7.6400 152.80             4.761905       7.6400
## 165       39.90       10 19.9500 399.00             4.761905      19.9500
## 166       42.57        8 17.0280 340.56             4.761905      17.0280
## 167       95.58       10 47.7900 955.80             4.761905      47.7900
## 168       98.98       10 49.4900 989.80             4.761905      49.4900
## 169       51.28        6 15.3840 307.68             4.761905      15.3840
## 170       69.52        7 24.3320 486.64             4.761905      24.3320
## 171       70.01        5 17.5025 350.05             4.761905      17.5025
## 172       80.05        5 20.0125 400.25             4.761905      20.0125
## 173       20.85        8  8.3400 166.80             4.761905       8.3400
## 174       52.89        6 15.8670 317.34             4.761905      15.8670
## 175       19.79        8  7.9160 158.32             4.761905       7.9160
## 176       33.84        9 15.2280 304.56             4.761905      15.2280
## 177       22.17        8  8.8680 177.36             4.761905       8.8680
## 178       22.51        7  7.8785 157.57             4.761905       7.8785
## 179       73.88        6 22.1640 443.28             4.761905      22.1640
## 180       86.80        3 13.0200 260.40             4.761905      13.0200
## 181       64.26        7 22.4910 449.82             4.761905      22.4910
## 182       38.47        8 15.3880 307.76             4.761905      15.3880
## 183       15.50       10  7.7500 155.00             4.761905       7.7500
## 184       34.31        8 13.7240 274.48             4.761905      13.7240
## 185       12.34        7  4.3190  86.38             4.761905       4.3190
## 186       18.08        3  2.7120  54.24             4.761905       2.7120
## 187       94.49        8 37.7960 755.92             4.761905      37.7960
## 188       46.47        4  9.2940 185.88             4.761905       9.2940
## 189       74.07        1  3.7035  74.07             4.761905       3.7035
## 190       69.81        4 13.9620 279.24             4.761905      13.9620
## 191       77.04        3 11.5560 231.12             4.761905      11.5560
## 192       73.52        2  7.3520 147.04             4.761905       7.3520
## 193       87.80        9 39.5100 790.20             4.761905      39.5100
## 194       25.55        4  5.1100 102.20             4.761905       5.1100
## 195       32.71        5  8.1775 163.55             4.761905       8.1775
```

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## 196       74.29        1  3.7145  74.29             4.761905       3.7145
## 197       43.70        2  4.3700  87.40             4.761905       4.3700
## 198       25.29        1  1.2645  25.29             4.761905       1.2645
## 199       41.50        4  8.3000 166.00             4.761905       8.3000
## 200       71.39        5 17.8475 356.95             4.761905      17.8475
## 201       19.15        6  5.7450 114.90             4.761905       5.7450
## 202       57.49        4 11.4980 229.96             4.761905      11.4980
## 203       61.41        7 21.4935 429.87             4.761905      21.4935
## 204       25.90       10 12.9500 259.00             4.761905      12.9500
## 205       17.77        5  4.4425  88.85             4.761905       4.4425
## 206       23.03        9 10.3635 207.27             4.761905      10.3635
## 207       66.65        9 29.9925 599.85             4.761905      29.9925
## 208       28.53       10 14.2650 285.30             4.761905      14.2650
## 209       30.37        3  4.5555  91.11             4.761905       4.5555
## 210       99.73        9 44.8785 897.57             4.761905      44.8785
## 211       26.23        9 11.8035 236.07             4.761905      11.8035
## 212       93.26        9 41.9670 839.34             4.761905      41.9670
## 213       92.36        5 23.0900 461.80             4.761905      23.0900
## 214       46.42        3  6.9630 139.26             4.761905       6.9630
## 215       29.61        7 10.3635 207.27             4.761905      10.3635
## 216       18.28        1  0.9140  18.28             4.761905       0.9140
## 217       24.77        5  6.1925 123.85             4.761905       6.1925
## 218       94.64        3 14.1960 283.92             4.761905      14.1960
## 219       94.87        8 37.9480 758.96             4.761905      37.9480
## 220       57.34        3  8.6010 172.02             4.761905       8.6010
## 221       45.35        6 13.6050 272.10             4.761905      13.6050
## 222       62.08        7 21.7280 434.56             4.761905      21.7280
## 223       11.81        5  2.9525  59.05             4.761905       2.9525
## 224       12.54        1  0.6270  12.54             4.761905       0.6270
## 225       43.25        2  4.3250  86.50             4.761905       4.3250
## 226       87.16        2  8.7160 174.32             4.761905       8.7160
## 227       69.37        9 31.2165 624.33             4.761905      31.2165
## 228       37.06        4  7.4120 148.24             4.761905       7.4120
## 229       90.70        6 27.2100 544.20             4.761905      27.2100
## 230       63.42        8 25.3680 507.36             4.761905      25.3680
## 231       81.37        2  8.1370 162.74             4.761905       8.1370
## 232       10.59        3  1.5885  31.77             4.761905       1.5885
## 233       84.09        9 37.8405 756.81             4.761905      37.8405
## 234       73.82        4 14.7640 295.28             4.761905      14.7640
## 235       51.94       10 25.9700 519.40             4.761905      25.9700
## 236       93.14        2  9.3140 186.28             4.761905       9.3140
## 237       17.41        5  4.3525  87.05             4.761905       4.3525
## 238       44.22        5 11.0550 221.10             4.761905      11.0550
## 239       13.22        5  3.3050  66.10             4.761905       3.3050
## 240       89.69        1  4.4845  89.69             4.761905       4.4845
## 241       24.94        9 11.2230 224.46             4.761905      11.2230
## 242       59.77        2  5.9770 119.54             4.761905       5.9770
## 243       93.20        2  9.3200 186.40             4.761905       9.3200
## 244       62.65        4 12.5300 250.60             4.761905      12.5300
## 245       93.87        8 37.5480 750.96             4.761905      37.5480
## 246       47.59        8 19.0360 380.72             4.761905      19.0360
## 247       81.40        3 12.2100 244.20             4.761905      12.2100
## 248       17.94        5  4.4850  89.70             4.761905       4.4850
## 249       77.72        4 15.5440 310.88             4.761905      15.5440
```

```
## 250       73.06        7 25.5710 511.42              4.761905      25.5710
## 251       46.55        9 20.9475 418.95              4.761905      20.9475
## 252       35.19       10 17.5950 351.90              4.761905      17.5950
## 253       14.39        2  1.4390  28.78              4.761905       1.4390
## 254       23.75        4  4.7500  95.00              4.761905       4.7500
## 255       58.90        8 23.5600 471.20              4.761905      23.5600
## 256       32.62        4  6.5240 130.48              4.761905       6.5240
## 257       66.35        1  3.3175  66.35              4.761905       3.3175
## 258       25.91        6  7.7730 155.46              4.761905       7.7730
## 259       32.25        4  6.4500 129.00              4.761905       6.4500
## 260       65.94        4 13.1880 263.76              4.761905      13.1880
## 261       75.06        9 33.7770 675.54              4.761905      33.7770
## 262       16.45        4  3.2900  65.80              4.761905       3.2900
## 263       38.30        4  7.6600 153.20              4.761905       7.6600
## 264       22.24       10 11.1200 222.40              4.761905      11.1200
## 265       54.45        1  2.7225  54.45              4.761905       2.7225
## 266       98.40        7 34.4400 688.80              4.761905      34.4400
## 267       35.47        4  7.0940 141.88              4.761905       7.0940
## 268       74.60       10 37.3000 746.00              4.761905      37.3000
## 269       70.74        4 14.1480 282.96              4.761905      14.1480
## 270       35.54       10 17.7700 355.40              4.761905      17.7700
## 271       67.43        5 16.8575 337.15              4.761905      16.8575
## 272       21.12        2  2.1120  42.24              4.761905       2.1120
## 273       21.54        9  9.6930 193.86              4.761905       9.6930
## 274       12.03        2  1.2030  24.06              4.761905       1.2030
## 275       99.71        6 29.9130 598.26              4.761905      29.9130
## 276       47.97        7 16.7895 335.79              4.761905      16.7895
## 277       21.82       10 10.9100 218.20              4.761905      10.9100
## 278       95.42        4 19.0840 381.68              4.761905      19.0840
## 279       70.99       10 35.4950 709.90              4.761905      35.4950
## 280       44.02       10 22.0100 440.20              4.761905      22.0100
## 281       69.96        8 27.9840 559.68              4.761905      27.9840
## 282       37.00        1  1.8500  37.00              4.761905       1.8500
## 283       15.34        1  0.7670  15.34              4.761905       0.7670
## 284       99.83        6 29.9490 598.98              4.761905      29.9490
## 285       47.67        4  9.5340 190.68              4.761905       9.5340
## 286       66.68        5 16.6700 333.40              4.761905      16.6700
## 287       74.86        1  3.7430  74.86              4.761905       3.7430
## 288       23.75        9 10.6875 213.75              4.761905      10.6875
## 289       48.51        7 16.9785 339.57              4.761905      16.9785
## 290       94.88        7 33.2080 664.16              4.761905      33.2080
## 291       40.30       10 20.1500 403.00              4.761905      20.1500
## 292       27.85        7  9.7475 194.95              4.761905       9.7475
## 293       62.48        1  3.1240  62.48              4.761905       3.1240
## 294       36.36        2  3.6360  72.72              4.761905       3.6360
## 295       18.11       10  9.0550 181.10              4.761905       9.0550
## 296       51.92        5 12.9800 259.60              4.761905      12.9800
## 297       28.84        4  5.7680 115.36              4.761905       5.7680
## 298       78.38        6 23.5140 470.28              4.761905      23.5140
## 299       60.01        4 12.0020 240.04              4.761905      12.0020
## 300       88.61        1  4.4305  88.61              4.761905       4.4305
## 301       99.82        2  9.9820 199.64              4.761905       9.9820
## 302       39.01        1  1.9505  39.01              4.761905       1.9505
## 303       48.61        1  2.4305  48.61              4.761905       2.4305
```

```
## 304       51.19        4 10.2380 204.76              4.761905      10.2380
## 305       14.96        8  5.9840 119.68              4.761905       5.9840
## 306       72.20        7 25.2700 505.40              4.761905      25.2700
## 307       40.23        7 14.0805 281.61              4.761905      14.0805
## 308       88.79        8 35.5160 710.32              4.761905      35.5160
## 309       26.48        3  3.9720  79.44              4.761905       3.9720
## 310       81.91        2  8.1910 163.82              4.761905       8.1910
## 311       79.93        6 23.9790 479.58              4.761905      23.9790
## 312       69.33        2  6.9330 138.66              4.761905       6.9330
## 313       14.23        5  3.5575  71.15              4.761905       3.5575
## 314       15.55        9  6.9975 139.95              4.761905       6.9975
## 315       78.13       10 39.0650 781.30              4.761905      39.0650
## 316       99.37        2  9.9370 198.74              4.761905       9.9370
## 317       21.08        3  3.1620  63.24              4.761905       3.1620
## 318       74.79        5 18.6975 373.95              4.761905      18.6975
## 319       29.67        7 10.3845 207.69              4.761905      10.3845
## 320       44.07        4  8.8140 176.28              4.761905       8.8140
## 321       22.93        9 10.3185 206.37              4.761905      10.3185
## 322       39.42        1  1.9710  39.42              4.761905       1.9710
## 323       15.26        6  4.5780  91.56              4.761905       4.5780
## 324       61.77        5 15.4425 308.85              4.761905      15.4425
## 325       21.52        6  6.4560 129.12              4.761905       6.4560
## 326       97.74        4 19.5480 390.96              4.761905      19.5480
## 327       99.78        5 24.9450 498.90              4.761905      24.9450
## 328       94.26        4 18.8520 377.04              4.761905      18.8520
## 329       51.13        4 10.2260 204.52              4.761905      10.2260
## 330       36.36        4  7.2720 145.44              4.761905       7.2720
## 331       22.02        9  9.9090 198.18              4.761905       9.9090
## 332       32.90        3  4.9350  98.70              4.761905       4.9350
## 333       77.02        5 19.2550 385.10              4.761905      19.2550
## 334       23.48        2  2.3480  46.96              4.761905       2.3480
## 335       14.70        5  3.6750  73.50              4.761905       3.6750
## 336       28.45        5  7.1125 142.25              4.761905       7.1125
## 337       76.40        9 34.3800 687.60              4.761905      34.3800
## 338       57.95        6 17.3850 347.70              4.761905      17.3850
## 339       47.65        3  7.1475 142.95              4.761905       7.1475
## 340       42.82        9 19.2690 385.38              4.761905      19.2690
## 341       48.09        3  7.2135 144.27              4.761905       7.2135
## 342       55.97        7 19.5895 391.79              4.761905      19.5895
## 343       76.90        7 26.9150 538.30              4.761905      26.9150
## 344       97.03        5 24.2575 485.15              4.761905      24.2575
## 345       44.65        3  6.6975 133.95              4.761905       6.6975
## 346       77.93        9 35.0685 701.37              4.761905      35.0685
## 347       71.95        1  3.5975  71.95              4.761905       3.5975
## 348       89.25        8 35.7000 714.00              4.761905      35.7000
## 349       26.02        7  9.1070 182.14              4.761905       9.1070
## 350       13.50       10  6.7500 135.00              4.761905       6.7500
## 351       99.30       10 49.6500 993.00              4.761905      49.6500
## 352       51.69        7 18.0915 361.83              4.761905      18.0915
## 353       54.73        7 19.1555 383.11              4.761905      19.1555
## 354       27.00        9 12.1500 243.00              4.761905      12.1500
## 355       30.24        1  1.5120  30.24              4.761905       1.5120
## 356       89.14        4 17.8280 356.56              4.761905      17.8280
## 357       37.55       10 18.7750 375.50              4.761905      18.7750
```

```
## 358       95.44       10 47.7200 954.40             4.761905      47.7200
## 359       27.50        3  4.1250  82.50             4.761905       4.1250
## 360       74.97        1  3.7485  74.97             4.761905       3.7485
## 361       80.96        8 32.3840 647.68             4.761905      32.3840
## 362       94.47        8 37.7880 755.76             4.761905      37.7880
## 363       99.79        2  9.9790 199.58             4.761905       9.9790
## 364       73.22        6 21.9660 439.32             4.761905      21.9660
## 365       41.24        4  8.2480 164.96             4.761905       8.2480
## 366       81.68        4 16.3360 326.72             4.761905      16.3360
## 367       51.32        9 23.0940 461.88             4.761905      23.0940
## 368       65.94        4 13.1880 263.76             4.761905      13.1880
## 369       14.36       10  7.1800 143.60             4.761905       7.1800
## 370       21.50        9  9.6750 193.50             4.761905       9.6750
## 371       26.26        7  9.1910 183.82             4.761905       9.1910
## 372       60.96        2  6.0960 121.92             4.761905       6.0960
## 373       70.11        6 21.0330 420.66             4.761905      21.0330
## 374       42.08        6 12.6240 252.48             4.761905      12.6240
## 375       67.09        5 16.7725 335.45             4.761905      16.7725
## 376       96.70        5 24.1750 483.50             4.761905      24.1750
## 377       35.38        9 15.9210 318.42             4.761905      15.9210
## 378       95.49        7 33.4215 668.43             4.761905      33.4215
## 379       96.98        4 19.3960 387.92             4.761905      19.3960
## 380       23.65        4  4.7300  94.60             4.761905       4.7300
## 381       82.33        4 16.4660 329.32             4.761905      16.4660
## 382       26.61        2  2.6610  53.22             4.761905       2.6610
## 383       99.69        5 24.9225 498.45             4.761905      24.9225
## 384       74.89        4 14.9780 299.56             4.761905      14.9780
## 385       40.94        5 10.2350 204.70             4.761905      10.2350
## 386       75.82        1  3.7910  75.82             4.761905       3.7910
## 387       46.77        6 14.0310 280.62             4.761905      14.0310
## 388       32.32       10 16.1600 323.20             4.761905      16.1600
## 389       54.07        9 24.3315 486.63             4.761905      24.3315
## 390       18.22        7  6.3770 127.54             4.761905       6.3770
## 391       80.48        3 12.0720 241.44             4.761905      12.0720
## 392       37.95       10 18.9750 379.50             4.761905      18.9750
## 393       76.82        1  3.8410  76.82             4.761905       3.8410
## 394       52.26       10 26.1300 522.60             4.761905      26.1300
## 395       79.74        1  3.9870  79.74             4.761905       3.9870
## 396       77.50        5 19.3750 387.50             4.761905      19.3750
## 397       54.27        5 13.5675 271.35             4.761905      13.5675
## 398       13.59        9  6.1155 122.31             4.761905       6.1155
## 399       41.06        6 12.3180 246.36             4.761905      12.3180
## 400       19.24        9  8.6580 173.16             4.761905       8.6580
## 401       39.43        6 11.8290 236.58             4.761905      11.8290
## 402       46.22        4  9.2440 184.88             4.761905       9.2440
## 403       13.98        1  0.6990  13.98             4.761905       0.6990
## 404       39.75        5  9.9375 198.75             4.761905       9.9375
## 405       97.79        7 34.2265 684.53             4.761905      34.2265
## 406       67.26        4 13.4520 269.04             4.761905      13.4520
## 407       13.79        5  3.4475  68.95             4.761905       3.4475
## 408       68.71        4 13.7420 274.84             4.761905      13.7420
## 409       56.53        4 11.3060 226.12             4.761905      11.3060
## 410       23.82        5  5.9550 119.10             4.761905       5.9550
## 411       34.21       10 17.1050 342.10             4.761905      17.1050
```

```
## 412       21.87        2  2.1870  43.74              4.761905       2.1870
## 413       20.97        5  5.2425 104.85              4.761905       5.2425
## 414       25.84        3  3.8760  77.52              4.761905       3.8760
## 415       50.93        8 20.3720 407.44              4.761905      20.3720
## 416       96.11        1  4.8055  96.11              4.761905       4.8055
## 417       45.38        4  9.0760 181.52              4.761905       9.0760
## 418       81.51        1  4.0755  81.51              4.761905       4.0755
## 419       57.22        2  5.7220 114.44              4.761905       5.7220
## 420       25.22        7  8.8270 176.54              4.761905       8.8270
## 421       38.60        3  5.7900 115.80              4.761905       5.7900
## 422       84.05        3 12.6075 252.15              4.761905      12.6075
## 423       97.21       10 48.6050 972.10              4.761905      48.6050
## 424       25.42        8 10.1680 203.36              4.761905      10.1680
## 425       16.28        1  0.8140  16.28              4.761905       0.8140
## 426       40.61        9 18.2745 365.49              4.761905      18.2745
## 427       53.17        7 18.6095 372.19              4.761905      18.6095
## 428       20.87        3  3.1305  62.61              4.761905       3.1305
## 429       67.27        5 16.8175 336.35              4.761905      16.8175
## 430       90.65       10 45.3250 906.50              4.761905      45.3250
## 431       69.08        2  6.9080 138.16              4.761905       6.9080
## 432       43.27        2  4.3270  86.54              4.761905       4.3270
## 433       23.46        6  7.0380 140.76              4.761905       7.0380
## 434       95.54        7 33.4390 668.78              4.761905      33.4390
## 435       47.44        1  2.3720  47.44              4.761905       2.3720
## 436       99.24        9 44.6580 893.16              4.761905      44.6580
## 437       82.93        4 16.5860 331.72              4.761905      16.5860
## 438       33.99        6 10.1970 203.94              4.761905      10.1970
## 439       17.04        4  3.4080  68.16              4.761905       3.4080
## 440       40.86        8 16.3440 326.88              4.761905      16.3440
## 441       17.44        5  4.3600  87.20              4.761905       4.3600
## 442       88.43        8 35.3720 707.44              4.761905      35.3720
## 443       89.21        9 40.1445 802.89              4.761905      40.1445
## 444       12.78        1  0.6390  12.78              4.761905       0.6390
## 445       19.10        7  6.6850 133.70              4.761905       6.6850
## 446       19.15        1  0.9575  19.15              4.761905       0.9575
## 447       27.66       10 13.8300 276.60              4.761905      13.8300
## 448       45.74        3  6.8610 137.22              4.761905       6.8610
## 449       27.07        1  1.3535  27.07              4.761905       1.3535
## 450       39.12        1  1.9560  39.12              4.761905       1.9560
## 451       74.71        6 22.4130 448.26              4.761905      22.4130
## 452       22.01        6  6.6030 132.06              4.761905       6.6030
## 453       63.61        5 15.9025 318.05              4.761905      15.9025
## 454       25.00        1  1.2500  25.00              4.761905       1.2500
## 455       20.77        4  4.1540  83.08              4.761905       4.1540
## 456       29.56        5  7.3900 147.80              4.761905       7.3900
## 457       77.40        9 34.8300 696.60              4.761905      34.8300
## 458       79.39       10 39.6950 793.90              4.761905      39.6950
## 459       46.57       10 23.2850 465.70              4.761905      23.2850
## 460       35.89        1  1.7945  35.89              4.761905       1.7945
## 461       40.52        5 10.1300 202.60              4.761905      10.1300
## 462       73.05       10 36.5250 730.50              4.761905      36.5250
## 463       73.95        4 14.7900 295.80              4.761905      14.7900
## 464       22.62        1  1.1310  22.62              4.761905       1.1310
## 465       51.34        5 12.8350 256.70              4.761905      12.8350
```

```
## 466       54.55       10 27.2750 545.50             4.761905      27.2750
## 467       37.15        7 13.0025 260.05             4.761905      13.0025
## 468       37.02        6 11.1060 222.12             4.761905      11.1060
## 469       21.58        1  1.0790  21.58             4.761905       1.0790
## 470       98.84        1  4.9420  98.84             4.761905       4.9420
## 471       83.77        6 25.1310 502.62             4.761905      25.1310
## 472       40.05        4  8.0100 160.20             4.761905       8.0100
## 473       43.13       10 21.5650 431.30             4.761905      21.5650
## 474       72.57        8 29.0280 580.56             4.761905      29.0280
## 475       64.44        5 16.1100 322.20             4.761905      16.1100
## 476       65.18        3  9.7770 195.54             4.761905       9.7770
## 477       33.26        5  8.3150 166.30             4.761905       8.3150
## 478       84.07        4 16.8140 336.28             4.761905      16.8140
## 479       34.37       10 17.1850 343.70             4.761905      17.1850
## 480       38.60        1  1.9300  38.60             4.761905       1.9300
## 481       65.97        8 26.3880 527.76             4.761905      26.3880
## 482       32.80       10 16.4000 328.00             4.761905      16.4000
## 483       37.14        5  9.2850 185.70             4.761905       9.2850
## 484       60.38       10 30.1900 603.80             4.761905      30.1900
## 485       36.98       10 18.4900 369.80             4.761905      18.4900
## 486       49.49        4  9.8980 197.96             4.761905       9.8980
## 487       41.09       10 20.5450 410.90             4.761905      20.5450
## 488       37.15        4  7.4300 148.60             4.761905       7.4300
## 489       22.96        1  1.1480  22.96             4.761905       1.1480
## 490       77.68        9 34.9560 699.12             4.761905      34.9560
## 491       34.70        2  3.4700  69.40             4.761905       3.4700
## 492       19.66       10  9.8300 196.60             4.761905       9.8300
## 493       25.32        8 10.1280 202.56             4.761905      10.1280
## 494       12.12       10  6.0600 121.20             4.761905       6.0600
## 495       99.89        2  9.9890 199.78             4.761905       9.9890
## 496       75.92        8 30.3680 607.36             4.761905      30.3680
## 497       63.22        2  6.3220 126.44             4.761905       6.3220
## 498       90.24        6 27.0720 541.44             4.761905      27.0720
## 499       98.13        1  4.9065  98.13             4.761905       4.9065
## 500       51.52        8 20.6080 412.16             4.761905      20.6080
## 501       73.97        1  3.6985  73.97             4.761905       3.6985
## 502       31.90        1  1.5950  31.90             4.761905       1.5950
## 503       69.40        2  6.9400 138.80             4.761905       6.9400
## 504       93.31        2  9.3310 186.62             4.761905       9.3310
## 505       88.45        1  4.4225  88.45             4.761905       4.4225
## 506       24.18        8  9.6720 193.44             4.761905       9.6720
## 507       48.50        3  7.2750 145.50             4.761905       7.2750
## 508       84.05        6 25.2150 504.30             4.761905      25.2150
## 509       61.29        5 15.3225 306.45             4.761905      15.3225
## 510       15.95        6  4.7850  95.70             4.761905       4.7850
## 511       90.74        7 31.7590 635.18             4.761905      31.7590
## 512       42.91        5 10.7275 214.55             4.761905      10.7275
## 513       54.28        7 18.9980 379.96             4.761905      18.9980
## 514       99.55        7 34.8425 696.85             4.761905      34.8425
## 515       58.39        7 20.4365 408.73             4.761905      20.4365
## 516       51.47        1  2.5735  51.47             4.761905       2.5735
## 517       54.86        5 13.7150 274.30             4.761905      13.7150
## 518       39.39        5  9.8475 196.95             4.761905       9.8475
## 519       34.73        2  3.4730  69.46             4.761905       3.4730
```

```
## 520       71.92        5 17.9800 359.60              4.761905      17.9800
## 521       45.71        3  6.8565 137.13              4.761905       6.8565
## 522       83.17        6 24.9510 499.02              4.761905      24.9510
## 523       37.44        6 11.2320 224.64              4.761905      11.2320
## 524       62.87        2  6.2870 125.74              4.761905       6.2870
## 525       81.71        6 24.5130 490.26              4.761905      24.5130
## 526       91.41        5 22.8525 457.05              4.761905      22.8525
## 527       39.21        4  7.8420 156.84              4.761905       7.8420
## 528       59.86        2  5.9860 119.72              4.761905       5.9860
## 529       54.36       10 27.1800 543.60              4.761905      27.1800
## 530       98.09        9 44.1405 882.81              4.761905      44.1405
## 531       25.43        6  7.6290 152.58              4.761905       7.6290
## 532       86.68        8 34.6720 693.44              4.761905      34.6720
## 533       22.95       10 11.4750 229.50              4.761905      11.4750
## 534       16.31        9  7.3395 146.79              4.761905       7.3395
## 535       28.32        5  7.0800 141.60              4.761905       7.0800
## 536       16.67        7  5.8345 116.69              4.761905       5.8345
## 537       73.96        1  3.6980  73.96              4.761905       3.6980
## 538       97.94        1  4.8970  97.94              4.761905       4.8970
## 539       73.05        4 14.6100 292.20              4.761905      14.6100
## 540       87.48        6 26.2440 524.88              4.761905      26.2440
## 541       30.68        3  4.6020  92.04              4.761905       4.6020
## 542       75.88        1  3.7940  75.88              4.761905       3.7940
## 543       20.18        4  4.0360  80.72              4.761905       4.0360
## 544       18.77        6  5.6310 112.62              4.761905       5.6310
## 545       71.20        1  3.5600  71.20              4.761905       3.5600
## 546       38.81        4  7.7620 155.24              4.761905       7.7620
## 547       29.42       10 14.7100 294.20              4.761905      14.7100
## 548       60.95        9 27.4275 548.55              4.761905      27.4275
## 549       51.54        5 12.8850 257.70              4.761905      12.8850
## 550       66.06        6 19.8180 396.36              4.761905      19.8180
## 551       57.27        3  8.5905 171.81              4.761905       8.5905
## 552       54.31        9 24.4395 488.79              4.761905      24.4395
## 553       58.24        9 26.2080 524.16              4.761905      26.2080
## 554       22.21        6  6.6630 133.26              4.761905       6.6630
## 555       19.32        7  6.7620 135.24              4.761905       6.7620
## 556       37.48        3  5.6220 112.44              4.761905       5.6220
## 557       72.04        2  7.2040 144.08              4.761905       7.2040
## 558       98.52       10 49.2600 985.20              4.761905      49.2600
## 559       41.66        6 12.4980 249.96              4.761905      12.4980
## 560       72.42        3 10.8630 217.26              4.761905      10.8630
## 561       21.58        9  9.7110 194.22              4.761905       9.7110
## 562       89.20       10 44.6000 892.00              4.761905      44.6000
## 563       42.42        8 16.9680 339.36              4.761905      16.9680
## 564       74.51        6 22.3530 447.06              4.761905      22.3530
## 565       99.25        2  9.9250 198.50              4.761905       9.9250
## 566       81.21       10 40.6050 812.10              4.761905      40.6050
## 567       49.33       10 24.6650 493.30              4.761905      24.6650
## 568       65.74        9 29.5830 591.66              4.761905      29.5830
## 569       79.86        7 27.9510 559.02              4.761905      27.9510
## 570       73.98        7 25.8930 517.86              4.761905      25.8930
## 571       82.04        5 20.5100 410.20              4.761905      20.5100
## 572       26.67       10 13.3350 266.70              4.761905      13.3350
## 573       10.13        7  3.5455  70.91              4.761905       3.5455
```

```
## 574       72.39        2  7.2390 144.78             4.761905       7.2390
## 575       85.91        5 21.4775 429.55             4.761905      21.4775
## 576       81.31        7 28.4585 569.17             4.761905      28.4585
## 577       60.30        4 12.0600 241.20             4.761905      12.0600
## 578       31.77        4  6.3540 127.08             4.761905       6.3540
## 579       64.27        4 12.8540 257.08             4.761905      12.8540
## 580       69.51        2  6.9510 139.02             4.761905       6.9510
## 581       27.22        3  4.0830  81.66             4.761905       4.0830
## 582       77.68        4 15.5360 310.72             4.761905      15.5360
## 583       92.98        2  9.2980 185.96             4.761905       9.2980
## 584       18.08        4  3.6160  72.32             4.761905       3.6160
## 585       63.06        3  9.4590 189.18             4.761905       9.4590
## 586       51.71        4 10.3420 206.84             4.761905      10.3420
## 587       52.34        3  7.8510 157.02             4.761905       7.8510
## 588       43.06        5 10.7650 215.30             4.761905      10.7650
## 589       59.61       10 29.8050 596.10             4.761905      29.8050
## 590       14.62        5  3.6550  73.10             4.761905       3.6550
## 591       46.53        6 13.9590 279.18             4.761905      13.9590
## 592       24.24        7  8.4840 169.68             4.761905       8.4840
## 593       45.58        1  2.2790  45.58             4.761905       2.2790
## 594       75.20        3 11.2800 225.60             4.761905      11.2800
## 595       96.80        3 14.5200 290.40             4.761905      14.5200
## 596       14.82        3  2.2230  44.46             4.761905       2.2230
## 597       52.20        3  7.8300 156.60             4.761905       7.8300
## 598       46.66        9 20.9970 419.94             4.761905      20.9970
## 599       36.85        5  9.2125 184.25             4.761905       9.2125
## 600       70.32        2  7.0320 140.64             4.761905       7.0320
## 601       83.08        1  4.1540  83.08             4.761905       4.1540
## 602       64.99        1  3.2495  64.99             4.761905       3.2495
## 603       77.56       10 38.7800 775.60             4.761905      38.7800
## 604       54.51        6 16.3530 327.06             4.761905      16.3530
## 605       51.89        7 18.1615 363.23             4.761905      18.1615
## 606       31.75        4  6.3500 127.00             4.761905       6.3500
## 607       53.65        7 18.7775 375.55             4.761905      18.7775
## 608       49.79        4  9.9580 199.16             4.761905       9.9580
## 609       30.61        1  1.5305  30.61             4.761905       1.5305
## 610       57.89        2  5.7890 115.78             4.761905       5.7890
## 611       28.96        1  1.4480  28.96             4.761905       1.4480
## 612       98.97        9 44.5365 890.73             4.761905      44.5365
## 613       93.22        3 13.9830 279.66             4.761905      13.9830
## 614       80.93        1  4.0465  80.93             4.761905       4.0465
## 615       67.45       10 33.7250 674.50             4.761905      33.7250
## 616       38.72        9 17.4240 348.48             4.761905      17.4240
## 617       72.60        6 21.7800 435.60             4.761905      21.7800
## 618       87.91        5 21.9775 439.55             4.761905      21.9775
## 619       98.53        6 29.5590 591.18             4.761905      29.5590
## 620       43.46        6 13.0380 260.76             4.761905      13.0380
## 621       71.68        3 10.7520 215.04             4.761905      10.7520
## 622       91.61        1  4.5805  91.61             4.761905       4.5805
## 623       94.59        7 33.1065 662.13             4.761905      33.1065
## 624       83.25       10 41.6250 832.50             4.761905      41.6250
## 625       91.35        1  4.5675  91.35             4.761905       4.5675
## 626       78.88        2  7.8880 157.76             4.761905       7.8880
## 627       60.87        2  6.0870 121.74             4.761905       6.0870
```

```
## 628       82.58       10 41.2900 825.80             4.761905      41.2900
## 629       53.30        3  7.9950 159.90             4.761905       7.9950
## 630       12.09        1  0.6045  12.09             4.761905       0.6045
## 631       64.19       10 32.0950 641.90             4.761905      32.0950
## 632       78.31        3 11.7465 234.93             4.761905      11.7465
## 633       83.77        2  8.3770 167.54             4.761905       8.3770
## 634       99.70        3 14.9550 299.10             4.761905      14.9550
## 635       79.91        3 11.9865 239.73             4.761905      11.9865
## 636       66.47       10 33.2350 664.70             4.761905      33.2350
## 637       28.95        7 10.1325 202.65             4.761905      10.1325
## 638       46.20        1  2.3100  46.20             4.761905       2.3100
## 639       17.63        5  4.4075  88.15             4.761905       4.4075
## 640       52.42        3  7.8630 157.26             4.761905       7.8630
## 641       98.79        3 14.8185 296.37             4.761905      14.8185
## 642       88.55        8 35.4200 708.40             4.761905      35.4200
## 643       55.67        2  5.5670 111.34             4.761905       5.5670
## 644       72.52        8 29.0080 580.16             4.761905      29.0080
## 645       12.05        5  3.0125  60.25             4.761905       3.0125
## 646       19.36        9  8.7120 174.24             4.761905       8.7120
## 647       70.21        6 21.0630 421.26             4.761905      21.0630
## 648       33.63        1  1.6815  33.63             4.761905       1.6815
## 649       15.49        2  1.5490  30.98             4.761905       1.5490
## 650       24.74       10 12.3700 247.40             4.761905      12.3700
## 651       75.66        5 18.9150 378.30             4.761905      18.9150
## 652       55.81        6 16.7430 334.86             4.761905      16.7430
## 653       72.78       10 36.3900 727.80             4.761905      36.3900
## 654       37.32        9 16.7940 335.88             4.761905      16.7940
## 655       60.18        4 12.0360 240.72             4.761905      12.0360
## 656       15.69        3  2.3535  47.07             4.761905       2.3535
## 657       99.69        1  4.9845  99.69             4.761905       4.9845
## 658       88.15        3 13.2225 264.45             4.761905      13.2225
## 659       27.93        5  6.9825 139.65             4.761905       6.9825
## 660       55.45        1  2.7725  55.45             4.761905       2.7725
## 661       42.97        3  6.4455 128.91             4.761905       6.4455
## 662       17.14        7  5.9990 119.98             4.761905       5.9990
## 663       58.75        6 17.6250 352.50             4.761905      17.6250
## 664       87.10       10 43.5500 871.00             4.761905      43.5500
## 665       98.80        2  9.8800 197.60             4.761905       9.8800
## 666       48.63        4  9.7260 194.52             4.761905       9.7260
## 667       57.74        3  8.6610 173.22             4.761905       8.6610
## 668       17.97        4  3.5940  71.88             4.761905       3.5940
## 669       47.71        6 14.3130 286.26             4.761905      14.3130
## 670       40.62        2  4.0620  81.24             4.761905       4.0620
## 671       56.04       10 28.0200 560.40             4.761905      28.0200
## 672       93.40        2  9.3400 186.80             4.761905       9.3400
## 673       73.41        3 11.0115 220.23             4.761905      11.0115
## 674       33.64        8 13.4560 269.12             4.761905      13.4560
## 675       45.48       10 22.7400 454.80             4.761905      22.7400
## 676       83.77        2  8.3770 167.54             4.761905       8.3770
## 677       64.08        7 22.4280 448.56             4.761905      22.4280
## 678       73.47        4 14.6940 293.88             4.761905      14.6940
## 679       58.95       10 29.4750 589.50             4.761905      29.4750
## 680       48.50        6 14.5500 291.00             4.761905      14.5500
## 681       39.48        1  1.9740  39.48             4.761905       1.9740
```

```
## 682       34.81        1  1.7405  34.81             4.761905       1.7405
## 683       49.32        6 14.7960 295.92             4.761905      14.7960
## 684       21.48        2  2.1480  42.96             4.761905       2.1480
## 685       23.08        6  6.9240 138.48             4.761905       6.9240
## 686       49.10        2  4.9100  98.20             4.761905       4.9100
## 687       64.83        2  6.4830 129.66             4.761905       6.4830
## 688       63.56       10 31.7800 635.60             4.761905      31.7800
## 689       72.88        2  7.2880 145.76             4.761905       7.2880
## 690       67.10        3 10.0650 201.30             4.761905      10.0650
## 691       70.19        9 31.5855 631.71             4.761905      31.5855
## 692       55.04        7 19.2640 385.28             4.761905      19.2640
## 693       48.63       10 24.3150 486.30             4.761905      24.3150
## 694       73.38        7 25.6830 513.66             4.761905      25.6830
## 695       52.60        9 23.6700 473.40             4.761905      23.6700
## 696       87.37        5 21.8425 436.85             4.761905      21.8425
## 697       27.04        4  5.4080 108.16             4.761905       5.4080
## 698       62.19        4 12.4380 248.76             4.761905      12.4380
## 699       69.58        9 31.3110 626.22             4.761905      31.3110
## 700       97.50       10 48.7500 975.00             4.761905      48.7500
## 701       60.41        8 24.1640 483.28             4.761905      24.1640
## 702       32.32        3  4.8480  96.96             4.761905       4.8480
## 703       19.77       10  9.8850 197.70             4.761905       9.8850
## 704       80.47        9 36.2115 724.23             4.761905      36.2115
## 705       88.39        9 39.7755 795.51             4.761905      39.7755
## 706       71.77        7 25.1195 502.39             4.761905      25.1195
## 707       43.00        4  8.6000 172.00             4.761905       8.6000
## 708       68.98        1  3.4490  68.98             4.761905       3.4490
## 709       15.62        8  6.2480 124.96             4.761905       6.2480
## 710       25.70        3  3.8550  77.10             4.761905       3.8550
## 711       80.62        6 24.1860 483.72             4.761905      24.1860
## 712       75.53        4 15.1060 302.12             4.761905      15.1060
## 713       77.63        9 34.9335 698.67             4.761905      34.9335
## 714       13.85        9  6.2325 124.65             4.761905       6.2325
## 715       98.70        8 39.4800 789.60             4.761905      39.4800
## 716       35.68        5  8.9200 178.40             4.761905       8.9200
## 717       71.46        7 25.0110 500.22             4.761905      25.0110
## 718       11.94        3  1.7910  35.82             4.761905       1.7910
## 719       45.38        3  6.8070 136.14             4.761905       6.8070
## 720       17.48        6  5.2440 104.88             4.761905       5.2440
## 721       25.56        7  8.9460 178.92             4.761905       8.9460
## 722       90.63        9 40.7835 815.67             4.761905      40.7835
## 723       44.12        3  6.6180 132.36             4.761905       6.6180
## 724       36.77        7 12.8695 257.39             4.761905      12.8695
## 725       23.34        4  4.6680  93.36             4.761905       4.6680
## 726       28.50        8 11.4000 228.00             4.761905      11.4000
## 727       55.57        3  8.3355 166.71             4.761905       8.3355
## 728       69.74       10 34.8700 697.40             4.761905      34.8700
## 729       97.26        4 19.4520 389.04             4.761905      19.4520
## 730       52.18        7 18.2630 365.26             4.761905      18.2630
## 731       22.32        4  4.4640  89.28             4.761905       4.4640
## 732       56.00        3  8.4000 168.00             4.761905       8.4000
## 733       19.70        1  0.9850  19.70             4.761905       0.9850
## 734       75.88        7 26.5580 531.16             4.761905      26.5580
## 735       53.72        1  2.6860  53.72             4.761905       2.6860
```

```
## 736       81.95       10 40.9750 819.50             4.761905      40.9750
## 737       81.20        7 28.4200 568.40             4.761905      28.4200
## 738       58.76       10 29.3800 587.60             4.761905      29.3800
## 739       91.56        8 36.6240 732.48             4.761905      36.6240
## 740       93.96        9 42.2820 845.64             4.761905      42.2820
## 741       55.61        7 19.4635 389.27             4.761905      19.4635
## 742       84.83        1  4.2415  84.83             4.761905       4.2415
## 743       71.63        2  7.1630 143.26             4.761905       7.1630
## 744       37.69        2  3.7690  75.38             4.761905       3.7690
## 745       31.67        8 12.6680 253.36             4.761905      12.6680
## 746       38.42        1  1.9210  38.42             4.761905       1.9210
## 747       65.23       10 32.6150 652.30             4.761905      32.6150
## 748       10.53        5  2.6325  52.65             4.761905       2.6325
## 749       12.29        9  5.5305 110.61             4.761905       5.5305
## 750       81.23        7 28.4305 568.61             4.761905      28.4305
## 751       22.32        4  4.4640  89.28             4.761905       4.4640
## 752       27.28        5  6.8200 136.40             4.761905       6.8200
## 753       17.42       10  8.7100 174.20             4.761905       8.7100
## 754       73.28        5 18.3200 366.40             4.761905      18.3200
## 755       84.87        3 12.7305 254.61             4.761905      12.7305
## 756       97.29        8 38.9160 778.32             4.761905      38.9160
## 757       35.74        8 14.2960 285.92             4.761905      14.2960
## 758       96.52        6 28.9560 579.12             4.761905      28.9560
## 759       18.85       10  9.4250 188.50             4.761905       9.4250
## 760       55.39        4 11.0780 221.56             4.761905      11.0780
## 761       77.20       10 38.6000 772.00             4.761905      38.6000
## 762       72.13       10 36.0650 721.30             4.761905      36.0650
## 763       63.88        8 25.5520 511.04             4.761905      25.5520
## 764       10.69        5  2.6725  53.45             4.761905       2.6725
## 765       55.50        4 11.1000 222.00             4.761905      11.1000
## 766       95.46        8 38.1840 763.68             4.761905      38.1840
## 767       76.06        3 11.4090 228.18             4.761905      11.4090
## 768       13.69        6  4.1070  82.14             4.761905       4.1070
## 769       95.64        4 19.1280 382.56             4.761905      19.1280
## 770       11.43        6  3.4290  68.58             4.761905       3.4290
## 771       95.54        4 19.1080 382.16             4.761905      19.1080
## 772       85.87        7 30.0545 601.09             4.761905      30.0545
## 773       67.99        7 23.7965 475.93             4.761905      23.7965
## 774       52.42        1  2.6210  52.42             4.761905       2.6210
## 775       65.65        2  6.5650 131.30             4.761905       6.5650
## 776       28.86        5  7.2150 144.30             4.761905       7.2150
## 777       65.31        7 22.8585 457.17             4.761905      22.8585
## 778       93.38        1  4.6690  93.38             4.761905       4.6690
## 779       25.25        5  6.3125 126.25             4.761905       6.3125
## 780       87.87        9 39.5415 790.83             4.761905      39.5415
## 781       21.80        8  8.7200 174.40             4.761905       8.7200
## 782       94.76        4 18.9520 379.04             4.761905      18.9520
## 783       30.62        1  1.5310  30.62             4.761905       1.5310
## 784       44.01        8 17.6040 352.08             4.761905      17.6040
## 785       10.16        5  2.5400  50.80             4.761905       2.5400
## 786       74.58        7 26.1030 522.06             4.761905      26.1030
## 787       71.89        8 28.7560 575.12             4.761905      28.7560
## 788       10.99        5  2.7475  54.95             4.761905       2.7475
## 789       60.47        3  9.0705 181.41             4.761905       9.0705
```

```
## 790       58.91        7 20.6185 412.37              4.761905      20.6185
## 791       46.41        1  2.3205  46.41              4.761905       2.3205
## 792       68.55        4 13.7100 274.20              4.761905      13.7100
## 793       97.37       10 48.6850 973.70              4.761905      48.6850
## 794       92.60        7 32.4100 648.20              4.761905      32.4100
## 795       46.61        2  4.6610  93.22              4.761905       4.6610
## 796       27.18        2  2.7180  54.36              4.761905       2.7180
## 797       60.87        1  3.0435  60.87              4.761905       3.0435
## 798       24.49       10 12.2450 244.90              4.761905      12.2450
## 799       92.78        1  4.6390  92.78              4.761905       4.6390
## 800       86.69        5 21.6725 433.45              4.761905      21.6725
## 801       23.01        6  6.9030 138.06              4.761905       6.9030
## 802       30.20        8 12.0800 241.60              4.761905      12.0800
## 803       67.39        7 23.5865 471.73              4.761905      23.5865
## 804       48.96        9 22.0320 440.64              4.761905      22.0320
## 805       75.59        9 34.0155 680.31              4.761905      34.0155
## 806       77.47        4 15.4940 309.88              4.761905      15.4940
## 807       93.18        2  9.3180 186.36              4.761905       9.3180
## 808       50.23        4 10.0460 200.92              4.761905      10.0460
## 809       17.75        1  0.8875  17.75              4.761905       0.8875
## 810       62.18       10 31.0900 621.80              4.761905      31.0900
## 811       10.75        8  4.3000  86.00              4.761905       4.3000
## 812       40.26       10 20.1300 402.60              4.761905      20.1300
## 813       64.97        5 16.2425 324.85              4.761905      16.2425
## 814       95.15        1  4.7575  95.15              4.761905       4.7575
## 815       48.62        8 19.4480 388.96              4.761905      19.4480
## 816       53.21        8 21.2840 425.68              4.761905      21.2840
## 817       45.44        7 15.9040 318.08              4.761905      15.9040
## 818       33.88        8 13.5520 271.04              4.761905      13.5520
## 819       96.16        4 19.2320 384.64              4.761905      19.2320
## 820       47.16        5 11.7900 235.80              4.761905      11.7900
## 821       52.89        4 10.5780 211.56              4.761905      10.5780
## 822       47.68        2  4.7680  95.36              4.761905       4.7680
## 823       10.17        1  0.5085  10.17              4.761905       0.5085
## 824       68.71        3 10.3065 206.13              4.761905      10.3065
## 825       60.08        7 21.0280 420.56              4.761905      21.0280
## 826       22.01        4  4.4020  88.04              4.761905       4.4020
## 827       72.11        9 32.4495 648.99              4.761905      32.4495
## 828       41.28        3  6.1920 123.84              4.761905       6.1920
## 829       64.95       10 32.4750 649.50              4.761905      32.4750
## 830       74.22       10 37.1100 742.20              4.761905      37.1100
## 831       10.56        8  4.2240  84.48              4.761905       4.2240
## 832       62.57        4 12.5140 250.28              4.761905      12.5140
## 833       11.85        8  4.7400  94.80              4.761905       4.7400
## 834       91.30        1  4.5650  91.30              4.761905       4.5650
## 835       40.73        7 14.2555 285.11              4.761905      14.2555
## 836       52.38        1  2.6190  52.38              4.761905       2.6190
## 837       38.54        5  9.6350 192.70              4.761905       9.6350
## 838       44.63        6 13.3890 267.78              4.761905      13.3890
## 839       55.87       10 27.9350 558.70              4.761905      27.9350
## 840       29.22        6  8.7660 175.32              4.761905       8.7660
## 841       51.94        3  7.7910 155.82              4.761905       7.7910
## 842       60.30        1  3.0150  60.30              4.761905       3.0150
## 843       39.47        2  3.9470  78.94              4.761905       3.9470
```

```
## 844       14.87        2  1.4870  29.74          4.761905       1.4870
## 845       21.32        1  1.0660  21.32          4.761905       1.0660
## 846       93.78        3 14.0670 281.34          4.761905      14.0670
## 847       73.26        1  3.6630  73.26          4.761905       3.6630
## 848       22.38        1  1.1190  22.38          4.761905       1.1190
## 849       72.88        9 32.7960 655.92          4.761905      32.7960
## 850       99.10        6 29.7300 594.60          4.761905      29.7300
## 851       74.10        1  3.7050  74.10          4.761905       3.7050
## 852       98.48        2  9.8480 196.96          4.761905       9.8480
## 853       53.19        7 18.6165 372.33          4.761905      18.6165
## 854       52.79       10 26.3950 527.90          4.761905      26.3950
## 855       95.95        5 23.9875 479.75          4.761905      23.9875
## 856       36.51        9 16.4295 328.59          4.761905      16.4295
## 857       21.12        8  8.4480 168.96          4.761905       8.4480
## 858       28.31        4  5.6620 113.24          4.761905       5.6620
## 859       57.59        6 17.2770 345.54          4.761905      17.2770
## 860       47.63        9 21.4335 428.67          4.761905      21.4335
## 861       86.27        1  4.3135  86.27          4.761905       4.3135
## 862       12.76        2  1.2760  25.52          4.761905       1.2760
## 863       11.28        9  5.0760 101.52          4.761905       5.0760
## 864       51.07        7 17.8745 357.49          4.761905      17.8745
## 865       79.59        3 11.9385 238.77          4.761905      11.9385
## 866       33.81        3  5.0715 101.43          4.761905       5.0715
## 867       90.53        8 36.2120 724.24          4.761905      36.2120
## 868       62.82        2  6.2820 125.64          4.761905       6.2820
## 869       24.31        3  3.6465  72.93          4.761905       3.6465
## 870       64.59        4 12.9180 258.36          4.761905      12.9180
## 871       24.82        7  8.6870 173.74          4.761905       8.6870
## 872       56.50        1  2.8250  56.50          4.761905       2.8250
## 873       21.43       10 10.7150 214.30          4.761905      10.7150
## 874       89.06        6 26.7180 534.36          4.761905      26.7180
## 875       23.29        4  4.6580  93.16          4.761905       4.6580
## 876       65.26        8 26.1040 522.08          4.761905      26.1040
## 877       52.35        1  2.6175  52.35          4.761905       2.6175
## 878       39.75        1  1.9875  39.75          4.761905       1.9875
## 879       90.02        8 36.0080 720.16          4.761905      36.0080
## 880       12.10        8  4.8400  96.80          4.761905       4.8400
## 881       33.21       10 16.6050 332.10          4.761905      16.6050
## 882       10.18        8  4.0720  81.44          4.761905       4.0720
## 883       31.99       10 15.9950 319.90          4.761905      15.9950
## 884       34.42        6 10.3260 206.52          4.761905      10.3260
## 885       83.34        2  8.3340 166.68          4.761905       8.3340
## 886       45.58        7 15.9530 319.06          4.761905      15.9530
## 887       87.90        1  4.3950  87.90          4.761905       4.3950
## 888       73.47       10 36.7350 734.70          4.761905      36.7350
## 889       12.19        8  4.8760  97.52          4.761905       4.8760
## 890       76.92       10 38.4600 769.20          4.761905      38.4600
## 891       83.66        5 20.9150 418.30          4.761905      20.9150
## 892       57.91        8 23.1640 463.28          4.761905      23.1640
## 893       92.49        5 23.1225 462.45          4.761905      23.1225
## 894       28.38        5  7.0950 141.90          4.761905       7.0950
## 895       50.45        6 15.1350 302.70          4.761905      15.1350
## 896       99.16        8 39.6640 793.28          4.761905      39.6640
## 897       60.74        7 21.2590 425.18          4.761905      21.2590
```

```
## 898       47.27        6 14.1810 283.62              4.761905      14.1810
## 899       85.60        7 29.9600 599.20              4.761905      29.9600
## 900       35.04        9 15.7680 315.36              4.761905      15.7680
## 901       44.84        9 20.1780 403.56              4.761905      20.1780
## 902       45.97        4  9.1940 183.88              4.761905       9.1940
## 903       27.73        5  6.9325 138.65              4.761905       6.9325
## 904       11.53        7  4.0355  80.71              4.761905       4.0355
## 905       58.32        2  5.8320 116.64              4.761905       5.8320
## 906       78.38        4 15.6760 313.52              4.761905      15.6760
## 907       84.61       10 42.3050 846.10              4.761905      42.3050
## 908       82.88        5 20.7200 414.40              4.761905      20.7200
## 909       79.54        2  7.9540 159.08              4.761905       7.9540
## 910       49.01       10 24.5050 490.10              4.761905      24.5050
## 911       29.15        3  4.3725  87.45              4.761905       4.3725
## 912       56.13        4 11.2260 224.52              4.761905      11.2260
## 913       93.12        8 37.2480 744.96              4.761905      37.2480
## 914       51.34        8 20.5360 410.72              4.761905      20.5360
## 915       99.60        3 14.9400 298.80              4.761905      14.9400
## 916       35.49        6 10.6470 212.94              4.761905      10.6470
## 917       42.85        1  2.1425  42.85              4.761905       2.1425
## 918       94.67        4 18.9340 378.68              4.761905      18.9340
## 919       68.97        3 10.3455 206.91              4.761905      10.3455
## 920       26.26        3  3.9390  78.78              4.761905       3.9390
## 921       35.79        9 16.1055 322.11              4.761905      16.1055
## 922       16.37        6  4.9110  98.22              4.761905       4.9110
## 923       12.73        2  1.2730  25.46              4.761905       1.2730
## 924       83.14        7 29.0990 581.98              4.761905      29.0990
## 925       35.22        6 10.5660 211.32              4.761905      10.5660
## 926       13.78        4  2.7560  55.12              4.761905       2.7560
## 927       88.31        1  4.4155  88.31              4.761905       4.4155
## 928       39.62        9 17.8290 356.58              4.761905      17.8290
## 929       88.25        9 39.7125 794.25              4.761905      39.7125
## 930       25.31        2  2.5310  50.62              4.761905       2.5310
## 931       99.92        6 29.9760 599.52              4.761905      29.9760
## 932       83.35        2  8.3350 166.70              4.761905       8.3350
## 933       74.44       10 37.2200 744.40              4.761905      37.2200
## 934       64.08        7 22.4280 448.56              4.761905      22.4280
## 935       63.15        6 18.9450 378.90              4.761905      18.9450
## 936       85.72        3 12.8580 257.16              4.761905      12.8580
## 937       78.89        7 27.6115 552.23              4.761905      27.6115
## 938       89.48        5 22.3700 447.40              4.761905      22.3700
## 939       92.09        3 13.8135 276.27              4.761905      13.8135
## 940       57.29        6 17.1870 343.74              4.761905      17.1870
## 941       66.52        4 13.3040 266.08              4.761905      13.3040
## 942       99.82        9 44.9190 898.38              4.761905      44.9190
## 943       45.68       10 22.8400 456.80              4.761905      22.8400
## 944       50.79        5 12.6975 253.95              4.761905      12.6975
## 945       10.08        7  3.5280  70.56              4.761905       3.5280
## 946       93.88        7 32.8580 657.16              4.761905      32.8580
## 947       84.25        2  8.4250 168.50              4.761905       8.4250
## 948       53.78        1  2.6890  53.78              4.761905       2.6890
## 949       35.81        5  8.9525 179.05              4.761905       8.9525
## 950       26.43        8 10.5720 211.44              4.761905      10.5720
## 951       39.91        3  5.9865 119.73              4.761905       5.9865
```

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## 952       21.90        3  3.2850  65.70              4.761905       3.2850
## 953       62.85        4 12.5700 251.40              4.761905      12.5700
## 954       21.04        4  4.2080  84.16              4.761905       4.2080
## 955       65.91        6 19.7730 395.46              4.761905      19.7730
## 956       42.57        7 14.8995 297.99              4.761905      14.8995
## 957       50.49        9 22.7205 454.41              4.761905      22.7205
## 958       46.02        6 13.8060 276.12              4.761905      13.8060
## 959       15.80       10  7.9000 158.00              4.761905       7.9000
## 960       98.66        9 44.3970 887.94              4.761905      44.3970
## 961       91.98        1  4.5990  91.98              4.761905       4.5990
## 962       20.89        2  2.0890  41.78              4.761905       2.0890
## 963       15.50        1  0.7750  15.50              4.761905       0.7750
## 964       96.82        3 14.5230 290.46              4.761905      14.5230
## 965       33.33        2  3.3330  66.66              4.761905       3.3330
## 966       38.27        2  3.8270  76.54              4.761905       3.8270
## 967       33.30        9 14.9850 299.70              4.761905      14.9850
## 968       81.01        3 12.1515 243.03              4.761905      12.1515
## 969       15.80        3  2.3700  47.40              4.761905       2.3700
## 970       34.49        5  8.6225 172.45              4.761905       8.6225
## 971       84.63       10 42.3150 846.30              4.761905      42.3150
## 972       36.91        7 12.9185 258.37              4.761905      12.9185
## 973       87.08        7 30.4780 609.56              4.761905      30.4780
## 974       80.08        3 12.0120 240.24              4.761905      12.0120
## 975       86.13        2  8.6130 172.26              4.761905       8.6130
## 976       49.92        2  4.9920  99.84              4.761905       4.9920
## 977       74.66        4 14.9320 298.64              4.761905      14.9320
## 978       26.60        6  7.9800 159.60              4.761905       7.9800
## 979       25.45        1  1.2725  25.45              4.761905       1.2725
## 980       67.77        1  3.3885  67.77              4.761905       3.3885
## 981       59.59        4 11.9180 238.36              4.761905      11.9180
## 982       58.15        4 11.6300 232.60              4.761905      11.6300
## 983       97.48        9 43.8660 877.32              4.761905      43.8660
## 984       99.96        7 34.9860 699.72              4.761905      34.9860
## 985       96.37        7 33.7295 674.59              4.761905      33.7295
## 986       63.71        5 15.9275 318.55              4.761905      15.9275
## 987       14.76        2  1.4760  29.52              4.761905       1.4760
## 988       62.00        8 24.8000 496.00              4.761905      24.8000
## 989       82.34       10 41.1700 823.40              4.761905      41.1700
## 990       75.37        8 30.1480 602.96              4.761905      30.1480
## 991       56.56        5 14.1400 282.80              4.761905      14.1400
## 992       76.60       10 38.3000 766.00              4.761905      38.3000
## 993       58.03        2  5.8030 116.06              4.761905       5.8030
## 994       17.49       10  8.7450 174.90              4.761905       8.7450
## 995       60.95        1  3.0475  60.95              4.761905       3.0475
## 996       40.35        1  2.0175  40.35              4.761905       2.0175
## 997       97.38       10 48.6900 973.80              4.761905      48.6900
## 998       31.84        1  1.5920  31.84              4.761905       1.5920
## 999       65.82        1  3.2910  65.82              4.761905       3.2910
## 1000      88.34        7 30.9190 618.38              4.761905      30.9190
##      Rating     Total
## 1       9.1  548.9715
## 2       9.6   80.2200
## 3       7.4  340.5255
## 4       8.4  489.0480
```

```
## 5       5.3  634.3785
## 6       4.1  627.6165
## 7       5.8  433.6920
## 8       8.0  772.3800
## 9       7.2   76.1460
## 10      5.9  172.7460
## 11      4.5   60.8160
## 12      6.8  107.1420
## 13      7.1  246.4875
## 14      8.2  453.4950
## 15      5.7  749.4900
## 16      4.5  590.4360
## 17      4.6  506.6355
## 18      6.9  457.4430
## 19      8.6  172.2105
## 20      4.4   84.6300
## 21      4.8  451.7100
## 22      5.1  277.1370
## 23      4.4   69.7200
## 24      9.9  181.4400
## 25      6.0  279.1845
## 26      8.5  441.7560
## 27      6.7   35.1960
## 28      7.7  184.1070
## 29      9.6  463.8900
## 30      7.4  235.2105
## 31      4.8  494.1825
## 32      4.5  737.7615
## 33      5.1  703.7520
## 34      5.1  202.8180
## 35      7.5  417.5640
## 36      6.8   71.5260
## 37      7.0  328.7550
## 38      4.7  575.3160
## 39      7.6  461.3280
## 40      7.7  253.0080
## 41      7.9   91.0560
## 42      6.3  117.8310
## 43      5.6  435.4560
## 44      7.6  829.0800
## 45      7.2   32.2770
## 46      9.5  394.6320
## 47      8.4  535.7205
## 48      4.1  189.0945
## 49      8.1  119.2590
## 50      7.9  867.6150
## 51      9.5  671.7900
## 52      8.5  234.0975
## 53      6.5   75.0540
## 54      6.1   16.2015
## 55      6.5   33.9360
## 56      8.2  722.2320
## 57      5.8   93.1140
## 58      6.6  752.6400
```

```
## 59      5.4  759.6750
## 60      9.3  192.8430
## 61     10.0   77.9310
## 62      7.0  351.0990
## 63     10.0  520.4115
## 64      8.6  166.0050
## 65      7.6  318.1080
## 66      5.8  166.6350
## 67      6.7   70.2870
## 68      9.9  614.9430
## 69      6.4  827.0850
## 70      4.3   19.2465
## 71      9.6  939.5400
## 72      5.9  652.2600
## 73      4.0  152.8380
## 74      8.7  478.2330
## 75      9.4  705.6315
## 76      5.4  437.3250
## 77      8.6  463.4280
## 78      5.7  189.0945
## 79      6.6  822.2550
## 80      6.0  106.9950
## 81      5.5  624.8970
## 82      6.4  304.5420
## 83      6.6  161.7000
## 84      8.3  337.5120
## 85      6.6  256.7775
## 86      4.0  610.4910
## 87      9.9  401.7300
## 88      7.3  362.9430
## 89      5.7   44.5935
## 90      6.1  485.0370
## 91      7.1  198.9960
## 92      8.2  471.0300
## 93      5.1  161.5530
## 94      8.6  608.2020
## 95      6.6   94.2375
## 96      7.2  102.0180
## 97      5.1  922.6350
## 98      4.1   78.4350
## 99      9.3  166.1625
## 100     7.4  521.0100
## 101     4.1   51.1455
## 102     7.2  742.2975
## 103     4.9  218.0115
## 104     9.9  367.0380
## 105     8.0  223.0725
## 106     7.3  931.0350
## 107     7.9  172.4940
## 108     7.4  391.4190
## 109     4.2  321.1110
## 110     9.2  860.6850
## 111     4.6   34.6290
## 112     7.8  309.3615
```

```
## 113     8.4  535.3740
## 114     4.3  548.7615
## 115     9.5  763.4655
## 116     7.1   85.1130
## 117     5.3  115.1850
## 118     5.2   53.9280
## 119     6.0  115.0800
## 120     4.1  112.2240
## 121     5.2  836.3040
## 122     6.5  419.8320
## 123     4.2  944.6220
## 124     4.6  536.8440
## 125     7.3  474.3480
## 126     4.5  688.6215
## 127     9.0  169.3125
## 128     5.9  299.8485
## 129     8.5  575.7360
## 130     7.2  853.1460
## 131     7.5  291.2070
## 132     8.3  580.4190
## 133     7.4  146.3280
## 134     8.8  550.9350
## 135     5.3  512.1900
## 136     6.2  284.1930
## 137     8.8  138.1275
## 138     9.8  216.8460
## 139     8.2  545.0550
## 140     9.2  609.0000
## 141     5.4  942.9000
## 142     8.1  950.2500
## 143     9.1  720.3000
## 144     8.4   31.9305
## 145     8.0  491.0850
## 146     9.5  291.4380
## 147     9.2  316.4700
## 148     5.6  277.7880
## 149     6.2  603.6240
## 150     4.9  272.6640
## 151     4.8  384.4680
## 152     7.3  254.0160
## 153     7.4  786.6180
## 154     9.9  103.8240
## 155     9.3  680.1480
## 156     9.0  484.5225
## 157     6.1   75.7785
## 158     9.7  263.9700
## 159     6.0  918.7290
## 160    10.0  588.3570
## 161     8.3  362.7120
## 162     6.0   66.8745
## 163     7.0  336.5565
## 164     6.5  160.4400
## 165     5.9  418.9500
## 166     5.6  357.5880
```

```
## 167     4.8 1003.5900
## 168     8.7 1039.2900
## 169     6.5  323.0640
## 170     8.5  510.9720
## 171     5.5  367.5525
## 172     9.4  420.2625
## 173     6.3  175.1400
## 174     9.8  333.2070
## 175     8.7  166.2360
## 176     8.8  319.7880
## 177     9.6  186.2280
## 178     4.8  165.4485
## 179     4.4  465.4440
## 180     9.9  273.4200
## 181     5.7  472.3110
## 182     7.7  323.1480
## 183     8.0  162.7500
## 184     5.7  288.2040
## 185     6.7   90.6990
## 186     8.0   56.9520
## 187     7.5  793.7160
## 188     7.0  195.1740
## 189     9.9   77.7735
## 190     5.9  293.2020
## 191     7.2  242.6760
## 192     4.6  154.3920
## 193     9.2  829.7100
## 194     5.7  107.3100
## 195     9.9  171.7275
## 196     5.0   78.0045
## 197     4.9   91.7700
## 198     6.1   26.5545
## 199     8.2  174.3000
## 200     5.5  374.7975
## 201     6.8  120.6450
## 202     6.6  241.4580
## 203     9.8  451.3635
## 204     8.7  271.9500
## 205     5.4   93.2925
## 206     7.9  217.6335
## 207     9.7  629.8425
## 208     7.8  299.5650
## 209     5.1   95.6655
## 210     6.5  942.4485
## 211     5.9  247.8735
## 212     8.8  881.3070
## 213     4.9  484.8900
## 214     4.4  146.2230
## 215     6.5  217.6335
## 216     8.3   19.1940
## 217     8.5  130.0425
## 218     5.5  298.1160
## 219     8.7  796.9080
## 220     7.9  180.6210
```

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## 221     6.1  285.7050
## 222     5.4  456.2880
## 223     9.4   62.0025
## 224     8.2   13.1670
## 225     6.2   90.8250
## 226     9.7  183.0360
## 227     4.0  655.5465
## 228     9.7  155.6520
## 229     5.3  571.4100
## 230     7.4  532.7280
## 231     6.5  170.8770
## 232     8.7   33.3585
## 233     8.0  794.6505
## 234     6.7  310.0440
## 235     6.5  545.3700
## 236     4.1  195.5940
## 237     4.9   91.4025
## 238     8.6  232.1550
## 239     4.3   69.4050
## 240     4.9   94.1745
## 241     5.6  235.6830
## 242     5.8  125.5170
## 243     6.0  195.7200
## 244     4.2  263.1300
## 245     8.3  788.5080
## 246     5.7  399.7560
## 247     4.8  256.4100
## 248     6.8   94.1850
## 249     8.8  326.4240
## 250     4.2  536.9910
## 251     6.4  439.8975
## 252     8.4  369.4950
## 253     7.2   30.2190
## 254     5.2   99.7500
## 255     8.9  494.7600
## 256     9.0  137.0040
## 257     9.7   69.6675
## 258     8.7  163.2330
## 259     6.5  135.4500
## 260     6.9  276.9480
## 261     6.2  709.3170
## 262     5.6   69.0900
## 263     5.7  160.8600
## 264     4.2  233.5200
## 265     7.9   57.1725
## 266     8.7  723.2400
## 267     6.9  148.9740
## 268     9.5  783.3000
## 269     4.4  297.1080
## 270     7.0  373.1700
## 271     6.3  354.0075
## 272     9.7   44.3520
## 273     8.8  203.5530
## 274     5.1   25.2630
```

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## 275     7.9  628.1730
## 276     6.2  352.5795
## 277     7.1  229.1100
## 278     6.4  400.7640
## 279     5.7  745.3950
## 280     9.6  462.2100
## 281     6.4  587.6640
## 282     7.9   38.8500
## 283     6.5   16.1070
## 284     8.5  628.9290
## 285     9.1  200.2140
## 286     7.6  350.0700
## 287     6.9   78.6030
## 288     9.5  224.4375
## 289     5.2  356.5485
## 290     4.2  697.3680
## 291     7.0  423.1500
## 292     6.0  204.6975
## 293     4.7   65.6040
## 294     7.1   76.3560
## 295     5.9  190.1550
## 296     7.5  272.5800
## 297     6.4  121.1280
## 298     5.8  493.7940
## 299     4.5  252.0420
## 300     7.7   93.0405
## 301     6.7  209.6220
## 302     4.7   40.9605
## 303     4.4   51.0405
## 304     4.7  214.9980
## 305     8.6  125.6640
## 306     4.3  530.6700
## 307     9.6  295.6905
## 308     4.1  745.8360
## 309     4.7   83.4120
## 310     7.8  172.0110
## 311     5.5  503.5590
## 312     9.7  145.5930
## 313     4.4   74.7075
## 314     5.0  146.9475
## 315     4.4  820.3650
## 316     5.2  208.6770
## 317     7.3   66.4020
## 318     4.9  392.6475
## 319     8.1  218.0745
## 320     8.4  185.0940
## 321     5.5  216.6885
## 322     8.4   41.3910
## 323     9.8   96.1380
## 324     6.7  324.2925
## 325     9.4  135.5760
## 326     6.4  410.5080
## 327     5.4  523.8450
## 328     8.6  395.8920
```

```
## 329     4.0  214.7460
## 330     7.6  152.7120
## 331     6.8  208.0890
## 332     9.1  103.6350
## 333     5.5  404.3550
## 334     7.9   49.3080
## 335     8.5   77.1750
## 336     9.1  149.3625
## 337     7.5  721.9800
## 338     5.2  365.0850
## 339     9.5  150.0975
## 340     8.9  404.6490
## 341     7.8  151.4835
## 342     8.9  411.3795
## 343     7.7  565.2150
## 344     9.3  509.4075
## 345     6.2  140.6475
## 346     7.6  736.4385
## 347     7.3   75.5475
## 348     4.7  749.7000
## 349     5.1  191.2470
## 350     4.8  141.7500
## 351     6.6 1042.6500
## 352     5.5  379.9215
## 353     8.5  402.2655
## 354     4.8  255.1500
## 355     8.4   31.7520
## 356     7.8  374.3880
## 357     9.3  394.2750
## 358     5.2 1002.1200
## 359     6.5   86.6250
## 360     5.6   78.7185
## 361     7.4  680.0640
## 362     9.1  793.5480
## 363     8.0  209.5590
## 364     7.2  461.2860
## 365     7.1  173.2080
## 366     9.1  343.0560
## 367     5.6  484.9740
## 368     6.0  276.9480
## 369     5.4  150.7800
## 370     7.8  203.1750
## 371     9.9  193.0110
## 372     4.9  128.0160
## 373     5.2  441.6930
## 374     8.9  265.1040
## 375     9.1  352.2225
## 376     7.0  507.6750
## 377     9.6  334.3410
## 378     8.7  701.8515
## 379     9.4  407.3160
## 380     4.0   99.3300
## 381     7.5  345.7860
## 382     4.2   55.8810
```

```
## 383     9.9  523.3725
## 384     4.2  314.5380
## 385     9.9  214.9350
## 386     5.8   79.6110
## 387     6.0  294.6510
## 388    10.0  339.3600
## 389     9.5  510.9615
## 390     6.6  133.9170
## 391     8.1  253.5120
## 392     9.7  398.4750
## 393     7.2   80.6610
## 394     6.2  548.7300
## 395     7.3   83.7270
## 396     4.3  406.8750
## 397     4.6  284.9175
## 398     5.8  128.4255
## 399     8.3  258.6780
## 400     8.0  181.8180
## 401     9.4  248.4090
## 402     6.2  194.1240
## 403     9.8   14.6790
## 404     9.6  208.6875
## 405     4.9  718.7565
## 406     8.0  282.4920
## 407     7.8   72.3975
## 408     4.1  288.5820
## 409     5.5  237.4260
## 410     5.4  125.0550
## 411     5.1  359.2050
## 412     6.9   45.9270
## 413     7.8  110.0925
## 414     6.6   81.3960
## 415     9.2  427.8120
## 416     7.8  100.9155
## 417     8.7  190.5960
## 418     9.2   85.5855
## 419     8.3  120.1620
## 420     8.2  185.3670
## 421     7.5  121.5900
## 422     9.8  264.7575
## 423     8.7 1020.7050
## 424     6.7  213.5280
## 425     5.0   17.0940
## 426     7.0  383.7645
## 427     8.9  390.7995
## 428     8.0   65.7405
## 429     6.9  353.1675
## 430     7.3  951.8250
## 431     6.9  145.0680
## 432     5.7   90.8670
## 433     6.4  147.7980
## 434     9.6  702.2190
## 435     6.8   49.8120
## 436     9.0  937.8180
```

```
## 437     9.6  348.3060
## 438     7.7  214.1370
## 439     7.0   71.5680
## 440     6.5  343.2240
## 441     8.1   91.5600
## 442     4.3  742.8120
## 443     6.5  843.0345
## 444     9.5   13.4190
## 445     9.7  140.3850
## 446     9.5   20.1075
## 447     8.9  290.4300
## 448     6.5  144.0810
## 449     5.3   28.4235
## 450     9.6   41.0760
## 451     6.7  470.6730
## 452     7.6  138.6630
## 453     4.8  333.9525
## 454     5.5   26.2500
## 455     4.7   87.2340
## 456     6.9  155.1900
## 457     4.5  731.4300
## 458     6.2  833.5950
## 459     7.6  488.9850
## 460     7.9   37.6845
## 461     4.5  212.7300
## 462     8.7  767.0250
## 463     6.1  310.5900
## 464     6.4   23.7510
## 465     9.1  269.5350
## 466     7.1  572.7750
## 467     7.7  273.0525
## 468     4.5  233.2260
## 469     7.2   22.6590
## 470     8.4  103.7820
## 471     5.4  527.7510
## 472     9.7  168.2100
## 473     5.5  452.8650
## 474     4.6  609.5880
## 475     6.6  338.3100
## 476     6.3  205.3170
## 477     4.2  174.6150
## 478     4.4  353.0940
## 479     6.7  360.8850
## 480     6.7   40.5300
## 481     8.4  554.1480
## 482     6.2  344.4000
## 483     5.0  194.9850
## 484     6.0  633.9900
## 485     7.0  388.2900
## 486     6.6  207.8580
## 487     7.3  431.4450
## 488     8.3  156.0300
## 489     4.3   24.1080
## 490     9.8  734.0760
```

```
## 491     8.2   72.8700
## 492     7.2  206.4300
## 493     8.7  212.6880
## 494     8.4  127.2600
## 495     7.1  209.7690
## 496     5.5  637.7280
## 497     8.5  132.7620
## 498     6.2  568.5120
## 499     8.9  103.0365
## 500     9.6  432.7680
## 501     5.4   77.6685
## 502     9.1   33.4950
## 503     9.0  145.7400
## 504     6.3  195.9510
## 505     9.5   92.8725
## 506     9.8  203.1120
## 507     6.7  152.7750
## 508     7.7  529.5150
## 509     7.0  321.7725
## 510     5.1  100.4850
## 511     6.2  666.9390
## 512     6.1  225.2775
## 513     9.3  398.9580
## 514     7.6  731.6925
## 515     8.2  429.1665
## 516     8.5   54.0435
## 517     9.8  288.0150
## 518     8.7  206.7975
## 519     9.7   72.9330
## 520     4.3  377.5800
## 521     7.7  143.9865
## 522     7.3  523.9710
## 523     5.9  235.8720
## 524     5.0  132.0270
## 525     8.0  514.7730
## 526     7.1  479.9025
## 527     9.0  164.6820
## 528     6.7  125.7060
## 529     6.1  570.7800
## 530     9.3  926.9505
## 531     7.0  160.2090
## 532     7.2  728.1120
## 533     8.2  240.9750
## 534     8.4  154.1295
## 535     6.2  148.6800
## 536     7.4  122.5245
## 537     5.0   77.6580
## 538     6.9  102.8370
## 539     4.9  306.8100
## 540     5.1  551.1240
## 541     9.1   96.6420
## 542     7.1   79.6740
## 543     5.0   84.7560
## 544     5.5  118.2510
```

```
## 545     9.2   74.7600
## 546     4.9  163.0020
## 547     8.9  308.9100
## 548     6.0  575.9775
## 549     4.2  270.5850
## 550     7.3  416.1780
## 551     6.5  180.4005
## 552     8.9  513.2295
## 553     9.7  550.3680
## 554     8.6  139.9230
## 555     6.9  142.0020
## 556     7.7  118.0620
## 557     9.5  151.2840
## 558     4.5 1034.4600
## 559     5.6  262.4580
## 560     8.2  228.1230
## 561     7.3  203.9310
## 562     4.4  936.6000
## 563     5.7  356.3280
## 564     5.0  469.4130
## 565     9.0  208.4250
## 566     6.3  852.7050
## 567     9.4  517.9650
## 568     7.7  621.2430
## 569     5.5  586.9710
## 570     4.1  543.7530
## 571     7.6  430.7100
## 572     8.6  280.0350
## 573     8.3   74.4555
## 574     8.1  152.0190
## 575     8.6  451.0275
## 576     6.3  597.6285
## 577     5.8  253.2600
## 578     6.2  133.4340
## 579     7.7  269.9340
## 580     8.1  145.9710
## 581     7.3   85.7430
## 582     8.4  326.2560
## 583     8.0  195.2580
## 584     9.5   75.9360
## 585     7.0  198.6390
## 586     9.8  217.1820
## 587     9.2  164.8710
## 588     7.7  226.0650
## 589     5.3  625.9050
## 590     4.4   76.7550
## 591     4.3  293.1390
## 592     9.4  178.1640
## 593     9.8   47.8590
## 594     4.8  236.8800
## 595     5.3  304.9200
## 596     8.7   46.6830
## 597     9.5  164.4300
## 598     5.3  440.9370
```

```
## 599     9.2  193.4625
## 600     9.6  147.6720
## 601     6.4   87.2340
## 602     4.5   68.2395
## 603     6.9  814.3800
## 604     7.8  343.4130
## 605     4.5  381.3915
## 606     8.6  133.3500
## 607     5.2  394.3275
## 608     6.4  209.1180
## 609     5.2   32.1405
## 610     8.9  121.5690
## 611     6.2   30.4080
## 612     6.7  935.2665
## 613     7.2  293.6430
## 614     9.0   84.9765
## 615     4.2  708.2250
## 616     4.2  365.9040
## 617     6.9  457.3800
## 618     4.4  461.5275
## 619     4.0  620.7390
## 620     8.5  273.7980
## 621     9.2  225.7920
## 622     9.8   96.1905
## 623     4.9  695.2365
## 624     4.4  874.1250
## 625     6.8   95.9175
## 626     9.1  165.6480
## 627     8.7  127.8270
## 628     5.0  867.0900
## 629     7.5  167.8950
## 630     8.2   12.6945
## 631     6.7  673.9950
## 632     5.4  246.6765
## 633     7.0  175.9170
## 634     4.7  314.0550
## 635     5.0  251.7165
## 636     5.0  697.9350
## 637     6.0  212.7825
## 638     6.3   48.5100
## 639     8.5   92.5575
## 640     7.5  165.1230
## 641     6.4  311.1885
## 642     4.7  743.8200
## 643     6.0  116.9070
## 644     4.0  609.1680
## 645     5.5   63.2625
## 646     8.7  182.9520
## 647     7.4  442.3230
## 648     5.6   35.3115
## 649     6.3   32.5290
## 650     7.1  259.7700
## 651     7.8  397.2150
## 652     9.9  351.6030
```

```
## 653     7.3  764.1900
## 654     5.1  352.6740
## 655     9.4  252.7560
## 656     5.8   49.4235
## 657     8.0  104.6745
## 658     7.9  277.6725
## 659     5.9  146.6325
## 660     4.9   58.2225
## 661     9.3  135.3555
## 662     7.9  125.9790
## 663     5.9  370.1250
## 664     9.9  914.5500
## 665     7.7  207.4800
## 666     7.6  204.2460
## 667     7.7  181.8810
## 668     6.4   75.4740
## 669     4.4  300.5730
## 670     4.1   85.3020
## 671     4.4  588.4200
## 672     5.5  196.1400
## 673     4.0  231.2415
## 674     9.3  282.5760
## 675     4.8  477.5400
## 676     4.6  175.9170
## 677     7.3  470.9880
## 678     6.0  308.5740
## 679     8.1  618.9750
## 680     9.4  305.5500
## 681     6.5   41.4540
## 682     7.0   36.5505
## 683     7.1  310.7160
## 684     6.6   45.1080
## 685     4.9  145.4040
## 686     6.4  103.1100
## 687     8.0  136.1430
## 688     4.3  667.3800
## 689     6.1  153.0480
## 690     7.5  211.3650
## 691     6.7  663.2955
## 692     5.2  404.5440
## 693     8.8  510.6150
## 694     9.5  539.3430
## 695     7.6  497.0700
## 696     6.6  458.6925
## 697     6.9  113.5680
## 698     4.3  261.1980
## 699     7.8  657.5310
## 700     8.0 1023.7500
## 701     9.6  507.4440
## 702     4.3  101.8080
## 703     5.0  207.5850
## 704     9.2  760.4415
## 705     6.3  835.2855
## 706     8.9  527.5095
```

```
## 707     7.6  180.6000
## 708     4.8   72.4290
## 709     9.1  131.2080
## 710     6.1   80.9550
## 711     9.1  507.9060
## 712     8.3  317.2260
## 713     7.2  733.6035
## 714     6.0  130.8825
## 715     8.5  829.0800
## 716     6.6  187.3200
## 717     4.5  525.2310
## 718     8.1   37.6110
## 719     7.2  142.9470
## 720     6.1  110.1240
## 721     7.1  187.8660
## 722     5.1  856.4535
## 723     7.9  138.9780
## 724     7.4  270.2595
## 725     7.4   98.0280
## 726     6.6  239.4000
## 727     5.9  175.0455
## 728     8.9  732.2700
## 729     6.8  408.4920
## 730     9.3  383.5230
## 731     4.4   93.7440
## 732     4.8  176.4000
## 733     9.5   20.6850
## 734     8.9  557.7180
## 735     6.4   56.4060
## 736     6.0  860.4750
## 737     8.1  596.8200
## 738     9.0  616.9800
## 739     6.0  769.1040
## 740     9.8  887.9220
## 741     8.5  408.7335
## 742     8.8   89.0715
## 743     8.8  150.4230
## 744     9.5   79.1490
## 745     5.6  266.0280
## 746     8.6   40.3410
## 747     5.2  684.9150
## 748     5.8   55.2825
## 749     8.0  116.1405
## 750     9.0  597.0405
## 751     4.1   93.7440
## 752     8.6  143.2200
## 753     7.0  182.9100
## 754     8.4  384.7200
## 755     7.4  267.3405
## 756     6.2  817.2360
## 757     4.9  300.2160
## 758     4.5  608.0760
## 759     5.6  197.9250
## 760     8.0  232.6380
```

```
## 761     5.6  810.6000
## 762     4.2  757.3650
## 763     9.9  536.5920
## 764     7.6   56.1225
## 765     6.6  233.1000
## 766     4.7  801.8640
## 767     9.8  239.5890
## 768     6.3   86.2470
## 769     7.9  401.6880
## 770     7.7   72.0090
## 771     4.5  401.2680
## 772     8.0  631.1445
## 773     5.7  499.7265
## 774     6.3   55.0410
## 775     6.0  137.8650
## 776     8.0  151.5150
## 777     4.2  480.0285
## 778     9.6   98.0490
## 779     6.1  132.5625
## 780     5.6  830.3715
## 781     8.3  183.1200
## 782     7.8  397.9920
## 783     4.1   32.1510
## 784     8.8  369.6840
## 785     4.1   53.3400
## 786     9.0  548.1630
## 787     5.5  603.8760
## 788     9.3   57.6975
## 789     5.6  190.4805
## 790     9.7  432.9885
## 791     4.0   48.7305
## 792     9.2  287.9100
## 793     4.9 1022.3850
## 794     9.3  680.6100
## 795     6.6   97.8810
## 796     4.3   57.0780
## 797     5.5   63.9135
## 798     8.1  257.1450
## 799     9.8   97.4190
## 800     9.4  455.1225
## 801     7.9  144.9630
## 802     5.1  253.6800
## 803     6.9  495.3165
## 804     8.0  462.6720
## 805     8.0  714.3255
## 806     4.2  325.3740
## 807     8.5  195.6780
## 808     9.0  210.9660
## 809     8.6   18.6375
## 810     6.0  652.8900
## 811     6.2   90.3000
## 812     5.0  422.7300
## 813     6.5  341.0925
## 814     6.0   99.9075
```

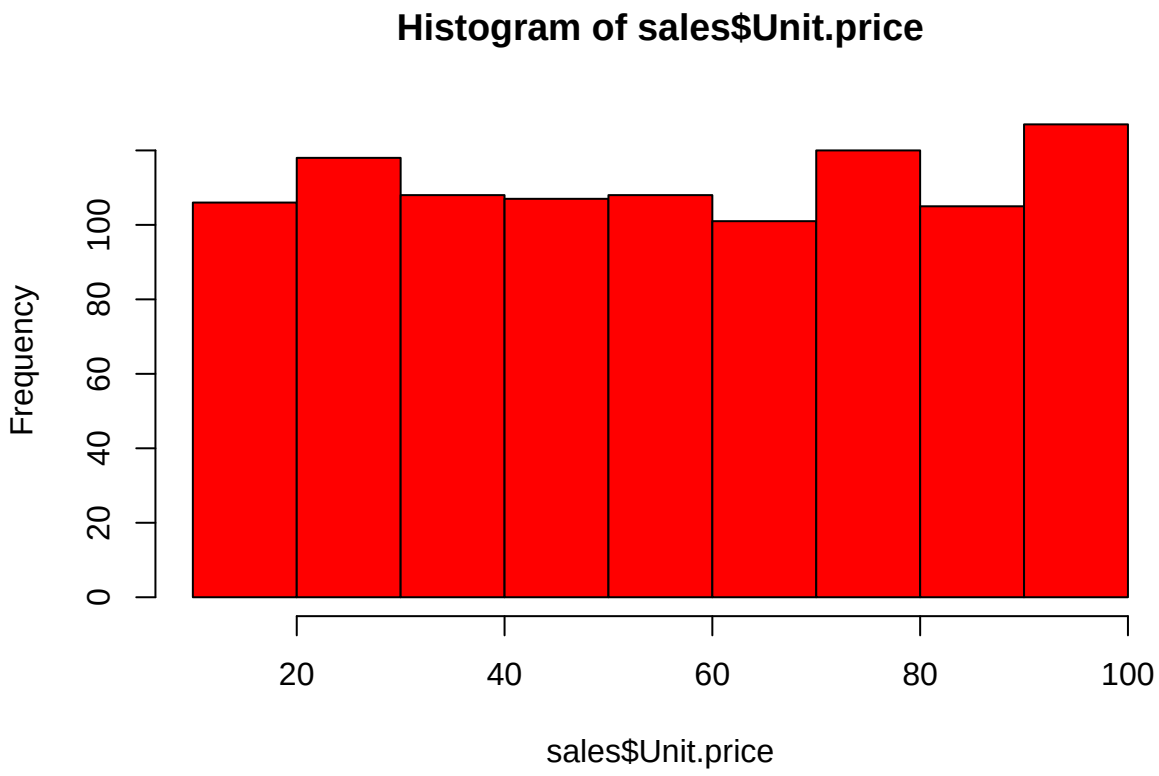
```
## 815     5.0  408.4080
## 816     5.0  446.9640
## 817     9.2  333.9840
## 818     9.6  284.5920
## 819     8.4  403.8720
## 820     6.0  247.5900
## 821     6.7  222.1380
## 822     4.1  100.1280
## 823     5.9   10.6785
## 824     8.7  216.4365
## 825     4.5  441.5880
## 826     6.6   92.4420
## 827     7.7  681.4395
## 828     8.5  130.0320
## 829     5.2  681.9750
## 830     4.3  779.3100
## 831     7.6   88.7040
## 832     9.5  262.7940
## 833     4.1   99.5400
## 834     9.2   95.8650
## 835     5.4  299.3655
## 836     5.8   54.9990
## 837     5.6  202.3350
## 838     5.1  281.1690
## 839     5.8  586.6350
## 840     5.0  184.0860
## 841     7.9  163.6110
## 842     6.0   63.3150
## 843     5.0   82.8870
## 844     8.9   31.2270
## 845     5.9   22.3860
## 846     5.9  295.4070
## 847     9.7   76.9230
## 848     8.6   23.4990
## 849     4.0  688.7160
## 850     4.2  624.3300
## 851     9.2   77.8050
## 852     9.2  206.8080
## 853     5.0  390.9465
## 854    10.0  554.2950
## 855     8.8  503.7375
## 856     4.2  345.0195
## 857     6.3  177.4080
## 858     8.2  118.9020
## 859     5.1  362.8170
## 860     5.0  450.1035
## 861     7.0   90.5835
## 862     7.8   26.7960
## 863     4.3  106.5960
## 864     7.0  375.3645
## 865     6.6  250.7085
## 866     7.3  106.5015
## 867     6.5  760.4520
## 868     4.9  131.9220
```

```
## 869     4.3   76.5765
## 870     9.3  271.2780
## 871     7.1  182.4270
## 872     9.6   59.3250
## 873     6.2  225.0150
## 874     9.9  561.0780
## 875     5.9   97.8180
## 876     6.3  548.1840
## 877     4.0   54.9675
## 878     6.1   41.7375
## 879     4.5  756.1680
## 880     8.6  101.6400
## 881     6.0  348.7050
## 882     9.5   85.5120
## 883     9.9  335.8950
## 884     7.5  216.8460
## 885     7.6  175.0140
## 886     5.0  335.0130
## 887     6.7   92.2950
## 888     9.5  771.4350
## 889     6.8  102.3960
## 890     5.6  807.6600
## 891     7.2  439.2150
## 892     8.1  486.4440
## 893     8.6  485.5725
## 894     9.4  148.9950
## 895     8.9  317.8350
## 896     4.2  832.9440
## 897     5.0  446.4390
## 898     8.8  297.8010
## 899     5.3  629.1600
## 900     4.6  331.1280
## 901     7.5  423.7380
## 902     5.1  193.0740
## 903     4.2  145.5825
## 904     8.1   84.7455
## 905     6.0  122.4720
## 906     7.9  329.1960
## 907     8.8  888.4050
## 908     6.6  435.1200
## 909     6.2  167.0340
## 910     4.2  514.6050
## 911     7.3   91.8225
## 912     8.6  235.7460
## 913     6.8  782.2080
## 914     7.6  431.2560
## 915     5.8  313.7400
## 916     4.1  223.5870
## 917     9.3   44.9925
## 918     6.8  397.6140
## 919     8.7  217.2555
## 920     6.3   82.7190
## 921     5.1  338.2155
## 922     7.0  103.1310
```

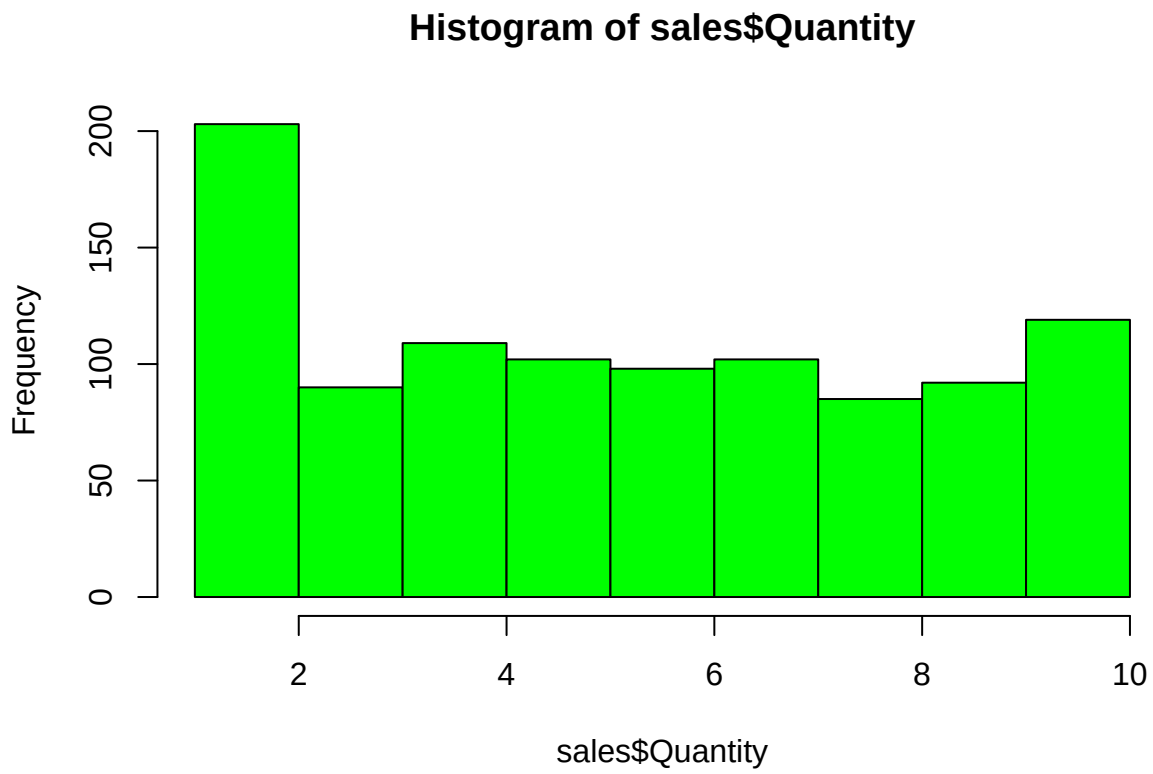
```
## 923     5.2   26.7330
## 924     6.6  611.0790
## 925     6.5  221.8860
## 926     9.0   57.8760
## 927     5.2   92.7255
## 928     6.8  374.4090
## 929     7.6  833.9625
## 930     7.2   53.1510
## 931     7.1  629.4960
## 932     9.5  175.0350
## 933     5.1  781.6200
## 934     7.6  470.9880
## 935     9.8  397.8450
## 936     5.1  270.0180
## 937     7.5  579.8415
## 938     7.4  469.7700
## 939     4.2  290.0835
## 940     5.9  360.9270
## 941     6.9  279.3840
## 942     6.6  943.2990
## 943     5.7  479.6400
## 944     5.3  266.6475
## 945     4.2   74.0880
## 946     7.3  690.0180
## 947     5.3  176.9250
## 948     4.7   56.4690
## 949     7.9  188.0025
## 950     8.9  222.0120
## 951     9.3  125.7165
## 952     4.7   68.9850
## 953     8.7  263.9700
## 954     7.6   88.3680
## 955     5.7  415.2330
## 956     6.8  312.8895
## 957     5.4  477.1305
## 958     7.1  289.9260
## 959     7.8  165.9000
## 960     8.4  932.3370
## 961     9.8   96.5790
## 962     9.8   43.8690
## 963     7.4   16.2750
## 964     6.7  304.9830
## 965     6.4   69.9930
## 966     5.8   80.3670
## 967     7.2  314.6850
## 968     9.3  255.1815
## 969     9.5   49.7700
## 970     9.0  181.0725
## 971     9.0  888.6150
## 972     6.7  271.2885
## 973     5.5  640.0380
## 974     5.4  252.2520
## 975     8.2  180.8730
## 976     7.0  104.8320
```

```
## 977     8.5  313.5720
## 978     4.9  167.5800
## 979     5.1   26.7225
## 980     6.5   71.1585
## 981     9.8  250.2780
## 982     8.4  244.2300
## 983     7.4  921.1860
## 984     6.1  734.7060
## 985     6.0  708.3195
## 986     8.5  334.4775
## 987     4.3   30.9960
## 988     6.2  520.8000
## 989     4.3  864.5700
## 990     8.4  633.1080
## 991     4.5  296.9400
## 992     6.0  804.3000
## 993     8.8  121.8630
## 994     6.6  183.6450
## 995     5.9   63.9975
## 996     6.2   42.3675
## 997     4.4 1022.4900
## 998     7.7   33.4320
## 999     4.1   69.1110
## 1000    6.6  649.2990
```

```
hist(sales$Unit.price, col  = "red")
```

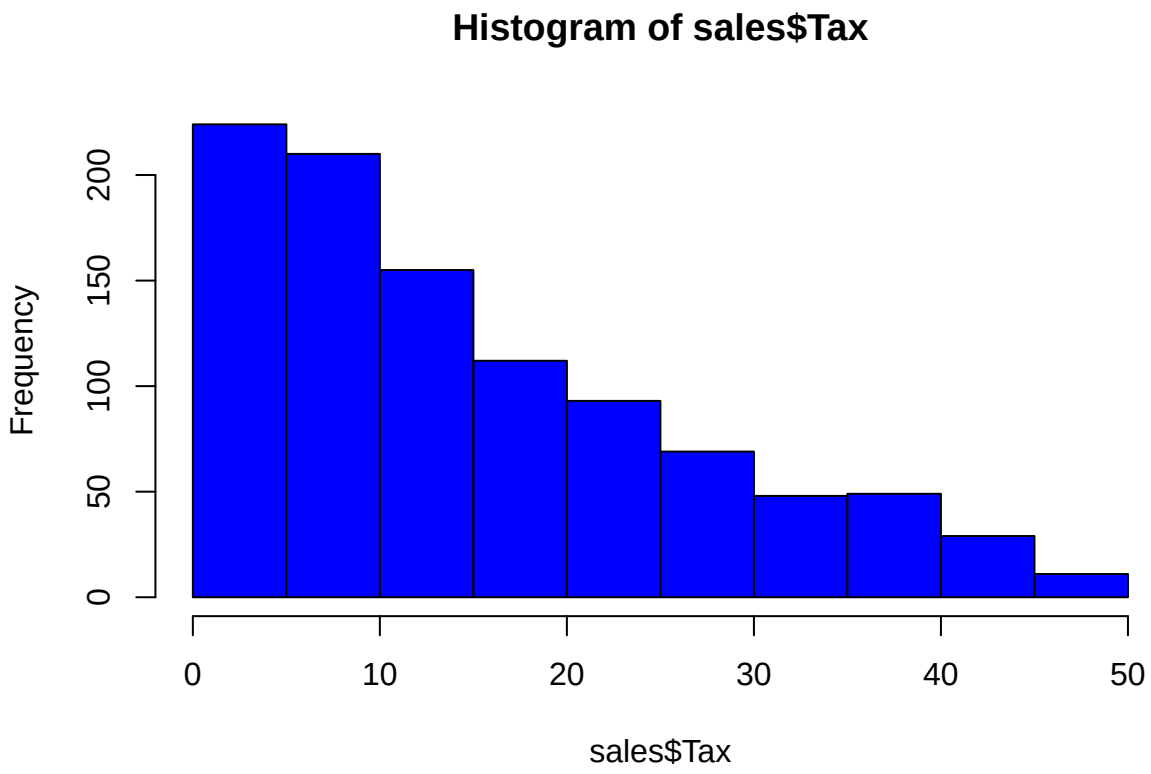


```
hist(sales$Quantity, col  = "green")
```

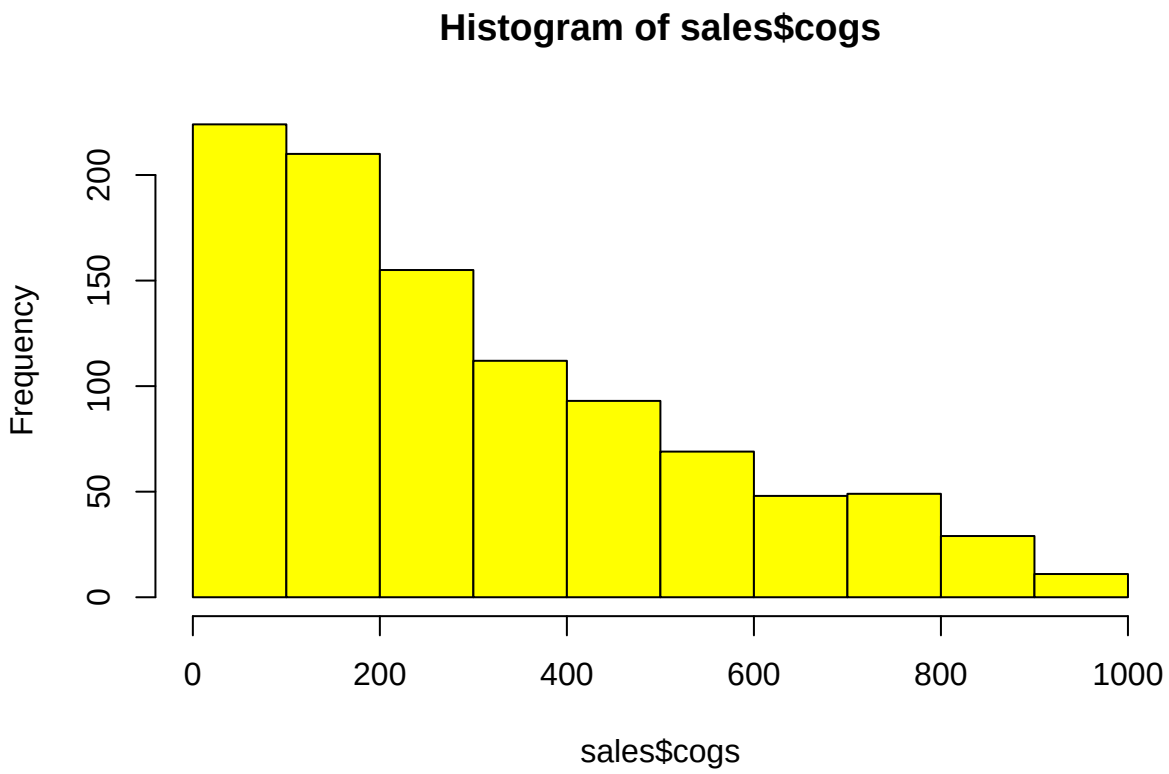


THe quantity is skewed to the right.

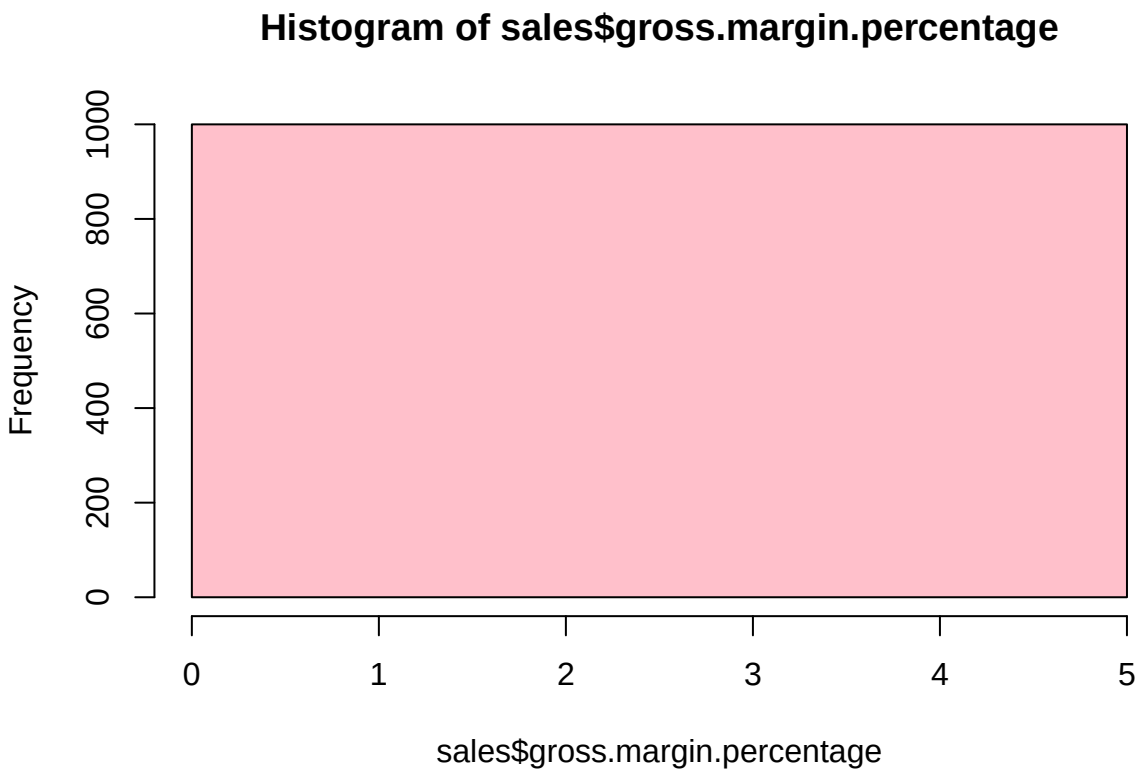
```
hist(sales$Tax, col  = "blue")
```




```
hist(sales$cogs, col  = "yellow")
```

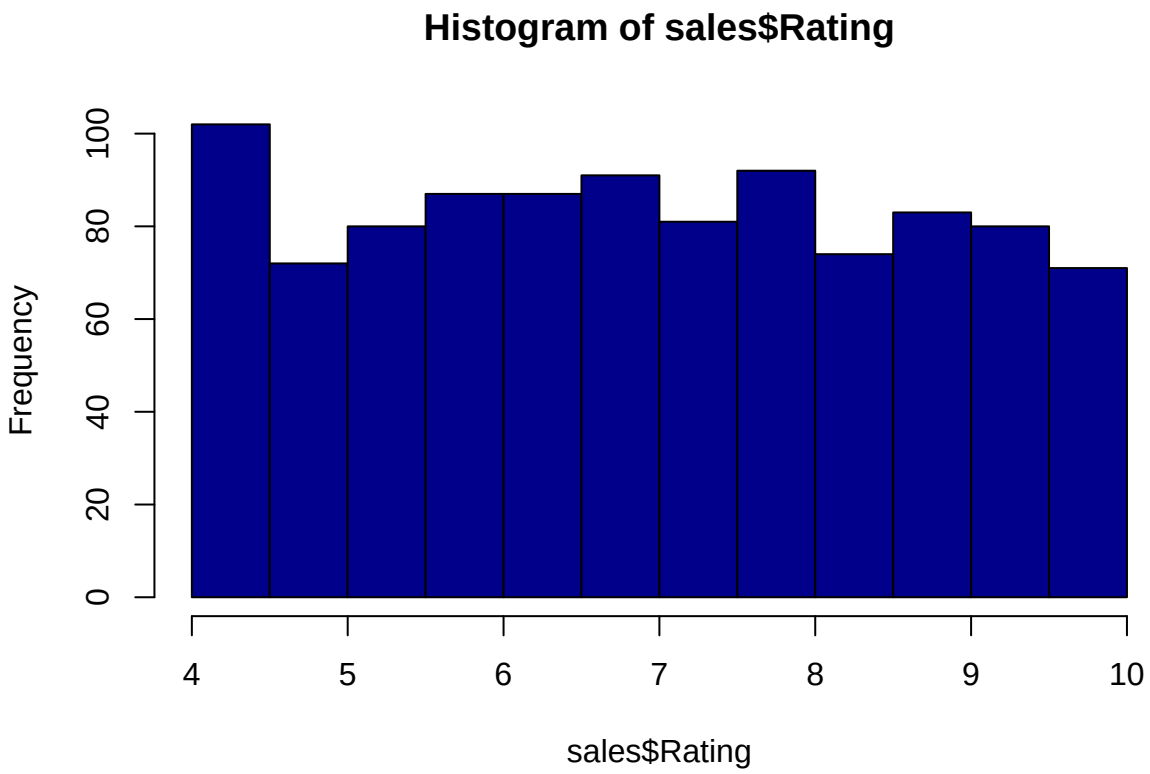



```
hist(sales$gross.margin.percentage, col  = "pink")
```




```
hist(sales$gross.income, col  = "orange")
```


```
hist(sales$Rating, col  = "darkblue")
```



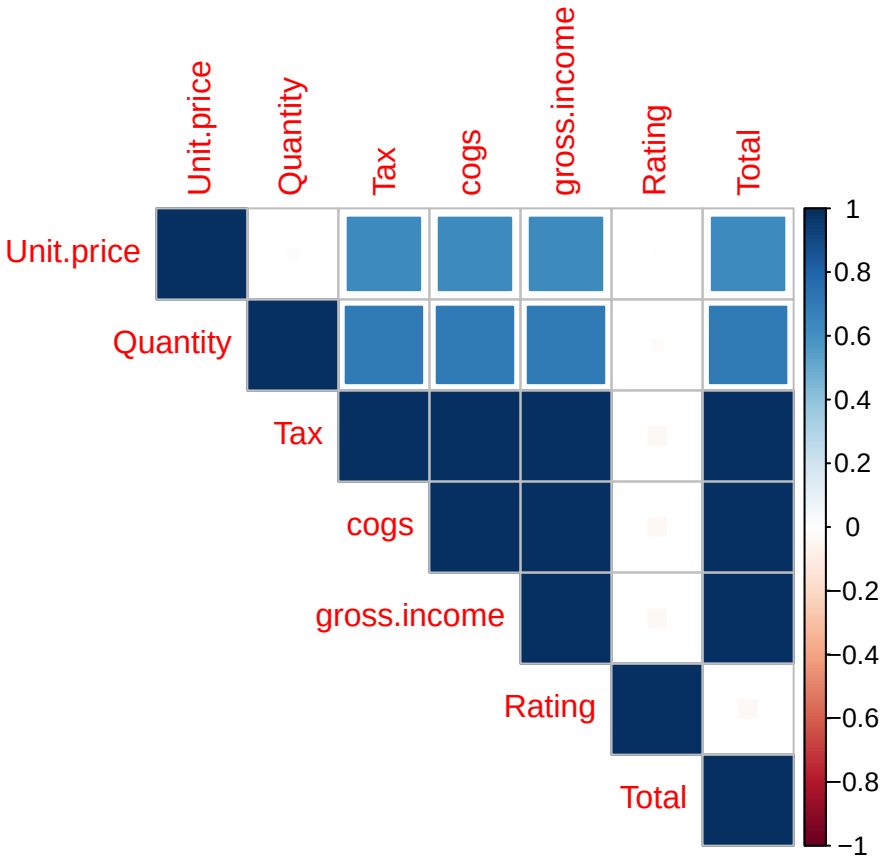
Bivariate Analysis

Correlation

```
#check for correlation
library(corrplot)
```

```
## corrplot 0.92 loaded
```

```
correlation <- cor(sales[,c(6,7,8,12,14,15,16)])
corrplot(correlation, method = "square", type = "upper", diag = TRUE)
```



Modelling

```
#check head
head(sales)
```

```
##    Invoice.ID Branch Customer.type Gender           Product.line Unit.price
## 1 750-67-8428      A        Member Female      Health and beauty      74.69
## 2 226-31-3081      C        Normal Female Electronic accessories      15.28
## 3 631-41-3108      A        Normal   Male     Home and lifestyle      46.33
## 4 123-19-1176      A        Member   Male      Health and beauty      58.22
## 5 373-73-7910      A        Normal   Male      Sports and travel      86.31
## 6 699-14-3026      C        Normal   Male Electronic accessories      85.39
##   Quantity     Tax      Date  Time     Payment   cogs gross.margin.percentage
## 1        7 26.1415  1/5/2019 13:08     Ewallet 522.83                4.761905
## 2        5  3.8200  3/8/2019 10:29        Cash  76.40                4.761905
## 3        7 16.2155  3/3/2019 13:23 Credit card 324.31                4.761905
## 4        8 23.2880 1/27/2019 20:33     Ewallet 465.76                4.761905
## 5        7 30.2085  2/8/2019 10:37     Ewallet 604.17                4.761905
## 6        7 29.8865 3/25/2019 18:30     Ewallet 597.73                4.761905
##   gross.income Rating    Total
## 1      26.1415    9.1 548.9715
## 2       3.8200    9.6  80.2200
## 3      16.2155    7.4 340.5255
```

```
## 4      23.2880    8.4 489.0480
## 5      30.2085    5.3 634.3785
## 6      29.8865    4.1 627.6165
```

Dimensionality Reduction

PCA (Principal component Analysis)

```
#Selecting data for pca
sales_df<-num[,-5]
sales_df
```

```
##      Unit.price Quantity     Tax   cogs gross.income Rating     Total
## 1         74.69        7 26.1415 522.83      26.1415    9.1  548.9715
## 2         15.28        5  3.8200  76.40       3.8200    9.6   80.2200
## 3         46.33        7 16.2155 324.31      16.2155    7.4  340.5255
## 4         58.22        8 23.2880 465.76      23.2880    8.4  489.0480
## 5         86.31        7 30.2085 604.17      30.2085    5.3  634.3785
## 6         85.39        7 29.8865 597.73      29.8865    4.1  627.6165
## 7         68.84        6 20.6520 413.04      20.6520    5.8  433.6920
## 8         73.56       10 36.7800 735.60      36.7800    8.0  772.3800
## 9         36.26        2  3.6260  72.52       3.6260    7.2   76.1460
## 10        54.84        3  8.2260 164.52       8.2260    5.9  172.7460
## 11        14.48        4  2.8960  57.92       2.8960    4.5   60.8160
## 12        25.51        4  5.1020 102.04       5.1020    6.8  107.1420
## 13        46.95        5 11.7375 234.75      11.7375    7.1  246.4875
## 14        43.19       10 21.5950 431.90      21.5950    8.2  453.4950
## 15        71.38       10 35.6900 713.80      35.6900    5.7  749.4900
## 16        93.72        6 28.1160 562.32      28.1160    4.5  590.4360
## 17        68.93        7 24.1255 482.51      24.1255    4.6  506.6355
## 18        72.61        6 21.7830 435.66      21.7830    6.9  457.4430
## 19        54.67        3  8.2005 164.01       8.2005    8.6  172.2105
## 20        40.30        2  4.0300  80.60       4.0300    4.4   84.6300
## 21        86.04        5 21.5100 430.20      21.5100    4.8  451.7100
## 22        87.98        3 13.1970 263.94      13.1970    5.1  277.1370
## 23        33.20        2  3.3200  66.40       3.3200    4.4   69.7200
## 24        34.56        5  8.6400 172.80       8.6400    9.9  181.4400
## 25        88.63        3 13.2945 265.89      13.2945    6.0  279.1845
## 26        52.59        8 21.0360 420.72      21.0360    8.5  441.7560
## 27        33.52        1  1.6760  33.52       1.6760    6.7   35.1960
## 28        87.67        2  8.7670 175.34       8.7670    7.7  184.1070
## 29        88.36        5 22.0900 441.80      22.0900    9.6  463.8900
## 30        24.89        9 11.2005 224.01      11.2005    7.4  235.2105
## 31        94.13        5 23.5325 470.65      23.5325    4.8  494.1825
## 32        78.07        9 35.1315 702.63      35.1315    4.5  737.7615
## 33        83.78        8 33.5120 670.24      33.5120    5.1  703.7520
## 34        96.58        2  9.6580 193.16       9.6580    5.1  202.8180
## 35        99.42        4 19.8840 397.68      19.8840    7.5  417.5640
## 36        68.12        1  3.4060  68.12       3.4060    6.8   71.5260
## 37        62.62        5 15.6550 313.10      15.6550    7.0  328.7550
## 38        60.88        9 27.3960 547.92      27.3960    4.7  575.3160
## 39        54.92        8 21.9680 439.36      21.9680    7.6  461.3280
```

```
## 40       30.12       8 12.0480 240.96      12.0480    7.7  253.0080
## 41       86.72       1  4.3360  86.72       4.3360    7.9   91.0560
## 42       56.11       2  5.6110 112.22       5.6110    6.3  117.8310
## 43       69.12       6 20.7360 414.72      20.7360    5.6  435.4560
## 44       98.70       8 39.4800 789.60      39.4800    7.6  829.0800
## 45       15.37       2  1.5370  30.74       1.5370    7.2   32.2770
## 46       93.96       4 18.7920 375.84      18.7920    9.5  394.6320
## 47       56.69       9 25.5105 510.21      25.5105    8.4  535.7205
## 48       20.01       9  9.0045 180.09       9.0045    4.1  189.0945
## 49       18.93       6  5.6790 113.58       5.6790    8.1  119.2590
## 50       82.63      10 41.3150 826.30      41.3150    7.9  867.6150
## 51       91.40       7 31.9900 639.80      31.9900    9.5  671.7900
## 52       44.59       5 11.1475 222.95      11.1475    8.5  234.0975
## 53       17.87       4  3.5740  71.48       3.5740    6.5   75.0540
## 54       15.43       1  0.7715  15.43       0.7715    6.1   16.2015
## 55       16.16       2  1.6160  32.32       1.6160    6.5   33.9360
## 56       85.98       8 34.3920 687.84      34.3920    8.2  722.2320
## 57       44.34       2  4.4340  88.68       4.4340    5.8   93.1140
## 58       89.60       8 35.8400 716.80      35.8400    6.6  752.6400
## 59       72.35      10 36.1750 723.50      36.1750    5.4  759.6750
## 60       30.61       6  9.1830 183.66       9.1830    9.3  192.8430
## 61       24.74       3  3.7110  74.22       3.7110   10.0   77.9310
## 62       55.73       6 16.7190 334.38      16.7190    7.0  351.0990
## 63       55.07       9 24.7815 495.63      24.7815   10.0  520.4115
## 64       15.81      10  7.9050 158.10       7.9050    8.6  166.0050
## 65       75.74       4 15.1480 302.96      15.1480    7.6  318.1080
## 66       15.87      10  7.9350 158.70       7.9350    5.8  166.6350
## 67       33.47       2  3.3470  66.94       3.3470    6.7   70.2870
## 68       97.61       6 29.2830 585.66      29.2830    9.9  614.9430
## 69       78.77      10 39.3850 787.70      39.3850    6.4  827.0850
## 70       18.33       1  0.9165  18.33       0.9165    4.3   19.2465
## 71       89.48      10 44.7400 894.80      44.7400    9.6  939.5400
## 72       62.12      10 31.0600 621.20      31.0600    5.9  652.2600
## 73       48.52       3  7.2780 145.56       7.2780    4.0  152.8380
## 74       75.91       6 22.7730 455.46      22.7730    8.7  478.2330
## 75       74.67       9 33.6015 672.03      33.6015    9.4  705.6315
## 76       41.65      10 20.8250 416.50      20.8250    5.4  437.3250
## 77       49.04       9 22.0680 441.36      22.0680    8.6  463.4280
## 78       20.01       9  9.0045 180.09       9.0045    5.7  189.0945
## 79       78.31      10 39.1550 783.10      39.1550    6.6  822.2550
## 80       20.38       5  5.0950 101.90       5.0950    6.0  106.9950
## 81       99.19       6 29.7570 595.14      29.7570    5.5  624.8970
## 82       96.68       3 14.5020 290.04      14.5020    6.4  304.5420
## 83       19.25       8  7.7000 154.00       7.7000    6.6  161.7000
## 84       80.36       4 16.0720 321.44      16.0720    8.3  337.5120
## 85       48.91       5 12.2275 244.55      12.2275    6.6  256.7775
## 86       83.06       7 29.0710 581.42      29.0710    4.0  610.4910
## 87       76.52       5 19.1300 382.60      19.1300    9.9  401.7300
## 88       49.38       7 17.2830 345.66      17.2830    7.3  362.9430
## 89       42.47       1  2.1235  42.47       2.1235    5.7   44.5935
## 90       76.99       6 23.0970 461.94      23.0970    6.1  485.0370
## 91       47.38       4  9.4760 189.52       9.4760    7.1  198.9960
## 92       44.86      10 22.4300 448.60      22.4300    8.2  471.0300
## 93       21.98       7  7.6930 153.86       7.6930    5.1  161.5530
```

```
## 94       64.36        9 28.9620 579.24      28.9620    8.6  608.2020
## 95       89.75        1  4.4875  89.75       4.4875    6.6   94.2375
## 96       97.16        1  4.8580  97.16       4.8580    7.2  102.0180
## 97       87.87       10 43.9350 878.70      43.9350    5.1  922.6350
## 98       12.45        6  3.7350  74.70       3.7350    4.1   78.4350
## 99       52.75        3  7.9125 158.25       7.9125    9.3  166.1625
## 100      82.70        6 24.8100 496.20      24.8100    7.4  521.0100
## 101      48.71        1  2.4355  48.71       2.4355    4.1   51.1455
## 102      78.55        9 35.3475 706.95      35.3475    7.2  742.2975
## 103      23.07        9 10.3815 207.63      10.3815    4.9  218.0115
## 104      58.26        6 17.4780 349.56      17.4780    9.9  367.0380
## 105      30.35        7 10.6225 212.45      10.6225    8.0  223.0725
## 106      88.67       10 44.3350 886.70      44.3350    7.3  931.0350
## 107      27.38        6  8.2140 164.28       8.2140    7.9  172.4940
## 108      62.13        6 18.6390 372.78      18.6390    7.4  391.4190
## 109      33.98        9 15.2910 305.82      15.2910    4.2  321.1110
## 110      81.97       10 40.9850 819.70      40.9850    9.2  860.6850
## 111      16.49        2  1.6490  32.98       1.6490    4.6   34.6290
## 112      98.21        3 14.7315 294.63      14.7315    7.8  309.3615
## 113      72.84        7 25.4940 509.88      25.4940    8.4  535.3740
## 114      58.07        9 26.1315 522.63      26.1315    4.3  548.7615
## 115      80.79        9 36.3555 727.11      36.3555    9.5  763.4655
## 116      27.02        3  4.0530  81.06       4.0530    7.1   85.1130
## 117      21.94        5  5.4850 109.70       5.4850    5.3  115.1850
## 118      51.36        1  2.5680  51.36       2.5680    5.2   53.9280
## 119      10.96       10  5.4800 109.60       5.4800    6.0  115.0800
## 120      53.44        2  5.3440 106.88       5.3440    4.1  112.2240
## 121      99.56        8 39.8240 796.48      39.8240    5.2  836.3040
## 122      57.12        7 19.9920 399.84      19.9920    6.5  419.8320
## 123      99.96        9 44.9820 899.64      44.9820    4.2  944.6220
## 124      63.91        8 25.5640 511.28      25.5640    4.6  536.8440
## 125      56.47        8 22.5880 451.76      22.5880    7.3  474.3480
## 126      93.69        7 32.7915 655.83      32.7915    4.5  688.6215
## 127      32.25        5  8.0625 161.25       8.0625    9.0  169.3125
## 128      31.73        9 14.2785 285.57      14.2785    5.9  299.8485
## 129      68.54        8 27.4160 548.32      27.4160    8.5  575.7360
## 130      90.28        9 40.6260 812.52      40.6260    7.2  853.1460
## 131      39.62        7 13.8670 277.34      13.8670    7.5  291.2070
## 132      92.13        6 27.6390 552.78      27.6390    8.3  580.4190
## 133      34.84        4  6.9680 139.36       6.9680    7.4  146.3280
## 134      87.45        6 26.2350 524.70      26.2350    8.8  550.9350
## 135      81.30        6 24.3900 487.80      24.3900    5.3  512.1900
## 136      90.22        3 13.5330 270.66      13.5330    6.2  284.1930
## 137      26.31        5  6.5775 131.55       6.5775    8.8  138.1275
## 138      34.42        6 10.3260 206.52      10.3260    9.8  216.8460
## 139      51.91       10 25.9550 519.10      25.9550    8.2  545.0550
## 140      72.50        8 29.0000 580.00      29.0000    9.2  609.0000
## 141      89.80       10 44.9000 898.00      44.9000    5.4  942.9000
## 142      90.50       10 45.2500 905.00      45.2500    8.1  950.2500
## 143      68.60       10 34.3000 686.00      34.3000    9.1  720.3000
## 144      30.41        1  1.5205  30.41       1.5205    8.4   31.9305
## 145      77.95        6 23.3850 467.70      23.3850    8.0  491.0850
## 146      46.26        6 13.8780 277.56      13.8780    9.5  291.4380
## 147      30.14       10 15.0700 301.40      15.0700    9.2  316.4700
```

```
## 148       66.14        4 13.2280 264.56      13.2280    5.6  277.7880
## 149       71.86        8 28.7440 574.88      28.7440    6.2  603.6240
## 150       32.46        8 12.9840 259.68      12.9840    4.9  272.6640
## 151       91.54        4 18.3080 366.16      18.3080    4.8  384.4680
## 152       34.56        7 12.0960 241.92      12.0960    7.3  254.0160
## 153       83.24        9 37.4580 749.16      37.4580    7.4  786.6180
## 154       16.48        6  4.9440  98.88       4.9440    9.9  103.8240
## 155       80.97        8 32.3880 647.76      32.3880    9.3  680.1480
## 156       92.29        5 23.0725 461.45      23.0725    9.0  484.5225
## 157       72.17        1  3.6085  72.17       3.6085    6.1   75.7785
## 158       50.28        5 12.5700 251.40      12.5700    9.7  263.9700
## 159       97.22        9 43.7490 874.98      43.7490    6.0  918.7290
## 160       93.39        6 28.0170 560.34      28.0170   10.0  588.3570
## 161       43.18        8 17.2720 345.44      17.2720    8.3  362.7120
## 162       63.69        1  3.1845  63.69       3.1845    6.0   66.8745
## 163       45.79        7 16.0265 320.53      16.0265    7.0  336.5565
## 164       76.40        2  7.6400 152.80       7.6400    6.5  160.4400
## 165       39.90       10 19.9500 399.00      19.9500    5.9  418.9500
## 166       42.57        8 17.0280 340.56      17.0280    5.6  357.5880
## 167       95.58       10 47.7900 955.80      47.7900    4.8 1003.5900
## 168       98.98       10 49.4900 989.80      49.4900    8.7 1039.2900
## 169       51.28        6 15.3840 307.68      15.3840    6.5  323.0640
## 170       69.52        7 24.3320 486.64      24.3320    8.5  510.9720
## 171       70.01        5 17.5025 350.05      17.5025    5.5  367.5525
## 172       80.05        5 20.0125 400.25      20.0125    9.4  420.2625
## 173       20.85        8  8.3400 166.80       8.3400    6.3  175.1400
## 174       52.89        6 15.8670 317.34      15.8670    9.8  333.2070
## 175       19.79        8  7.9160 158.32       7.9160    8.7  166.2360
## 176       33.84        9 15.2280 304.56      15.2280    8.8  319.7880
## 177       22.17        8  8.8680 177.36       8.8680    9.6  186.2280
## 178       22.51        7  7.8785 157.57       7.8785    4.8  165.4485
## 179       73.88        6 22.1640 443.28      22.1640    4.4  465.4440
## 180       86.80        3 13.0200 260.40      13.0200    9.9  273.4200
## 181       64.26        7 22.4910 449.82      22.4910    5.7  472.3110
## 182       38.47        8 15.3880 307.76      15.3880    7.7  323.1480
## 183       15.50       10  7.7500 155.00       7.7500    8.0  162.7500
## 184       34.31        8 13.7240 274.48      13.7240    5.7  288.2040
## 185       12.34        7  4.3190  86.38       4.3190    6.7   90.6990
## 186       18.08        3  2.7120  54.24       2.7120    8.0   56.9520
## 187       94.49        8 37.7960 755.92      37.7960    7.5  793.7160
## 188       46.47        4  9.2940 185.88       9.2940    7.0  195.1740
## 189       74.07        1  3.7035  74.07       3.7035    9.9   77.7735
## 190       69.81        4 13.9620 279.24      13.9620    5.9  293.2020
## 191       77.04        3 11.5560 231.12      11.5560    7.2  242.6760
## 192       73.52        2  7.3520 147.04       7.3520    4.6  154.3920
## 193       87.80        9 39.5100 790.20      39.5100    9.2  829.7100
## 194       25.55        4  5.1100 102.20       5.1100    5.7  107.3100
## 195       32.71        5  8.1775 163.55       8.1775    9.9  171.7275
## 196       74.29        1  3.7145  74.29       3.7145    5.0   78.0045
## 197       43.70        2  4.3700  87.40       4.3700    4.9   91.7700
## 198       25.29        1  1.2645  25.29       1.2645    6.1   26.5545
## 199       41.50        4  8.3000 166.00       8.3000    8.2  174.3000
## 200       71.39        5 17.8475 356.95      17.8475    5.5  374.7975
## 201       19.15        6  5.7450 114.90       5.7450    6.8  120.6450
```

```
## 202       57.49        4 11.4980 229.96      11.4980    6.6  241.4580
## 203       61.41        7 21.4935 429.87      21.4935    9.8  451.3635
## 204       25.90       10 12.9500 259.00      12.9500    8.7  271.9500
## 205       17.77        5  4.4425  88.85       4.4425    5.4   93.2925
## 206       23.03        9 10.3635 207.27      10.3635    7.9  217.6335
## 207       66.65        9 29.9925 599.85      29.9925    9.7  629.8425
## 208       28.53       10 14.2650 285.30      14.2650    7.8  299.5650
## 209       30.37        3  4.5555  91.11       4.5555    5.1   95.6655
## 210       99.73        9 44.8785 897.57      44.8785    6.5  942.4485
## 211       26.23        9 11.8035 236.07      11.8035    5.9  247.8735
## 212       93.26        9 41.9670 839.34      41.9670    8.8  881.3070
## 213       92.36        5 23.0900 461.80      23.0900    4.9  484.8900
## 214       46.42        3  6.9630 139.26       6.9630    4.4  146.2230
## 215       29.61        7 10.3635 207.27      10.3635    6.5  217.6335
## 216       18.28        1  0.9140  18.28       0.9140    8.3   19.1940
## 217       24.77        5  6.1925 123.85       6.1925    8.5  130.0425
## 218       94.64        3 14.1960 283.92      14.1960    5.5  298.1160
## 219       94.87        8 37.9480 758.96      37.9480    8.7  796.9080
## 220       57.34        3  8.6010 172.02       8.6010    7.9  180.6210
## 221       45.35        6 13.6050 272.10      13.6050    6.1  285.7050
## 222       62.08        7 21.7280 434.56      21.7280    5.4  456.2880
## 223       11.81        5  2.9525  59.05       2.9525    9.4   62.0025
## 224       12.54        1  0.6270  12.54       0.6270    8.2   13.1670
## 225       43.25        2  4.3250  86.50       4.3250    6.2   90.8250
## 226       87.16        2  8.7160 174.32       8.7160    9.7  183.0360
## 227       69.37        9 31.2165 624.33      31.2165    4.0  655.5465
## 228       37.06        4  7.4120 148.24       7.4120    9.7  155.6520
## 229       90.70        6 27.2100 544.20      27.2100    5.3  571.4100
## 230       63.42        8 25.3680 507.36      25.3680    7.4  532.7280
## 231       81.37        2  8.1370 162.74       8.1370    6.5  170.8770
## 232       10.59        3  1.5885  31.77       1.5885    8.7   33.3585
## 233       84.09        9 37.8405 756.81      37.8405    8.0  794.6505
## 234       73.82        4 14.7640 295.28      14.7640    6.7  310.0440
## 235       51.94       10 25.9700 519.40      25.9700    6.5  545.3700
## 236       93.14        2  9.3140 186.28       9.3140    4.1  195.5940
## 237       17.41        5  4.3525  87.05       4.3525    4.9   91.4025
## 238       44.22        5 11.0550 221.10      11.0550    8.6  232.1550
## 239       13.22        5  3.3050  66.10       3.3050    4.3   69.4050
## 240       89.69        1  4.4845  89.69       4.4845    4.9   94.1745
## 241       24.94        9 11.2230 224.46      11.2230    5.6  235.6830
## 242       59.77        2  5.9770 119.54       5.9770    5.8  125.5170
## 243       93.20        2  9.3200 186.40       9.3200    6.0  195.7200
## 244       62.65        4 12.5300 250.60      12.5300    4.2  263.1300
## 245       93.87        8 37.5480 750.96      37.5480    8.3  788.5080
## 246       47.59        8 19.0360 380.72      19.0360    5.7  399.7560
## 247       81.40        3 12.2100 244.20      12.2100    4.8  256.4100
## 248       17.94        5  4.4850  89.70       4.4850    6.8   94.1850
## 249       77.72        4 15.5440 310.88      15.5440    8.8  326.4240
## 250       73.06        7 25.5710 511.42      25.5710    4.2  536.9910
## 251       46.55        9 20.9475 418.95      20.9475    6.4  439.8975
## 252       35.19       10 17.5950 351.90      17.5950    8.4  369.4950
## 253       14.39        2  1.4390  28.78       1.4390    7.2   30.2190
## 254       23.75        4  4.7500  95.00       4.7500    5.2   99.7500
## 255       58.90        8 23.5600 471.20      23.5600    8.9  494.7600
```

```
## 256       32.62        4  6.5240 130.48       6.5240    9.0  137.0040
## 257       66.35        1  3.3175  66.35       3.3175    9.7   69.6675
## 258       25.91        6  7.7730 155.46       7.7730    8.7  163.2330
## 259       32.25        4  6.4500 129.00       6.4500    6.5  135.4500
## 260       65.94        4 13.1880 263.76      13.1880    6.9  276.9480
## 261       75.06        9 33.7770 675.54      33.7770    6.2  709.3170
## 262       16.45        4  3.2900  65.80       3.2900    5.6   69.0900
## 263       38.30        4  7.6600 153.20       7.6600    5.7  160.8600
## 264       22.24       10 11.1200 222.40      11.1200    4.2  233.5200
## 265       54.45        1  2.7225  54.45       2.7225    7.9   57.1725
## 266       98.40        7 34.4400 688.80      34.4400    8.7  723.2400
## 267       35.47        4  7.0940 141.88       7.0940    6.9  148.9740
## 268       74.60       10 37.3000 746.00      37.3000    9.5  783.3000
## 269       70.74        4 14.1480 282.96      14.1480    4.4  297.1080
## 270       35.54       10 17.7700 355.40      17.7700    7.0  373.1700
## 271       67.43        5 16.8575 337.15      16.8575    6.3  354.0075
## 272       21.12        2  2.1120  42.24       2.1120    9.7   44.3520
## 273       21.54        9  9.6930 193.86       9.6930    8.8  203.5530
## 274       12.03        2  1.2030  24.06       1.2030    5.1   25.2630
## 275       99.71        6 29.9130 598.26      29.9130    7.9  628.1730
## 276       47.97        7 16.7895 335.79      16.7895    6.2  352.5795
## 277       21.82       10 10.9100 218.20      10.9100    7.1  229.1100
## 278       95.42        4 19.0840 381.68      19.0840    6.4  400.7640
## 279       70.99       10 35.4950 709.90      35.4950    5.7  745.3950
## 280       44.02       10 22.0100 440.20      22.0100    9.6  462.2100
## 281       69.96        8 27.9840 559.68      27.9840    6.4  587.6640
## 282       37.00        1  1.8500  37.00       1.8500    7.9   38.8500
## 283       15.34        1  0.7670  15.34       0.7670    6.5   16.1070
## 284       99.83        6 29.9490 598.98      29.9490    8.5  628.9290
## 285       47.67        4  9.5340 190.68       9.5340    9.1  200.2140
## 286       66.68        5 16.6700 333.40      16.6700    7.6  350.0700
## 287       74.86        1  3.7430  74.86       3.7430    6.9   78.6030
## 288       23.75        9 10.6875 213.75      10.6875    9.5  224.4375
## 289       48.51        7 16.9785 339.57      16.9785    5.2  356.5485
## 290       94.88        7 33.2080 664.16      33.2080    4.2  697.3680
## 291       40.30       10 20.1500 403.00      20.1500    7.0  423.1500
## 292       27.85        7  9.7475 194.95       9.7475    6.0  204.6975
## 293       62.48        1  3.1240  62.48       3.1240    4.7   65.6040
## 294       36.36        2  3.6360  72.72       3.6360    7.1   76.3560
## 295       18.11       10  9.0550 181.10       9.0550    5.9  190.1550
## 296       51.92        5 12.9800 259.60      12.9800    7.5  272.5800
## 297       28.84        4  5.7680 115.36       5.7680    6.4  121.1280
## 298       78.38        6 23.5140 470.28      23.5140    5.8  493.7940
## 299       60.01        4 12.0020 240.04      12.0020    4.5  252.0420
## 300       88.61        1  4.4305  88.61       4.4305    7.7   93.0405
## 301       99.82        2  9.9820 199.64       9.9820    6.7  209.6220
## 302       39.01        1  1.9505  39.01       1.9505    4.7   40.9605
## 303       48.61        1  2.4305  48.61       2.4305    4.4   51.0405
## 304       51.19        4 10.2380 204.76      10.2380    4.7  214.9980
## 305       14.96        8  5.9840 119.68       5.9840    8.6  125.6640
## 306       72.20        7 25.2700 505.40      25.2700    4.3  530.6700
## 307       40.23        7 14.0805 281.61      14.0805    9.6  295.6905
## 308       88.79        8 35.5160 710.32      35.5160    4.1  745.8360
## 309       26.48        3  3.9720  79.44       3.9720    4.7   83.4120
```

```
## 310       81.91        2  8.1910 163.82       8.1910    7.8  172.0110
## 311       79.93        6 23.9790 479.58      23.9790    5.5  503.5590
## 312       69.33        2  6.9330 138.66       6.9330    9.7  145.5930
## 313       14.23        5  3.5575  71.15       3.5575    4.4   74.7075
## 314       15.55        9  6.9975 139.95       6.9975    5.0  146.9475
## 315       78.13       10 39.0650 781.30      39.0650    4.4  820.3650
## 316       99.37        2  9.9370 198.74       9.9370    5.2  208.6770
## 317       21.08        3  3.1620  63.24       3.1620    7.3   66.4020
## 318       74.79        5 18.6975 373.95      18.6975    4.9  392.6475
## 319       29.67        7 10.3845 207.69      10.3845    8.1  218.0745
## 320       44.07        4  8.8140 176.28       8.8140    8.4  185.0940
## 321       22.93        9 10.3185 206.37      10.3185    5.5  216.6885
## 322       39.42        1  1.9710  39.42       1.9710    8.4   41.3910
## 323       15.26        6  4.5780  91.56       4.5780    9.8   96.1380
## 324       61.77        5 15.4425 308.85      15.4425    6.7  324.2925
## 325       21.52        6  6.4560 129.12       6.4560    9.4  135.5760
## 326       97.74        4 19.5480 390.96      19.5480    6.4  410.5080
## 327       99.78        5 24.9450 498.90      24.9450    5.4  523.8450
## 328       94.26        4 18.8520 377.04      18.8520    8.6  395.8920
## 329       51.13        4 10.2260 204.52      10.2260    4.0  214.7460
## 330       36.36        4  7.2720 145.44       7.2720    7.6  152.7120
## 331       22.02        9  9.9090 198.18       9.9090    6.8  208.0890
## 332       32.90        3  4.9350  98.70       4.9350    9.1  103.6350
## 333       77.02        5 19.2550 385.10      19.2550    5.5  404.3550
## 334       23.48        2  2.3480  46.96       2.3480    7.9   49.3080
## 335       14.70        5  3.6750  73.50       3.6750    8.5   77.1750
## 336       28.45        5  7.1125 142.25       7.1125    9.1  149.3625
## 337       76.40        9 34.3800 687.60      34.3800    7.5  721.9800
## 338       57.95        6 17.3850 347.70      17.3850    5.2  365.0850
## 339       47.65        3  7.1475 142.95       7.1475    9.5  150.0975
## 340       42.82        9 19.2690 385.38      19.2690    8.9  404.6490
## 341       48.09        3  7.2135 144.27       7.2135    7.8  151.4835
## 342       55.97        7 19.5895 391.79      19.5895    8.9  411.3795
## 343       76.90        7 26.9150 538.30      26.9150    7.7  565.2150
## 344       97.03        5 24.2575 485.15      24.2575    9.3  509.4075
## 345       44.65        3  6.6975 133.95       6.6975    6.2  140.6475
## 346       77.93        9 35.0685 701.37      35.0685    7.6  736.4385
## 347       71.95        1  3.5975  71.95       3.5975    7.3   75.5475
## 348       89.25        8 35.7000 714.00      35.7000    4.7  749.7000
## 349       26.02        7  9.1070 182.14       9.1070    5.1  191.2470
## 350       13.50       10  6.7500 135.00       6.7500    4.8  141.7500
## 351       99.30       10 49.6500 993.00      49.6500    6.6 1042.6500
## 352       51.69        7 18.0915 361.83      18.0915    5.5  379.9215
## 353       54.73        7 19.1555 383.11      19.1555    8.5  402.2655
## 354       27.00        9 12.1500 243.00      12.1500    4.8  255.1500
## 355       30.24        1  1.5120  30.24       1.5120    8.4   31.7520
## 356       89.14        4 17.8280 356.56      17.8280    7.8  374.3880
## 357       37.55       10 18.7750 375.50      18.7750    9.3  394.2750
## 358       95.44       10 47.7200 954.40      47.7200    5.2 1002.1200
## 359       27.50        3  4.1250  82.50       4.1250    6.5   86.6250
## 360       74.97        1  3.7485  74.97       3.7485    5.6   78.7185
## 361       80.96        8 32.3840 647.68      32.3840    7.4  680.0640
## 362       94.47        8 37.7880 755.76      37.7880    9.1  793.5480
## 363       99.79        2  9.9790 199.58       9.9790    8.0  209.5590
```

```
## 364       73.22        6 21.9660 439.32      21.9660    7.2  461.2860
## 365       41.24        4  8.2480 164.96       8.2480    7.1  173.2080
## 366       81.68        4 16.3360 326.72      16.3360    9.1  343.0560
## 367       51.32        9 23.0940 461.88      23.0940    5.6  484.9740
## 368       65.94        4 13.1880 263.76      13.1880    6.0  276.9480
## 369       14.36       10  7.1800 143.60       7.1800    5.4  150.7800
## 370       21.50        9  9.6750 193.50       9.6750    7.8  203.1750
## 371       26.26        7  9.1910 183.82       9.1910    9.9  193.0110
## 372       60.96        2  6.0960 121.92       6.0960    4.9  128.0160
## 373       70.11        6 21.0330 420.66      21.0330    5.2  441.6930
## 374       42.08        6 12.6240 252.48      12.6240    8.9  265.1040
## 375       67.09        5 16.7725 335.45      16.7725    9.1  352.2225
## 376       96.70        5 24.1750 483.50      24.1750    7.0  507.6750
## 377       35.38        9 15.9210 318.42      15.9210    9.6  334.3410
## 378       95.49        7 33.4215 668.43      33.4215    8.7  701.8515
## 379       96.98        4 19.3960 387.92      19.3960    9.4  407.3160
## 380       23.65        4  4.7300  94.60       4.7300    4.0   99.3300
## 381       82.33        4 16.4660 329.32      16.4660    7.5  345.7860
## 382       26.61        2  2.6610  53.22       2.6610    4.2   55.8810
## 383       99.69        5 24.9225 498.45      24.9225    9.9  523.3725
## 384       74.89        4 14.9780 299.56      14.9780    4.2  314.5380
## 385       40.94        5 10.2350 204.70      10.2350    9.9  214.9350
## 386       75.82        1  3.7910  75.82       3.7910    5.8   79.6110
## 387       46.77        6 14.0310 280.62      14.0310    6.0  294.6510
## 388       32.32       10 16.1600 323.20      16.1600   10.0  339.3600
## 389       54.07        9 24.3315 486.63      24.3315    9.5  510.9615
## 390       18.22        7  6.3770 127.54       6.3770    6.6  133.9170
## 391       80.48        3 12.0720 241.44      12.0720    8.1  253.5120
## 392       37.95       10 18.9750 379.50      18.9750    9.7  398.4750
## 393       76.82        1  3.8410  76.82       3.8410    7.2   80.6610
## 394       52.26       10 26.1300 522.60      26.1300    6.2  548.7300
## 395       79.74        1  3.9870  79.74       3.9870    7.3   83.7270
## 396       77.50        5 19.3750 387.50      19.3750    4.3  406.8750
## 397       54.27        5 13.5675 271.35      13.5675    4.6  284.9175
## 398       13.59        9  6.1155 122.31       6.1155    5.8  128.4255
## 399       41.06        6 12.3180 246.36      12.3180    8.3  258.6780
## 400       19.24        9  8.6580 173.16       8.6580    8.0  181.8180
## 401       39.43        6 11.8290 236.58      11.8290    9.4  248.4090
## 402       46.22        4  9.2440 184.88       9.2440    6.2  194.1240
## 403       13.98        1  0.6990  13.98       0.6990    9.8   14.6790
## 404       39.75        5  9.9375 198.75       9.9375    9.6  208.6875
## 405       97.79        7 34.2265 684.53      34.2265    4.9  718.7565
## 406       67.26        4 13.4520 269.04      13.4520    8.0  282.4920
## 407       13.79        5  3.4475  68.95       3.4475    7.8   72.3975
## 408       68.71        4 13.7420 274.84      13.7420    4.1  288.5820
## 409       56.53        4 11.3060 226.12      11.3060    5.5  237.4260
## 410       23.82        5  5.9550 119.10       5.9550    5.4  125.0550
## 411       34.21       10 17.1050 342.10      17.1050    5.1  359.2050
## 412       21.87        2  2.1870  43.74       2.1870    6.9   45.9270
## 413       20.97        5  5.2425 104.85       5.2425    7.8  110.0925
## 414       25.84        3  3.8760  77.52       3.8760    6.6   81.3960
## 415       50.93        8 20.3720 407.44      20.3720    9.2  427.8120
## 416       96.11        1  4.8055  96.11       4.8055    7.8  100.9155
## 417       45.38        4  9.0760 181.52       9.0760    8.7  190.5960
```

```
## 418       81.51        1  4.0755  81.51       4.0755    9.2   85.5855
## 419       57.22        2  5.7220 114.44       5.7220    8.3  120.1620
## 420       25.22        7  8.8270 176.54       8.8270    8.2  185.3670
## 421       38.60        3  5.7900 115.80       5.7900    7.5  121.5900
## 422       84.05        3 12.6075 252.15      12.6075    9.8  264.7575
## 423       97.21       10 48.6050 972.10      48.6050    8.7 1020.7050
## 424       25.42        8 10.1680 203.36      10.1680    6.7  213.5280
## 425       16.28        1  0.8140  16.28       0.8140    5.0   17.0940
## 426       40.61        9 18.2745 365.49      18.2745    7.0  383.7645
## 427       53.17        7 18.6095 372.19      18.6095    8.9  390.7995
## 428       20.87        3  3.1305  62.61       3.1305    8.0   65.7405
## 429       67.27        5 16.8175 336.35      16.8175    6.9  353.1675
## 430       90.65       10 45.3250 906.50      45.3250    7.3  951.8250
## 431       69.08        2  6.9080 138.16       6.9080    6.9  145.0680
## 432       43.27        2  4.3270  86.54       4.3270    5.7   90.8670
## 433       23.46        6  7.0380 140.76       7.0380    6.4  147.7980
## 434       95.54        7 33.4390 668.78      33.4390    9.6  702.2190
## 435       47.44        1  2.3720  47.44       2.3720    6.8   49.8120
## 436       99.24        9 44.6580 893.16      44.6580    9.0  937.8180
## 437       82.93        4 16.5860 331.72      16.5860    9.6  348.3060
## 438       33.99        6 10.1970 203.94      10.1970    7.7  214.1370
## 439       17.04        4  3.4080  68.16       3.4080    7.0   71.5680
## 440       40.86        8 16.3440 326.88      16.3440    6.5  343.2240
## 441       17.44        5  4.3600  87.20       4.3600    8.1   91.5600
## 442       88.43        8 35.3720 707.44      35.3720    4.3  742.8120
## 443       89.21        9 40.1445 802.89      40.1445    6.5  843.0345
## 444       12.78        1  0.6390  12.78       0.6390    9.5   13.4190
## 445       19.10        7  6.6850 133.70       6.6850    9.7  140.3850
## 446       19.15        1  0.9575  19.15       0.9575    9.5   20.1075
## 447       27.66       10 13.8300 276.60      13.8300    8.9  290.4300
## 448       45.74        3  6.8610 137.22       6.8610    6.5  144.0810
## 449       27.07        1  1.3535  27.07       1.3535    5.3   28.4235
## 450       39.12        1  1.9560  39.12       1.9560    9.6   41.0760
## 451       74.71        6 22.4130 448.26      22.4130    6.7  470.6730
## 452       22.01        6  6.6030 132.06       6.6030    7.6  138.6630
## 453       63.61        5 15.9025 318.05      15.9025    4.8  333.9525
## 454       25.00        1  1.2500  25.00       1.2500    5.5   26.2500
## 455       20.77        4  4.1540  83.08       4.1540    4.7   87.2340
## 456       29.56        5  7.3900 147.80       7.3900    6.9  155.1900
## 457       77.40        9 34.8300 696.60      34.8300    4.5  731.4300
## 458       79.39       10 39.6950 793.90      39.6950    6.2  833.5950
## 459       46.57       10 23.2850 465.70      23.2850    7.6  488.9850
## 460       35.89        1  1.7945  35.89       1.7945    7.9   37.6845
## 461       40.52        5 10.1300 202.60      10.1300    4.5  212.7300
## 462       73.05       10 36.5250 730.50      36.5250    8.7  767.0250
## 463       73.95        4 14.7900 295.80      14.7900    6.1  310.5900
## 464       22.62        1  1.1310  22.62       1.1310    6.4   23.7510
## 465       51.34        5 12.8350 256.70      12.8350    9.1  269.5350
## 466       54.55       10 27.2750 545.50      27.2750    7.1  572.7750
## 467       37.15        7 13.0025 260.05      13.0025    7.7  273.0525
## 468       37.02        6 11.1060 222.12      11.1060    4.5  233.2260
## 469       21.58        1  1.0790  21.58       1.0790    7.2   22.6590
## 470       98.84        1  4.9420  98.84       4.9420    8.4  103.7820
## 471       83.77        6 25.1310 502.62      25.1310    5.4  527.7510
```

```
## 472       40.05        4  8.0100 160.20       8.0100    9.7  168.2100
## 473       43.13       10 21.5650 431.30      21.5650    5.5  452.8650
## 474       72.57        8 29.0280 580.56      29.0280    4.6  609.5880
## 475       64.44        5 16.1100 322.20      16.1100    6.6  338.3100
## 476       65.18        3  9.7770 195.54       9.7770    6.3  205.3170
## 477       33.26        5  8.3150 166.30       8.3150    4.2  174.6150
## 478       84.07        4 16.8140 336.28      16.8140    4.4  353.0940
## 479       34.37       10 17.1850 343.70      17.1850    6.7  360.8850
## 480       38.60        1  1.9300  38.60       1.9300    6.7   40.5300
## 481       65.97        8 26.3880 527.76      26.3880    8.4  554.1480
## 482       32.80       10 16.4000 328.00      16.4000    6.2  344.4000
## 483       37.14        5  9.2850 185.70       9.2850    5.0  194.9850
## 484       60.38       10 30.1900 603.80      30.1900    6.0  633.9900
## 485       36.98       10 18.4900 369.80      18.4900    7.0  388.2900
## 486       49.49        4  9.8980 197.96       9.8980    6.6  207.8580
## 487       41.09       10 20.5450 410.90      20.5450    7.3  431.4450
## 488       37.15        4  7.4300 148.60       7.4300    8.3  156.0300
## 489       22.96        1  1.1480  22.96       1.1480    4.3   24.1080
## 490       77.68        9 34.9560 699.12      34.9560    9.8  734.0760
## 491       34.70        2  3.4700  69.40       3.4700    8.2   72.8700
## 492       19.66       10  9.8300 196.60       9.8300    7.2  206.4300
## 493       25.32        8 10.1280 202.56      10.1280    8.7  212.6880
## 494       12.12       10  6.0600 121.20       6.0600    8.4  127.2600
## 495       99.89        2  9.9890 199.78       9.9890    7.1  209.7690
## 496       75.92        8 30.3680 607.36      30.3680    5.5  637.7280
## 497       63.22        2  6.3220 126.44       6.3220    8.5  132.7620
## 498       90.24        6 27.0720 541.44      27.0720    6.2  568.5120
## 499       98.13        1  4.9065  98.13       4.9065    8.9  103.0365
## 500       51.52        8 20.6080 412.16      20.6080    9.6  432.7680
## 501       73.97        1  3.6985  73.97       3.6985    5.4   77.6685
## 502       31.90        1  1.5950  31.90       1.5950    9.1   33.4950
## 503       69.40        2  6.9400 138.80       6.9400    9.0  145.7400
## 504       93.31        2  9.3310 186.62       9.3310    6.3  195.9510
## 505       88.45        1  4.4225  88.45       4.4225    9.5   92.8725
## 506       24.18        8  9.6720 193.44       9.6720    9.8  203.1120
## 507       48.50        3  7.2750 145.50       7.2750    6.7  152.7750
## 508       84.05        6 25.2150 504.30      25.2150    7.7  529.5150
## 509       61.29        5 15.3225 306.45      15.3225    7.0  321.7725
## 510       15.95        6  4.7850  95.70       4.7850    5.1  100.4850
## 511       90.74        7 31.7590 635.18      31.7590    6.2  666.9390
## 512       42.91        5 10.7275 214.55      10.7275    6.1  225.2775
## 513       54.28        7 18.9980 379.96      18.9980    9.3  398.9580
## 514       99.55        7 34.8425 696.85      34.8425    7.6  731.6925
## 515       58.39        7 20.4365 408.73      20.4365    8.2  429.1665
## 516       51.47        1  2.5735  51.47       2.5735    8.5   54.0435
## 517       54.86        5 13.7150 274.30      13.7150    9.8  288.0150
## 518       39.39        5  9.8475 196.95       9.8475    8.7  206.7975
## 519       34.73        2  3.4730  69.46       3.4730    9.7   72.9330
## 520       71.92        5 17.9800 359.60      17.9800    4.3  377.5800
## 521       45.71        3  6.8565 137.13       6.8565    7.7  143.9865
## 522       83.17        6 24.9510 499.02      24.9510    7.3  523.9710
## 523       37.44        6 11.2320 224.64      11.2320    5.9  235.8720
## 524       62.87        2  6.2870 125.74       6.2870    5.0  132.0270
## 525       81.71        6 24.5130 490.26      24.5130    8.0  514.7730
```

```
## 526       91.41        5 22.8525 457.05      22.8525    7.1  479.9025
## 527       39.21        4  7.8420 156.84       7.8420    9.0  164.6820
## 528       59.86        2  5.9860 119.72       5.9860    6.7  125.7060
## 529       54.36       10 27.1800 543.60      27.1800    6.1  570.7800
## 530       98.09        9 44.1405 882.81      44.1405    9.3  926.9505
## 531       25.43        6  7.6290 152.58       7.6290    7.0  160.2090
## 532       86.68        8 34.6720 693.44      34.6720    7.2  728.1120
## 533       22.95       10 11.4750 229.50      11.4750    8.2  240.9750
## 534       16.31        9  7.3395 146.79       7.3395    8.4  154.1295
## 535       28.32        5  7.0800 141.60       7.0800    6.2  148.6800
## 536       16.67        7  5.8345 116.69       5.8345    7.4  122.5245
## 537       73.96        1  3.6980  73.96       3.6980    5.0   77.6580
## 538       97.94        1  4.8970  97.94       4.8970    6.9  102.8370
## 539       73.05        4 14.6100 292.20      14.6100    4.9  306.8100
## 540       87.48        6 26.2440 524.88      26.2440    5.1  551.1240
## 541       30.68        3  4.6020  92.04       4.6020    9.1   96.6420
## 542       75.88        1  3.7940  75.88       3.7940    7.1   79.6740
## 543       20.18        4  4.0360  80.72       4.0360    5.0   84.7560
## 544       18.77        6  5.6310 112.62       5.6310    5.5  118.2510
## 545       71.20        1  3.5600  71.20       3.5600    9.2   74.7600
## 546       38.81        4  7.7620 155.24       7.7620    4.9  163.0020
## 547       29.42       10 14.7100 294.20      14.7100    8.9  308.9100
## 548       60.95        9 27.4275 548.55      27.4275    6.0  575.9775
## 549       51.54        5 12.8850 257.70      12.8850    4.2  270.5850
## 550       66.06        6 19.8180 396.36      19.8180    7.3  416.1780
## 551       57.27        3  8.5905 171.81       8.5905    6.5  180.4005
## 552       54.31        9 24.4395 488.79      24.4395    8.9  513.2295
## 553       58.24        9 26.2080 524.16      26.2080    9.7  550.3680
## 554       22.21        6  6.6630 133.26       6.6630    8.6  139.9230
## 555       19.32        7  6.7620 135.24       6.7620    6.9  142.0020
## 556       37.48        3  5.6220 112.44       5.6220    7.7  118.0620
## 557       72.04        2  7.2040 144.08       7.2040    9.5  151.2840
## 558       98.52       10 49.2600 985.20      49.2600    4.5 1034.4600
## 559       41.66        6 12.4980 249.96      12.4980    5.6  262.4580
## 560       72.42        3 10.8630 217.26      10.8630    8.2  228.1230
## 561       21.58        9  9.7110 194.22       9.7110    7.3  203.9310
## 562       89.20       10 44.6000 892.00      44.6000    4.4  936.6000
## 563       42.42        8 16.9680 339.36      16.9680    5.7  356.3280
## 564       74.51        6 22.3530 447.06      22.3530    5.0  469.4130
## 565       99.25        2  9.9250 198.50       9.9250    9.0  208.4250
## 566       81.21       10 40.6050 812.10      40.6050    6.3  852.7050
## 567       49.33       10 24.6650 493.30      24.6650    9.4  517.9650
## 568       65.74        9 29.5830 591.66      29.5830    7.7  621.2430
## 569       79.86        7 27.9510 559.02      27.9510    5.5  586.9710
## 570       73.98        7 25.8930 517.86      25.8930    4.1  543.7530
## 571       82.04        5 20.5100 410.20      20.5100    7.6  430.7100
## 572       26.67       10 13.3350 266.70      13.3350    8.6  280.0350
## 573       10.13        7  3.5455  70.91       3.5455    8.3   74.4555
## 574       72.39        2  7.2390 144.78       7.2390    8.1  152.0190
## 575       85.91        5 21.4775 429.55      21.4775    8.6  451.0275
## 576       81.31        7 28.4585 569.17      28.4585    6.3  597.6285
## 577       60.30        4 12.0600 241.20      12.0600    5.8  253.2600
## 578       31.77        4  6.3540 127.08       6.3540    6.2  133.4340
## 579       64.27        4 12.8540 257.08      12.8540    7.7  269.9340
```

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## 580       69.51        2  6.9510 139.02       6.9510    8.1  145.9710
## 581       27.22        3  4.0830  81.66       4.0830    7.3   85.7430
## 582       77.68        4 15.5360 310.72      15.5360    8.4  326.2560
## 583       92.98        2  9.2980 185.96       9.2980    8.0  195.2580
## 584       18.08        4  3.6160  72.32       3.6160    9.5   75.9360
## 585       63.06        3  9.4590 189.18       9.4590    7.0  198.6390
## 586       51.71        4 10.3420 206.84      10.3420    9.8  217.1820
## 587       52.34        3  7.8510 157.02       7.8510    9.2  164.8710
## 588       43.06        5 10.7650 215.30      10.7650    7.7  226.0650
## 589       59.61       10 29.8050 596.10      29.8050    5.3  625.9050
## 590       14.62        5  3.6550  73.10       3.6550    4.4   76.7550
## 591       46.53        6 13.9590 279.18      13.9590    4.3  293.1390
## 592       24.24        7  8.4840 169.68       8.4840    9.4  178.1640
## 593       45.58        1  2.2790  45.58       2.2790    9.8   47.8590
## 594       75.20        3 11.2800 225.60      11.2800    4.8  236.8800
## 595       96.80        3 14.5200 290.40      14.5200    5.3  304.9200
## 596       14.82        3  2.2230  44.46       2.2230    8.7   46.6830
## 597       52.20        3  7.8300 156.60       7.8300    9.5  164.4300
## 598       46.66        9 20.9970 419.94      20.9970    5.3  440.9370
## 599       36.85        5  9.2125 184.25       9.2125    9.2  193.4625
## 600       70.32        2  7.0320 140.64       7.0320    9.6  147.6720
## 601       83.08        1  4.1540  83.08       4.1540    6.4   87.2340
## 602       64.99        1  3.2495  64.99       3.2495    4.5   68.2395
## 603       77.56       10 38.7800 775.60      38.7800    6.9  814.3800
## 604       54.51        6 16.3530 327.06      16.3530    7.8  343.4130
## 605       51.89        7 18.1615 363.23      18.1615    4.5  381.3915
## 606       31.75        4  6.3500 127.00       6.3500    8.6  133.3500
## 607       53.65        7 18.7775 375.55      18.7775    5.2  394.3275
## 608       49.79        4  9.9580 199.16       9.9580    6.4  209.1180
## 609       30.61        1  1.5305  30.61       1.5305    5.2   32.1405
## 610       57.89        2  5.7890 115.78       5.7890    8.9  121.5690
## 611       28.96        1  1.4480  28.96       1.4480    6.2   30.4080
## 612       98.97        9 44.5365 890.73      44.5365    6.7  935.2665
## 613       93.22        3 13.9830 279.66      13.9830    7.2  293.6430
## 614       80.93        1  4.0465  80.93       4.0465    9.0   84.9765
## 615       67.45       10 33.7250 674.50      33.7250    4.2  708.2250
## 616       38.72        9 17.4240 348.48      17.4240    4.2  365.9040
## 617       72.60        6 21.7800 435.60      21.7800    6.9  457.3800
## 618       87.91        5 21.9775 439.55      21.9775    4.4  461.5275
## 619       98.53        6 29.5590 591.18      29.5590    4.0  620.7390
## 620       43.46        6 13.0380 260.76      13.0380    8.5  273.7980
## 621       71.68        3 10.7520 215.04      10.7520    9.2  225.7920
## 622       91.61        1  4.5805  91.61       4.5805    9.8   96.1905
## 623       94.59        7 33.1065 662.13      33.1065    4.9  695.2365
## 624       83.25       10 41.6250 832.50      41.6250    4.4  874.1250
## 625       91.35        1  4.5675  91.35       4.5675    6.8   95.9175
## 626       78.88        2  7.8880 157.76       7.8880    9.1  165.6480
## 627       60.87        2  6.0870 121.74       6.0870    8.7  127.8270
## 628       82.58       10 41.2900 825.80      41.2900    5.0  867.0900
## 629       53.30        3  7.9950 159.90       7.9950    7.5  167.8950
## 630       12.09        1  0.6045  12.09       0.6045    8.2   12.6945
## 631       64.19       10 32.0950 641.90      32.0950    6.7  673.9950
## 632       78.31        3 11.7465 234.93      11.7465    5.4  246.6765
## 633       83.77        2  8.3770 167.54       8.3770    7.0  175.9170
```

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## 634       99.70        3 14.9550 299.10      14.9550    4.7  314.0550
## 635       79.91        3 11.9865 239.73      11.9865    5.0  251.7165
## 636       66.47       10 33.2350 664.70      33.2350    5.0  697.9350
## 637       28.95        7 10.1325 202.65      10.1325    6.0  212.7825
## 638       46.20        1  2.3100  46.20       2.3100    6.3   48.5100
## 639       17.63        5  4.4075  88.15       4.4075    8.5   92.5575
## 640       52.42        3  7.8630 157.26       7.8630    7.5  165.1230
## 641       98.79        3 14.8185 296.37      14.8185    6.4  311.1885
## 642       88.55        8 35.4200 708.40      35.4200    4.7  743.8200
## 643       55.67        2  5.5670 111.34       5.5670    6.0  116.9070
## 644       72.52        8 29.0080 580.16      29.0080    4.0  609.1680
## 645       12.05        5  3.0125  60.25       3.0125    5.5   63.2625
## 646       19.36        9  8.7120 174.24       8.7120    8.7  182.9520
## 647       70.21        6 21.0630 421.26      21.0630    7.4  442.3230
## 648       33.63        1  1.6815  33.63       1.6815    5.6   35.3115
## 649       15.49        2  1.5490  30.98       1.5490    6.3   32.5290
## 650       24.74       10 12.3700 247.40      12.3700    7.1  259.7700
## 651       75.66        5 18.9150 378.30      18.9150    7.8  397.2150
## 652       55.81        6 16.7430 334.86      16.7430    9.9  351.6030
## 653       72.78       10 36.3900 727.80      36.3900    7.3  764.1900
## 654       37.32        9 16.7940 335.88      16.7940    5.1  352.6740
## 655       60.18        4 12.0360 240.72      12.0360    9.4  252.7560
## 656       15.69        3  2.3535  47.07       2.3535    5.8   49.4235
## 657       99.69        1  4.9845  99.69       4.9845    8.0  104.6745
## 658       88.15        3 13.2225 264.45      13.2225    7.9  277.6725
## 659       27.93        5  6.9825 139.65       6.9825    5.9  146.6325
## 660       55.45        1  2.7725  55.45       2.7725    4.9   58.2225
## 661       42.97        3  6.4455 128.91       6.4455    9.3  135.3555
## 662       17.14        7  5.9990 119.98       5.9990    7.9  125.9790
## 663       58.75        6 17.6250 352.50      17.6250    5.9  370.1250
## 664       87.10       10 43.5500 871.00      43.5500    9.9  914.5500
## 665       98.80        2  9.8800 197.60       9.8800    7.7  207.4800
## 666       48.63        4  9.7260 194.52       9.7260    7.6  204.2460
## 667       57.74        3  8.6610 173.22       8.6610    7.7  181.8810
## 668       17.97        4  3.5940  71.88       3.5940    6.4   75.4740
## 669       47.71        6 14.3130 286.26      14.3130    4.4  300.5730
## 670       40.62        2  4.0620  81.24       4.0620    4.1   85.3020
## 671       56.04       10 28.0200 560.40      28.0200    4.4  588.4200
## 672       93.40        2  9.3400 186.80       9.3400    5.5  196.1400
## 673       73.41        3 11.0115 220.23      11.0115    4.0  231.2415
## 674       33.64        8 13.4560 269.12      13.4560    9.3  282.5760
## 675       45.48       10 22.7400 454.80      22.7400    4.8  477.5400
## 676       83.77        2  8.3770 167.54       8.3770    4.6  175.9170
## 677       64.08        7 22.4280 448.56      22.4280    7.3  470.9880
## 678       73.47        4 14.6940 293.88      14.6940    6.0  308.5740
## 679       58.95       10 29.4750 589.50      29.4750    8.1  618.9750
## 680       48.50        6 14.5500 291.00      14.5500    9.4  305.5500
## 681       39.48        1  1.9740  39.48       1.9740    6.5   41.4540
## 682       34.81        1  1.7405  34.81       1.7405    7.0   36.5505
## 683       49.32        6 14.7960 295.92      14.7960    7.1  310.7160
## 684       21.48        2  2.1480  42.96       2.1480    6.6   45.1080
## 685       23.08        6  6.9240 138.48       6.9240    4.9  145.4040
## 686       49.10        2  4.9100  98.20       4.9100    6.4  103.1100
## 687       64.83        2  6.4830 129.66       6.4830    8.0  136.1430
```

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## 688       63.56       10 31.7800 635.60      31.7800    4.3  667.3800
## 689       72.88        2  7.2880 145.76       7.2880    6.1  153.0480
## 690       67.10        3 10.0650 201.30      10.0650    7.5  211.3650
## 691       70.19        9 31.5855 631.71      31.5855    6.7  663.2955
## 692       55.04        7 19.2640 385.28      19.2640    5.2  404.5440
## 693       48.63       10 24.3150 486.30      24.3150    8.8  510.6150
## 694       73.38        7 25.6830 513.66      25.6830    9.5  539.3430
## 695       52.60        9 23.6700 473.40      23.6700    7.6  497.0700
## 696       87.37        5 21.8425 436.85      21.8425    6.6  458.6925
## 697       27.04        4  5.4080 108.16       5.4080    6.9  113.5680
## 698       62.19        4 12.4380 248.76      12.4380    4.3  261.1980
## 699       69.58        9 31.3110 626.22      31.3110    7.8  657.5310
## 700       97.50       10 48.7500 975.00      48.7500    8.0 1023.7500
## 701       60.41        8 24.1640 483.28      24.1640    9.6  507.4440
## 702       32.32        3  4.8480  96.96       4.8480    4.3  101.8080
## 703       19.77       10  9.8850 197.70       9.8850    5.0  207.5850
## 704       80.47        9 36.2115 724.23      36.2115    9.2  760.4415
## 705       88.39        9 39.7755 795.51      39.7755    6.3  835.2855
## 706       71.77        7 25.1195 502.39      25.1195    8.9  527.5095
## 707       43.00        4  8.6000 172.00       8.6000    7.6  180.6000
## 708       68.98        1  3.4490  68.98       3.4490    4.8   72.4290
## 709       15.62        8  6.2480 124.96       6.2480    9.1  131.2080
## 710       25.70        3  3.8550  77.10       3.8550    6.1   80.9550
## 711       80.62        6 24.1860 483.72      24.1860    9.1  507.9060
## 712       75.53        4 15.1060 302.12      15.1060    8.3  317.2260
## 713       77.63        9 34.9335 698.67      34.9335    7.2  733.6035
## 714       13.85        9  6.2325 124.65       6.2325    6.0  130.8825
## 715       98.70        8 39.4800 789.60      39.4800    8.5  829.0800
## 716       35.68        5  8.9200 178.40       8.9200    6.6  187.3200
## 717       71.46        7 25.0110 500.22      25.0110    4.5  525.2310
## 718       11.94        3  1.7910  35.82       1.7910    8.1   37.6110
## 719       45.38        3  6.8070 136.14       6.8070    7.2  142.9470
## 720       17.48        6  5.2440 104.88       5.2440    6.1  110.1240
## 721       25.56        7  8.9460 178.92       8.9460    7.1  187.8660
## 722       90.63        9 40.7835 815.67      40.7835    5.1  856.4535
## 723       44.12        3  6.6180 132.36       6.6180    7.9  138.9780
## 724       36.77        7 12.8695 257.39      12.8695    7.4  270.2595
## 725       23.34        4  4.6680  93.36       4.6680    7.4   98.0280
## 726       28.50        8 11.4000 228.00      11.4000    6.6  239.4000
## 727       55.57        3  8.3355 166.71       8.3355    5.9  175.0455
## 728       69.74       10 34.8700 697.40      34.8700    8.9  732.2700
## 729       97.26        4 19.4520 389.04      19.4520    6.8  408.4920
## 730       52.18        7 18.2630 365.26      18.2630    9.3  383.5230
## 731       22.32        4  4.4640  89.28       4.4640    4.4   93.7440
## 732       56.00        3  8.4000 168.00       8.4000    4.8  176.4000
## 733       19.70        1  0.9850  19.70       0.9850    9.5   20.6850
## 734       75.88        7 26.5580 531.16      26.5580    8.9  557.7180
## 735       53.72        1  2.6860  53.72       2.6860    6.4   56.4060
## 736       81.95       10 40.9750 819.50      40.9750    6.0  860.4750
## 737       81.20        7 28.4200 568.40      28.4200    8.1  596.8200
## 738       58.76       10 29.3800 587.60      29.3800    9.0  616.9800
## 739       91.56        8 36.6240 732.48      36.6240    6.0  769.1040
## 740       93.96        9 42.2820 845.64      42.2820    9.8  887.9220
## 741       55.61        7 19.4635 389.27      19.4635    8.5  408.7335
```

```
## 742       84.83        1  4.2415  84.83       4.2415    8.8   89.0715
## 743       71.63        2  7.1630 143.26       7.1630    8.8  150.4230
## 744       37.69        2  3.7690  75.38       3.7690    9.5   79.1490
## 745       31.67        8 12.6680 253.36      12.6680    5.6  266.0280
## 746       38.42        1  1.9210  38.42       1.9210    8.6   40.3410
## 747       65.23       10 32.6150 652.30      32.6150    5.2  684.9150
## 748       10.53        5  2.6325  52.65       2.6325    5.8   55.2825
## 749       12.29        9  5.5305 110.61       5.5305    8.0  116.1405
## 750       81.23        7 28.4305 568.61      28.4305    9.0  597.0405
## 751       22.32        4  4.4640  89.28       4.4640    4.1   93.7440
## 752       27.28        5  6.8200 136.40       6.8200    8.6  143.2200
## 753       17.42       10  8.7100 174.20       8.7100    7.0  182.9100
## 754       73.28        5 18.3200 366.40      18.3200    8.4  384.7200
## 755       84.87        3 12.7305 254.61      12.7305    7.4  267.3405
## 756       97.29        8 38.9160 778.32      38.9160    6.2  817.2360
## 757       35.74        8 14.2960 285.92      14.2960    4.9  300.2160
## 758       96.52        6 28.9560 579.12      28.9560    4.5  608.0760
## 759       18.85       10  9.4250 188.50       9.4250    5.6  197.9250
## 760       55.39        4 11.0780 221.56      11.0780    8.0  232.6380
## 761       77.20       10 38.6000 772.00      38.6000    5.6  810.6000
## 762       72.13       10 36.0650 721.30      36.0650    4.2  757.3650
## 763       63.88        8 25.5520 511.04      25.5520    9.9  536.5920
## 764       10.69        5  2.6725  53.45       2.6725    7.6   56.1225
## 765       55.50        4 11.1000 222.00      11.1000    6.6  233.1000
## 766       95.46        8 38.1840 763.68      38.1840    4.7  801.8640
## 767       76.06        3 11.4090 228.18      11.4090    9.8  239.5890
## 768       13.69        6  4.1070  82.14       4.1070    6.3   86.2470
## 769       95.64        4 19.1280 382.56      19.1280    7.9  401.6880
## 770       11.43        6  3.4290  68.58       3.4290    7.7   72.0090
## 771       95.54        4 19.1080 382.16      19.1080    4.5  401.2680
## 772       85.87        7 30.0545 601.09      30.0545    8.0  631.1445
## 773       67.99        7 23.7965 475.93      23.7965    5.7  499.7265
## 774       52.42        1  2.6210  52.42       2.6210    6.3   55.0410
## 775       65.65        2  6.5650 131.30       6.5650    6.0  137.8650
## 776       28.86        5  7.2150 144.30       7.2150    8.0  151.5150
## 777       65.31        7 22.8585 457.17      22.8585    4.2  480.0285
## 778       93.38        1  4.6690  93.38       4.6690    9.6   98.0490
## 779       25.25        5  6.3125 126.25       6.3125    6.1  132.5625
## 780       87.87        9 39.5415 790.83      39.5415    5.6  830.3715
## 781       21.80        8  8.7200 174.40       8.7200    8.3  183.1200
## 782       94.76        4 18.9520 379.04      18.9520    7.8  397.9920
## 783       30.62        1  1.5310  30.62       1.5310    4.1   32.1510
## 784       44.01        8 17.6040 352.08      17.6040    8.8  369.6840
## 785       10.16        5  2.5400  50.80       2.5400    4.1   53.3400
## 786       74.58        7 26.1030 522.06      26.1030    9.0  548.1630
## 787       71.89        8 28.7560 575.12      28.7560    5.5  603.8760
## 788       10.99        5  2.7475  54.95       2.7475    9.3   57.6975
## 789       60.47        3  9.0705 181.41       9.0705    5.6  190.4805
## 790       58.91        7 20.6185 412.37      20.6185    9.7  432.9885
## 791       46.41        1  2.3205  46.41       2.3205    4.0   48.7305
## 792       68.55        4 13.7100 274.20      13.7100    9.2  287.9100
## 793       97.37       10 48.6850 973.70      48.6850    4.9 1022.3850
## 794       92.60        7 32.4100 648.20      32.4100    9.3  680.6100
## 795       46.61        2  4.6610  93.22       4.6610    6.6   97.8810
```

```
## 796       27.18        2  2.7180  54.36       2.7180    4.3   57.0780
## 797       60.87        1  3.0435  60.87       3.0435    5.5   63.9135
## 798       24.49       10 12.2450 244.90      12.2450    8.1  257.1450
## 799       92.78        1  4.6390  92.78       4.6390    9.8   97.4190
## 800       86.69        5 21.6725 433.45      21.6725    9.4  455.1225
## 801       23.01        6  6.9030 138.06       6.9030    7.9  144.9630
## 802       30.20        8 12.0800 241.60      12.0800    5.1  253.6800
## 803       67.39        7 23.5865 471.73      23.5865    6.9  495.3165
## 804       48.96        9 22.0320 440.64      22.0320    8.0  462.6720
## 805       75.59        9 34.0155 680.31      34.0155    8.0  714.3255
## 806       77.47        4 15.4940 309.88      15.4940    4.2  325.3740
## 807       93.18        2  9.3180 186.36       9.3180    8.5  195.6780
## 808       50.23        4 10.0460 200.92      10.0460    9.0  210.9660
## 809       17.75        1  0.8875  17.75       0.8875    8.6   18.6375
## 810       62.18       10 31.0900 621.80      31.0900    6.0  652.8900
## 811       10.75        8  4.3000  86.00       4.3000    6.2   90.3000
## 812       40.26       10 20.1300 402.60      20.1300    5.0  422.7300
## 813       64.97        5 16.2425 324.85      16.2425    6.5  341.0925
## 814       95.15        1  4.7575  95.15       4.7575    6.0   99.9075
## 815       48.62        8 19.4480 388.96      19.4480    5.0  408.4080
## 816       53.21        8 21.2840 425.68      21.2840    5.0  446.9640
## 817       45.44        7 15.9040 318.08      15.9040    9.2  333.9840
## 818       33.88        8 13.5520 271.04      13.5520    9.6  284.5920
## 819       96.16        4 19.2320 384.64      19.2320    8.4  403.8720
## 820       47.16        5 11.7900 235.80      11.7900    6.0  247.5900
## 821       52.89        4 10.5780 211.56      10.5780    6.7  222.1380
## 822       47.68        2  4.7680  95.36       4.7680    4.1  100.1280
## 823       10.17        1  0.5085  10.17       0.5085    5.9   10.6785
## 824       68.71        3 10.3065 206.13      10.3065    8.7  216.4365
## 825       60.08        7 21.0280 420.56      21.0280    4.5  441.5880
## 826       22.01        4  4.4020  88.04       4.4020    6.6   92.4420
## 827       72.11        9 32.4495 648.99      32.4495    7.7  681.4395
## 828       41.28        3  6.1920 123.84       6.1920    8.5  130.0320
## 829       64.95       10 32.4750 649.50      32.4750    5.2  681.9750
## 830       74.22       10 37.1100 742.20      37.1100    4.3  779.3100
## 831       10.56        8  4.2240  84.48       4.2240    7.6   88.7040
## 832       62.57        4 12.5140 250.28      12.5140    9.5  262.7940
## 833       11.85        8  4.7400  94.80       4.7400    4.1   99.5400
## 834       91.30        1  4.5650  91.30       4.5650    9.2   95.8650
## 835       40.73        7 14.2555 285.11      14.2555    5.4  299.3655
## 836       52.38        1  2.6190  52.38       2.6190    5.8   54.9990
## 837       38.54        5  9.6350 192.70       9.6350    5.6  202.3350
## 838       44.63        6 13.3890 267.78      13.3890    5.1  281.1690
## 839       55.87       10 27.9350 558.70      27.9350    5.8  586.6350
## 840       29.22        6  8.7660 175.32       8.7660    5.0  184.0860
## 841       51.94        3  7.7910 155.82       7.7910    7.9  163.6110
## 842       60.30        1  3.0150  60.30       3.0150    6.0   63.3150
## 843       39.47        2  3.9470  78.94       3.9470    5.0   82.8870
## 844       14.87        2  1.4870  29.74       1.4870    8.9   31.2270
## 845       21.32        1  1.0660  21.32       1.0660    5.9   22.3860
## 846       93.78        3 14.0670 281.34      14.0670    5.9  295.4070
## 847       73.26        1  3.6630  73.26       3.6630    9.7   76.9230
## 848       22.38        1  1.1190  22.38       1.1190    8.6   23.4990
## 849       72.88        9 32.7960 655.92      32.7960    4.0  688.7160
```

```
## 850       99.10        6 29.7300 594.60      29.7300    4.2  624.3300
## 851       74.10        1  3.7050  74.10       3.7050    9.2   77.8050
## 852       98.48        2  9.8480 196.96       9.8480    9.2  206.8080
## 853       53.19        7 18.6165 372.33      18.6165    5.0  390.9465
## 854       52.79       10 26.3950 527.90      26.3950   10.0  554.2950
## 855       95.95        5 23.9875 479.75      23.9875    8.8  503.7375
## 856       36.51        9 16.4295 328.59      16.4295    4.2  345.0195
## 857       21.12        8  8.4480 168.96       8.4480    6.3  177.4080
## 858       28.31        4  5.6620 113.24       5.6620    8.2  118.9020
## 859       57.59        6 17.2770 345.54      17.2770    5.1  362.8170
## 860       47.63        9 21.4335 428.67      21.4335    5.0  450.1035
## 861       86.27        1  4.3135  86.27       4.3135    7.0   90.5835
## 862       12.76        2  1.2760  25.52       1.2760    7.8   26.7960
## 863       11.28        9  5.0760 101.52       5.0760    4.3  106.5960
## 864       51.07        7 17.8745 357.49      17.8745    7.0  375.3645
## 865       79.59        3 11.9385 238.77      11.9385    6.6  250.7085
## 866       33.81        3  5.0715 101.43       5.0715    7.3  106.5015
## 867       90.53        8 36.2120 724.24      36.2120    6.5  760.4520
## 868       62.82        2  6.2820 125.64       6.2820    4.9  131.9220
## 869       24.31        3  3.6465  72.93       3.6465    4.3   76.5765
## 870       64.59        4 12.9180 258.36      12.9180    9.3  271.2780
## 871       24.82        7  8.6870 173.74       8.6870    7.1  182.4270
## 872       56.50        1  2.8250  56.50       2.8250    9.6   59.3250
## 873       21.43       10 10.7150 214.30      10.7150    6.2  225.0150
## 874       89.06        6 26.7180 534.36      26.7180    9.9  561.0780
## 875       23.29        4  4.6580  93.16       4.6580    5.9   97.8180
## 876       65.26        8 26.1040 522.08      26.1040    6.3  548.1840
## 877       52.35        1  2.6175  52.35       2.6175    4.0   54.9675
## 878       39.75        1  1.9875  39.75       1.9875    6.1   41.7375
## 879       90.02        8 36.0080 720.16      36.0080    4.5  756.1680
## 880       12.10        8  4.8400  96.80       4.8400    8.6  101.6400
## 881       33.21       10 16.6050 332.10      16.6050    6.0  348.7050
## 882       10.18        8  4.0720  81.44       4.0720    9.5   85.5120
## 883       31.99       10 15.9950 319.90      15.9950    9.9  335.8950
## 884       34.42        6 10.3260 206.52      10.3260    7.5  216.8460
## 885       83.34        2  8.3340 166.68       8.3340    7.6  175.0140
## 886       45.58        7 15.9530 319.06      15.9530    5.0  335.0130
## 887       87.90        1  4.3950  87.90       4.3950    6.7   92.2950
## 888       73.47       10 36.7350 734.70      36.7350    9.5  771.4350
## 889       12.19        8  4.8760  97.52       4.8760    6.8  102.3960
## 890       76.92       10 38.4600 769.20      38.4600    5.6  807.6600
## 891       83.66        5 20.9150 418.30      20.9150    7.2  439.2150
## 892       57.91        8 23.1640 463.28      23.1640    8.1  486.4440
## 893       92.49        5 23.1225 462.45      23.1225    8.6  485.5725
## 894       28.38        5  7.0950 141.90       7.0950    9.4  148.9950
## 895       50.45        6 15.1350 302.70      15.1350    8.9  317.8350
## 896       99.16        8 39.6640 793.28      39.6640    4.2  832.9440
## 897       60.74        7 21.2590 425.18      21.2590    5.0  446.4390
## 898       47.27        6 14.1810 283.62      14.1810    8.8  297.8010
## 899       85.60        7 29.9600 599.20      29.9600    5.3  629.1600
## 900       35.04        9 15.7680 315.36      15.7680    4.6  331.1280
## 901       44.84        9 20.1780 403.56      20.1780    7.5  423.7380
## 902       45.97        4  9.1940 183.88       9.1940    5.1  193.0740
## 903       27.73        5  6.9325 138.65       6.9325    4.2  145.5825
```

```
## 904       11.53        7  4.0355  80.71       4.0355    8.1   84.7455
## 905       58.32        2  5.8320 116.64       5.8320    6.0  122.4720
## 906       78.38        4 15.6760 313.52      15.6760    7.9  329.1960
## 907       84.61       10 42.3050 846.10      42.3050    8.8  888.4050
## 908       82.88        5 20.7200 414.40      20.7200    6.6  435.1200
## 909       79.54        2  7.9540 159.08       7.9540    6.2  167.0340
## 910       49.01       10 24.5050 490.10      24.5050    4.2  514.6050
## 911       29.15        3  4.3725  87.45       4.3725    7.3   91.8225
## 912       56.13        4 11.2260 224.52      11.2260    8.6  235.7460
## 913       93.12        8 37.2480 744.96      37.2480    6.8  782.2080
## 914       51.34        8 20.5360 410.72      20.5360    7.6  431.2560
## 915       99.60        3 14.9400 298.80      14.9400    5.8  313.7400
## 916       35.49        6 10.6470 212.94      10.6470    4.1  223.5870
## 917       42.85        1  2.1425  42.85       2.1425    9.3   44.9925
## 918       94.67        4 18.9340 378.68      18.9340    6.8  397.6140
## 919       68.97        3 10.3455 206.91      10.3455    8.7  217.2555
## 920       26.26        3  3.9390  78.78       3.9390    6.3   82.7190
## 921       35.79        9 16.1055 322.11      16.1055    5.1  338.2155
## 922       16.37        6  4.9110  98.22       4.9110    7.0  103.1310
## 923       12.73        2  1.2730  25.46       1.2730    5.2   26.7330
## 924       83.14        7 29.0990 581.98      29.0990    6.6  611.0790
## 925       35.22        6 10.5660 211.32      10.5660    6.5  221.8860
## 926       13.78        4  2.7560  55.12       2.7560    9.0   57.8760
## 927       88.31        1  4.4155  88.31       4.4155    5.2   92.7255
## 928       39.62        9 17.8290 356.58      17.8290    6.8  374.4090
## 929       88.25        9 39.7125 794.25      39.7125    7.6  833.9625
## 930       25.31        2  2.5310  50.62       2.5310    7.2   53.1510
## 931       99.92        6 29.9760 599.52      29.9760    7.1  629.4960
## 932       83.35        2  8.3350 166.70       8.3350    9.5  175.0350
## 933       74.44       10 37.2200 744.40      37.2200    5.1  781.6200
## 934       64.08        7 22.4280 448.56      22.4280    7.6  470.9880
## 935       63.15        6 18.9450 378.90      18.9450    9.8  397.8450
## 936       85.72        3 12.8580 257.16      12.8580    5.1  270.0180
## 937       78.89        7 27.6115 552.23      27.6115    7.5  579.8415
## 938       89.48        5 22.3700 447.40      22.3700    7.4  469.7700
## 939       92.09        3 13.8135 276.27      13.8135    4.2  290.0835
## 940       57.29        6 17.1870 343.74      17.1870    5.9  360.9270
## 941       66.52        4 13.3040 266.08      13.3040    6.9  279.3840
## 942       99.82        9 44.9190 898.38      44.9190    6.6  943.2990
## 943       45.68       10 22.8400 456.80      22.8400    5.7  479.6400
## 944       50.79        5 12.6975 253.95      12.6975    5.3  266.6475
## 945       10.08        7  3.5280  70.56       3.5280    4.2   74.0880
## 946       93.88        7 32.8580 657.16      32.8580    7.3  690.0180
## 947       84.25        2  8.4250 168.50       8.4250    5.3  176.9250
## 948       53.78        1  2.6890  53.78       2.6890    4.7   56.4690
## 949       35.81        5  8.9525 179.05       8.9525    7.9  188.0025
## 950       26.43        8 10.5720 211.44      10.5720    8.9  222.0120
## 951       39.91        3  5.9865 119.73       5.9865    9.3  125.7165
## 952       21.90        3  3.2850  65.70       3.2850    4.7   68.9850
## 953       62.85        4 12.5700 251.40      12.5700    8.7  263.9700
## 954       21.04        4  4.2080  84.16       4.2080    7.6   88.3680
## 955       65.91        6 19.7730 395.46      19.7730    5.7  415.2330
## 956       42.57        7 14.8995 297.99      14.8995    6.8  312.8895
## 957       50.49        9 22.7205 454.41      22.7205    5.4  477.1305
```

```
## 958       46.02        6 13.8060 276.12      13.8060    7.1  289.9260
## 959       15.80       10  7.9000 158.00       7.9000    7.8  165.9000
## 960       98.66        9 44.3970 887.94      44.3970    8.4  932.3370
## 961       91.98        1  4.5990  91.98       4.5990    9.8   96.5790
## 962       20.89        2  2.0890  41.78       2.0890    9.8   43.8690
## 963       15.50        1  0.7750  15.50       0.7750    7.4   16.2750
## 964       96.82        3 14.5230 290.46      14.5230    6.7  304.9830
## 965       33.33        2  3.3330  66.66       3.3330    6.4   69.9930
## 966       38.27        2  3.8270  76.54       3.8270    5.8   80.3670
## 967       33.30        9 14.9850 299.70      14.9850    7.2  314.6850
## 968       81.01        3 12.1515 243.03      12.1515    9.3  255.1815
## 969       15.80        3  2.3700  47.40       2.3700    9.5   49.7700
## 970       34.49        5  8.6225 172.45       8.6225    9.0  181.0725
## 971       84.63       10 42.3150 846.30      42.3150    9.0  888.6150
## 972       36.91        7 12.9185 258.37      12.9185    6.7  271.2885
## 973       87.08        7 30.4780 609.56      30.4780    5.5  640.0380
## 974       80.08        3 12.0120 240.24      12.0120    5.4  252.2520
## 975       86.13        2  8.6130 172.26       8.6130    8.2  180.8730
## 976       49.92        2  4.9920  99.84       4.9920    7.0  104.8320
## 977       74.66        4 14.9320 298.64      14.9320    8.5  313.5720
## 978       26.60        6  7.9800 159.60       7.9800    4.9  167.5800
## 979       25.45        1  1.2725  25.45       1.2725    5.1   26.7225
## 980       67.77        1  3.3885  67.77       3.3885    6.5   71.1585
## 981       59.59        4 11.9180 238.36      11.9180    9.8  250.2780
## 982       58.15        4 11.6300 232.60      11.6300    8.4  244.2300
## 983       97.48        9 43.8660 877.32      43.8660    7.4  921.1860
## 984       99.96        7 34.9860 699.72      34.9860    6.1  734.7060
## 985       96.37        7 33.7295 674.59      33.7295    6.0  708.3195
## 986       63.71        5 15.9275 318.55      15.9275    8.5  334.4775
## 987       14.76        2  1.4760  29.52       1.4760    4.3   30.9960
## 988       62.00        8 24.8000 496.00      24.8000    6.2  520.8000
## 989       82.34       10 41.1700 823.40      41.1700    4.3  864.5700
## 990       75.37        8 30.1480 602.96      30.1480    8.4  633.1080
## 991       56.56        5 14.1400 282.80      14.1400    4.5  296.9400
## 992       76.60       10 38.3000 766.00      38.3000    6.0  804.3000
## 993       58.03        2  5.8030 116.06       5.8030    8.8  121.8630
## 994       17.49       10  8.7450 174.90       8.7450    6.6  183.6450
## 995       60.95        1  3.0475  60.95       3.0475    5.9   63.9975
## 996       40.35        1  2.0175  40.35       2.0175    6.2   42.3675
## 997       97.38       10 48.6900 973.80      48.6900    4.4 1022.4900
## 998       31.84        1  1.5920  31.84       1.5920    7.7   33.4320
## 999       65.82        1  3.2910  65.82       3.2910    4.1   69.1110
## 1000      88.34        7 30.9190 618.38      30.9190    6.6  649.2990
```

```
sales.pca <- prcomp(sales_df, center = TRUE, scale. = TRUE)
summary(sales.pca)
```

```
## Importance of components:
##                           PC1    PC2    PC3     PC4       PC5       PC6
## Standard deviation     2.2185 1.0002 0.9939 0.30001 2.981e-16 1.493e-16
## Proportion of Variance 0.7031 0.1429 0.1411 0.01286 0.000e+00 0.000e+00
## Cumulative Proportion  0.7031 0.8460 0.9871 1.00000 1.000e+00 1.000e+00
##                           PC7
## Standard deviation     9.831e-17
```

```
## Proportion of Variance 0.000e+00
## Cumulative Proportion  1.000e+00
```

As a result we obtain 7 principal components, each which explain a percentate of the total variation of the dataset. PC1 explains 70.31%% of the total variance, which means that more two-thirds of the information in the dataset (7 variables) can be encapsulated by just that one Principal Component. PC2 explains 14,29% of the variance.

```
#checking the structure
str(sales.pca)
```

```
## List of 5
##  $ sdev    : num [1:7] 2.22 1.00 9.94e-01 3.00e-01 2.98e-16 ...
##  $ rotation: num [1:7, 1:7] -0.292 -0.325 -0.45 -0.45 -0.45 ...
##   ..- attr(*, "dimnames")=List of 2
##   .. ..$ : chr [1:7] "Unit.price" "Quantity" "Tax" "cogs" ...
##   .. ..$ : chr [1:7] "PC1" "PC2" "PC3" "PC4" ...
##  $ center  : Named num [1:7] 55.67 5.51 15.38 307.59 15.38 ...
##   ..- attr(*, "names")= chr [1:7] "Unit.price" "Quantity" "Tax" "cogs" ...
##  $ scale   : Named num [1:7] 26.49 2.92 11.71 234.18 11.71 ...
##   ..- attr(*, "names")= chr [1:7] "Unit.price" "Quantity" "Tax" "cogs" ...
##  $ x       : num [1:1000, 1:7] -2.005 2.306 -0.186 -1.504 -2.8 ...
##   ..- attr(*, "dimnames")=List of 2
##   .. ..$ : NULL
##   .. ..$ : chr [1:7] "PC1" "PC2" "PC3" "PC4" ...
##  - attr(*, "class")= chr "prcomp"
```

##Plot

```
#Plotting the pca
library(devtools)
```

```
## Loading required package: usethis
```

```
install_github("vqv/ggbiplot")
```

```
## Skipping install of 'ggbiplot' from a github remote, the SHA1 (7325e880) has not changed since last i
##   Use 'force = TRUE' to force installation
```

```
#Load
library(ggbiplot)
```

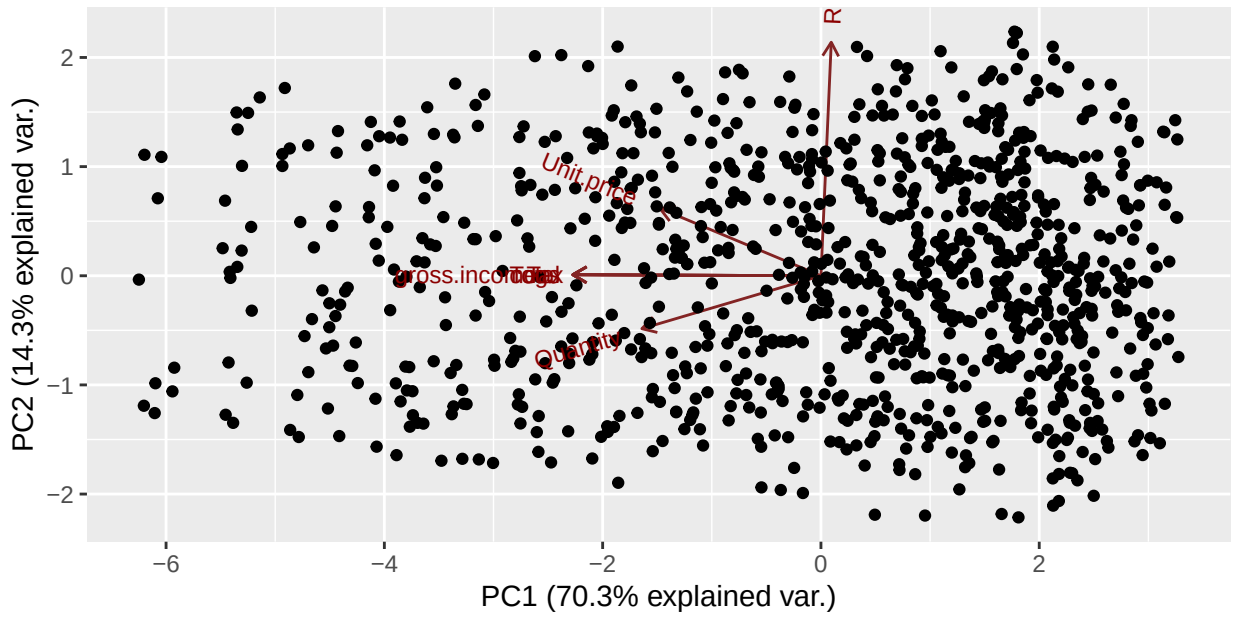
```
## Loading required package: ggplot2
```

```
## Loading required package: plyr
```

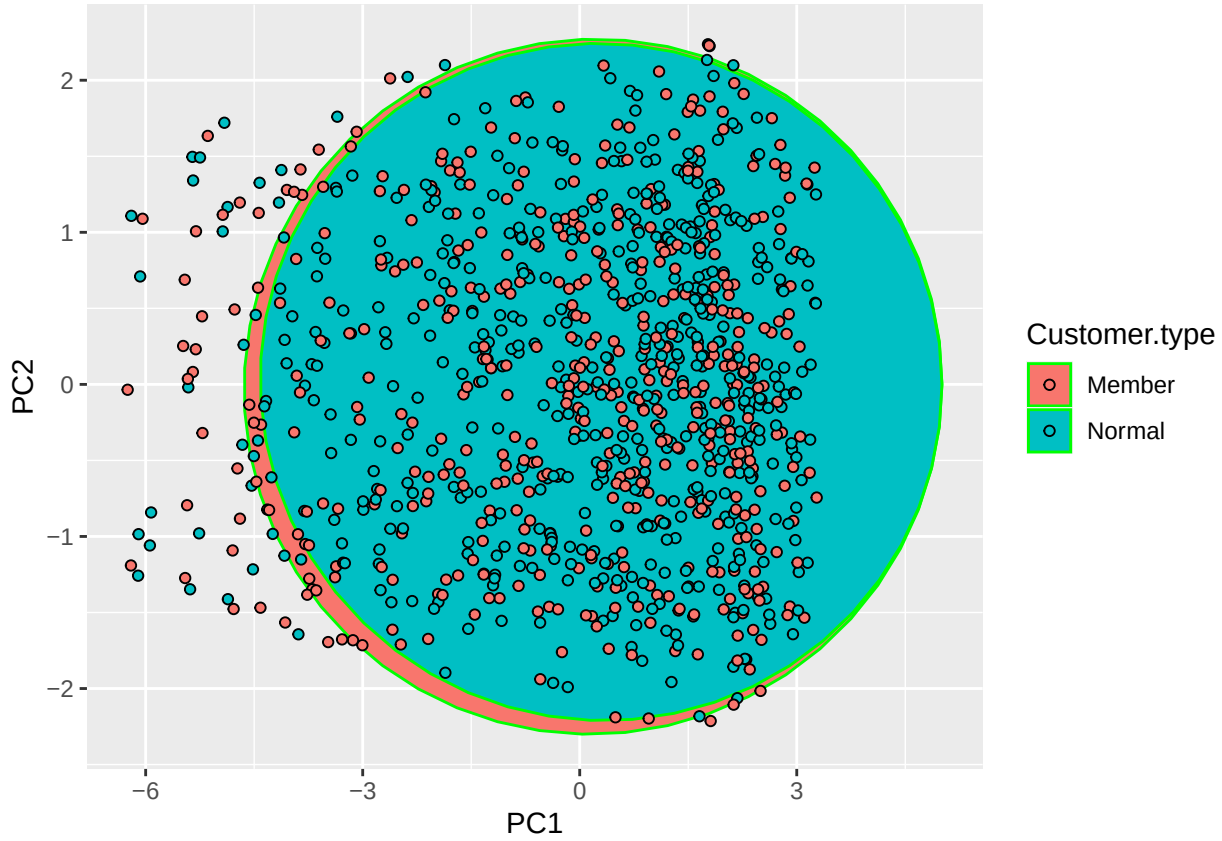
```
## Loading required package: scales
```

```
## Loading required package: grid
```

```
ggbiplot(sales.pca, obs.scale = 1, var.scale = 1)
```




```
#Selecting pca 1 to 3 and adding to the main
sales_pca <- cbind(sales,sales.pca$x[,1:3])
#plotting PC1 and PC2 to check the products by grouping based on Customer Type
ggplot(sales_pca,aes(PC1,PC2,, col=Product.line,fill=Customer.type))+
 stat_ellipse(geom = "polygon",col='green',alpha=1)+
 geom_point(col='black',shape=21)
```



Conclusion

Quantity, Rating, Unit Price and Gross income are the most important features in this analysis. Marketing team when adversting their products should consider quality of the product, unit price, rating of the products and the gross income of their consumers.

Feature Selection

Filter Methods

```
# Installing and loading our caret and corrplot package
# ---
#
suppressWarnings(
        suppressMessages(if
                         (!require(caret, quietly=TRUE))
                 install.packages("caret")))
library(caret)
suppressWarnings(
        suppressMessages(if
                         (!require(corrplot, quietly=TRUE))
```

```
                install.packages("corrplot")))
library(corrplot)
```

```
# Installing and loading our clustvarsel package
suppressWarnings(
        suppressMessages(if
                         (!require(clustvarsel, quietly=TRUE))
                install.packages("clustvarsel")))

library(clustvarsel)
# Installing and loading our mclust package
suppressWarnings(
        suppressMessages(if
                         (!require(mclust, quietly=TRUE))
                install.packages("mclust")))
library(mclust)
```

```
# Calculating the correlation matrix
corr<- cor(num)
```

```
## Warning in cor(num): the standard deviation is zero
```

```
corr
```

```
##                            Unit.price    Quantity        Tax       cogs
## Unit.price                1.000000000  0.01077756  0.6339621  0.6339621
## Quantity                  0.010777564  1.00000000  0.7055102  0.7055102
## Tax                       0.633962089  0.70551019  1.0000000  1.0000000
## cogs                      0.633962089  0.70551019  1.0000000  1.0000000
## gross.margin.percentage           NA          NA         NA         NA
## gross.income              0.633962089  0.70551019  1.0000000  1.0000000
## Rating                   -0.008777507 -0.01581490 -0.0364417 -0.0364417
## Total                     0.633962089  0.70551019  1.0000000  1.0000000
##                          gross.margin.percentage gross.income       Rating
## Unit.price                                    NA    0.6339621 -0.008777507
## Quantity                                      NA    0.7055102 -0.015814905
## Tax                                           NA    1.0000000 -0.036441705
## cogs                                          NA    1.0000000 -0.036441705
## gross.margin.percentage                        1           NA           NA
## gross.income                                  NA    1.0000000 -0.036441705
## Rating                                        NA   -0.0364417  1.000000000
## Total                                         NA    1.0000000 -0.036441705
##                                Total
## Unit.price                 0.6339621
## Quantity                   0.7055102
## Tax                        1.0000000
## cogs                       1.0000000
## gross.margin.percentage         NA
## gross.income               1.0000000
## Rating                    -0.0364417
## Total                      1.0000000
```

```
# Find attributes that are highly correlated
# ---
#
highlyCorr <- findCorrelation(corr, cutoff=0.75)
highlyCorr
```

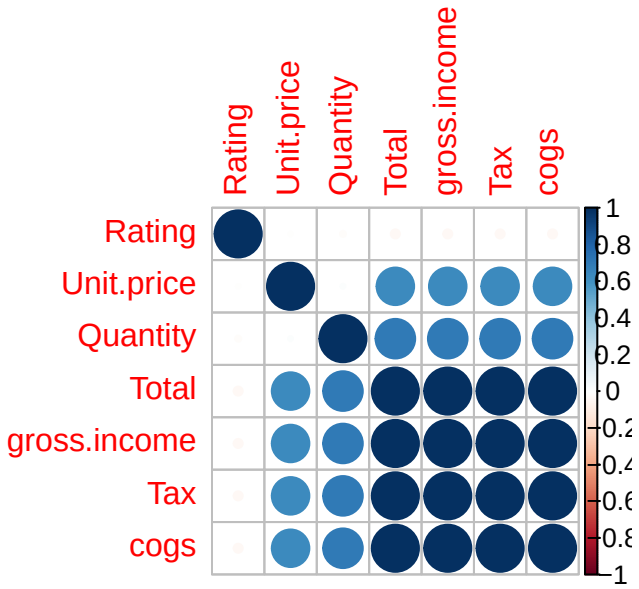
```
## [1] 4 8 3
```

```
names(sales[,highlyCorr])
```

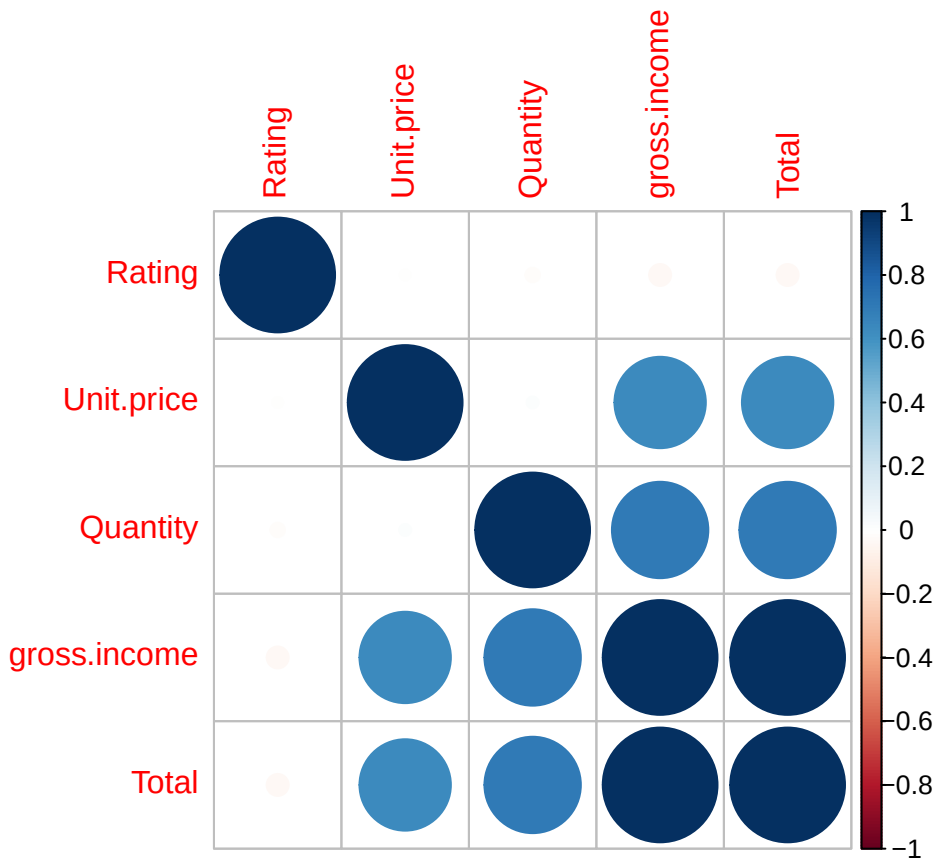
```
## [1] "Gender"        "Tax"           "Customer.type"
```

```
# We can remove the variables with a higher correlation
sales_dt<-sales_df[-highlyCorr]
```

```
#Graphical comparison
par(mfrow = c(1, 2))
#Before removing the highly correlated features
corrplot(cor(sales_df), order = "hclust")
```




```
#Afer removing the highly correlated features
corrplot(cor(sales_dt), order = "hclust")
```




```
#Normalize the data
library(dplyr)
```

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

```
## The following objects are masked from 'package:plyr':
##
##     arrange, count, desc, failwith, id, mutate, rename, summarise,
##     summarize
```

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

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

```
sale_df.norm<-as.data.frame(scale(sales_df))
head(sale_df.norm)
```

```
##    Unit.price   Quantity         Tax        cogs gross.income     Rating
## 1  0.71780097  0.5096752  0.91914693  0.91914693   0.91914693  1.2378240
```

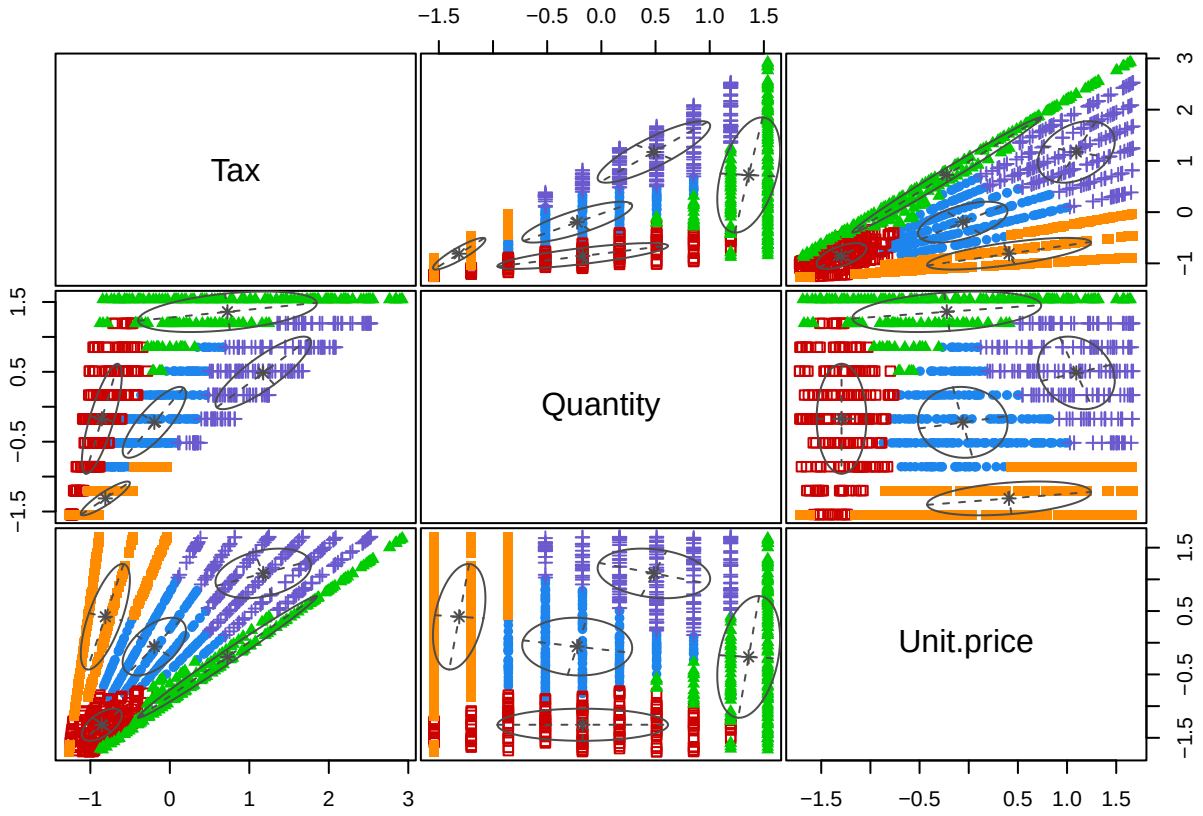
```
## 2 -1.52454035 -0.1744526 -0.98723557 -0.98723557  -0.98723557  1.5287619
## 3 -0.35260468  0.5096752  0.07141032  0.07141032   0.07141032  0.2486355
## 4  0.09616553  0.8517391  0.67544187  0.67544187   0.67544187  0.8305111
## 5  1.15638044  0.5096752  1.26649176  1.26649176   1.26649176 -0.9733034
## 6  1.12165642  0.5096752  1.23899114  1.23899114   1.23899114 -1.6715541
##         Total
## 1  0.91914693
## 2 -0.98723557
## 3  0.07141032
## 4  0.67544187
## 5  1.26649176
## 6  1.23899114
```

```
#Sequential forward greedy search:
out = clustvarsel(sale_df.norm, G = 1:5)
```

```
# Clustering model
Subset1 = sale_df.norm[,out$subset]
mod = Mclust(Subset1, G = 1:5)
summary(mod)
```

```
## ----------------------------------------------------
## Gaussian finite mixture model fitted by EM algorithm
## ----------------------------------------------------
##
## Mclust EVV (ellipsoidal, equal volume) model with 5 components:
##
##  log-likelihood    n df       BIC      ICL
##       -1176.213 1000 45 -2663.276 -2791.29
##
## Clustering table:
##   1   2   3   4   5
## 213 197 185 200 205
```

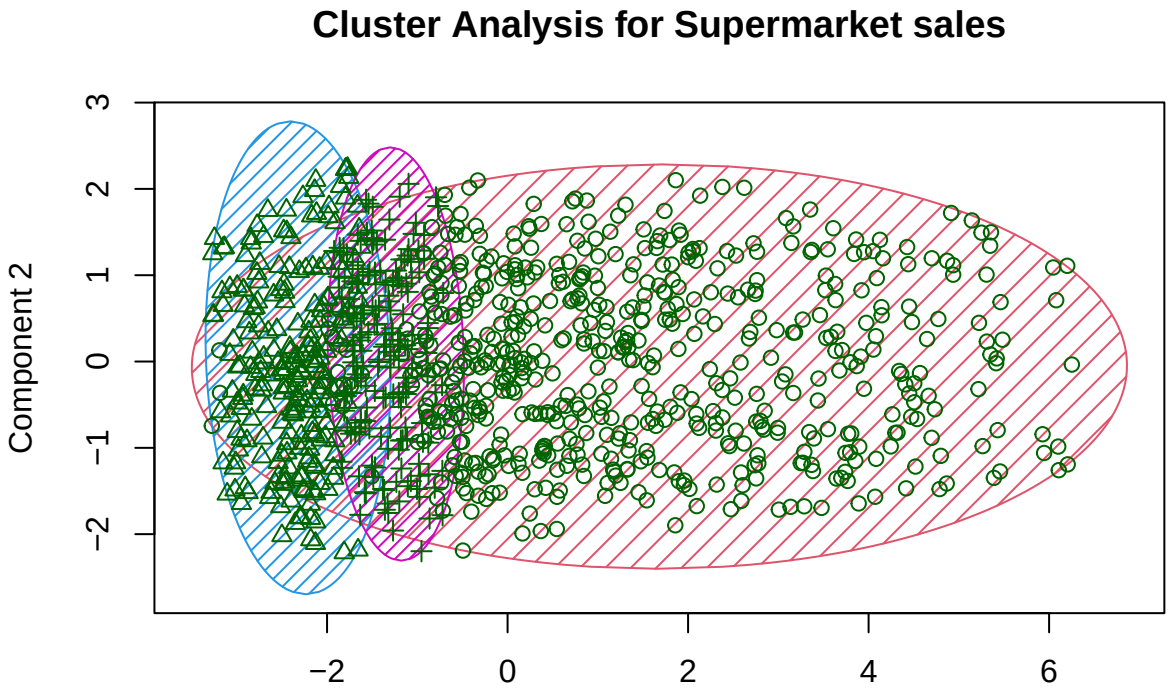
```
plot(mod,c("classification"))
```




```
suppressWarnings(
        suppressMessages(if
                        (!require(cluster, quietly=TRUE))
                install.packages("cluster")))
library("cluster")

suppressWarnings(
        suppressMessages(if
                        (!require(wskm, quietly=TRUE))
                install.packages("wskm")))
library(wskm)
```

```
#Deploying the function
set.seed(23)
model <- ewkm(sales_df, 3, lambda=2, maxiter=1000)
```

```
#Clustering
clusplot(sales_df, model$cluster, color=TRUE, shade=TRUE,
         lines=1,main='Cluster Analysis for Supermarket sales')
```



These two components explain 84.6 % of the point variability.

```
# Weights are calculated for each variable and cluster.
# They are a measure of the relative importance of each variable
# with regards to the membership of the observations to that cluster.
# The weights are incorporated into the distance function,
# typically reducing the distance for more important variables.
# Weights remain stored in the model and we can check them as follows:
#
round(model$weights*100,2)
```

```
##   Unit.price Quantity Tax cogs gross.income Rating Total
## 1          0        0   0    0            0  99.99     0
## 2          0        0  50    0           50   0.00     0
## 3          0        0  50    0           50   0.00     0
```

Part 3 : Association rules.

```
library(arules)
```

```
## Loading required package: Matrix
```

```
##
## Attaching package: 'arules'
```

```
## The following object is masked from 'package:dplyr':
##
##     recode

## The following objects are masked from 'package:base':
##
##     abbreviate, write
```

```
path <- "http://bit.ly/SupermarketDatasetII"
Transactions<-read.transactions(path, sep = ",")
```

```
## Warning in asMethod(object): removing duplicated items in transactions
```

```
Transactions
```

```
## transactions in sparse format with
##  7501 transactions (rows) and
##  119 items (columns)
```

```
# verifying the object class
class(Transactions)
```

```
## [1] "transactions"
## attr(,"package")
## [1] "arules"
```

```
# Previewing our first 5 transactions
inspect(Transactions[1:5])
```

```
##     items
## [1] {almonds,
##      antioxydant juice,
##      avocado,
##      cottage cheese,
##      energy drink,
##      frozen smoothie,
##      green grapes,
##      green tea,
##      honey,
##      low fat yogurt,
##      mineral water,
##      olive oil,
##      salad,
##      salmon,
##      shrimp,
##      spinach,
##      tomato juice,
##      vegetables mix,
##      whole weat flour,
##      yams}
## [2] {burgers,
```

```
##      eggs,
##      meatballs}
## [3] {chutney}
## [4] {avocado,
##      turkey}
## [5] {energy bar,
##      green tea,
##      milk,
##      mineral water,
##      whole wheat rice}
```

```
# preview the items that make up our dataset,
# alternatively we can do the following
# ---
#
items<-as.data.frame(itemLabels(Transactions))
colnames(items) <- "Item"
head(items, 10)
```

```
##                 Item
## 1            almonds
## 2  antioxydant juice
## 3          asparagus
## 4            avocado
## 5        babies food
## 6              bacon
## 7     barbecue sauce
## 8          black tea
## 9        blueberries
## 10        body spray
```

```
# Generating a summary of the transaction dataset
# ---
# This would give us some information such as the most purchased items,
# distribution of the item sets (no. of items purchased in each transaction), etc.
summary(Transactions)
```

```
## transactions as itemMatrix in sparse format with
##  7501 rows (elements/itemsets/transactions) and
##  119 columns (items) and a density of 0.03288973
##
## most frequent items:
## mineral water          eggs     spaghetti  french fries     chocolate
##          1788          1348          1306          1282          1229
##       (Other)
##         22405
##
## element (itemset/transaction) length distribution:
## sizes
##    1    2    3    4    5    6    7    8    9   10   11   12   13   14   15   16
## 1754 1358 1044  816  667  493  391  324  259  139  102   67   40   22   17    4
##   18   19   20
##    1    2    1
```

```
##
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
##   1.000   2.000   3.000   3.914   5.000  20.000
##
## includes extended item information - examples:
##              labels
## 1           almonds
## 2 antioxydant juice
## 3         asparagus
```

In the dataset, the most frequently bought item is Mineral water followed by eggs.

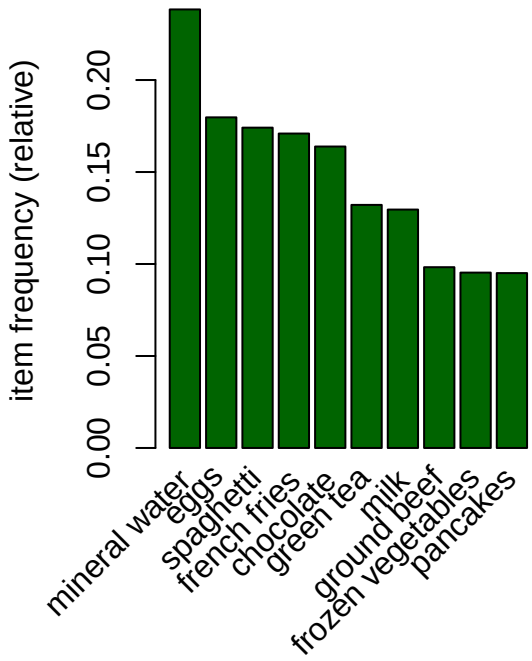
```
# Exploring the frequency of some articles

itemFrequency(Transactions[, 8:10],type = "absolute")
```

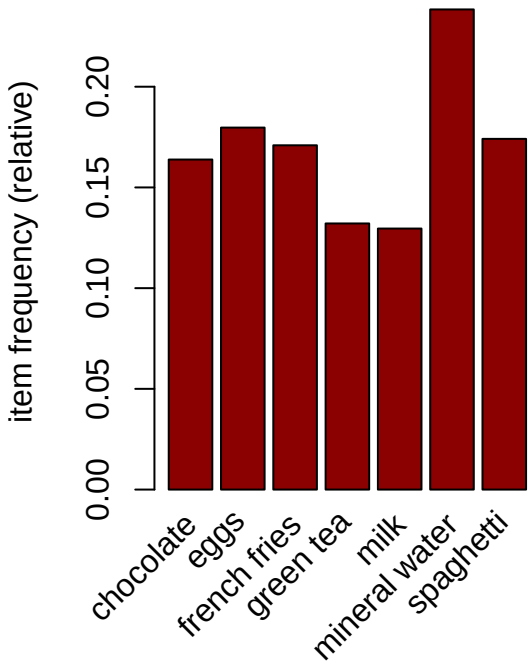
```
##   black tea blueberries  body spray
##         107          69          86
```

```
round(itemFrequency(Transactions[, 8:10],type = "relative")*100,2)
```

```
##   black tea blueberries  body spray
##        1.43        0.92        1.15
```

```
# Producing a chart of frequencies and filtering
# to consider only items with a minimum percentage
# of support/ considering a top x of items
# ---
# Displaying top 10 most common items in the transactions dataset
# and the items whose relative importance is at least 10%
#
par(mfrow = c(1, 2))
# plot the frequency of items
itemFrequencyPlot(Transactions, topN = 10,col="darkgreen")
itemFrequencyPlot(Transactions, support = 0.1,col="darkred")
```






```
# Building a model based on association rules
# We use Min Support as 0.001 and confidence as 0.8
rules <- apriori (Transactions, parameter = list(supp = 0.001, conf = 0.8))
```

```
## Apriori
##
## Parameter specification:
##  confidence minval smax arem  aval originalSupport maxtime support minlen
##         0.8    0.1    1 none FALSE            TRUE       5   0.001      1
##  maxlen target  ext
##      10  rules TRUE
##
## Algorithmic control:
##  filter tree heap memopt load sort verbose
##     0.1 TRUE TRUE  FALSE TRUE    2    TRUE
##
## Absolute minimum support count: 7
##
## set item appearances ...[0 item(s)] done [0.00s].
## set transactions ...[119 item(s), 7501 transaction(s)] done [0.00s].
## sorting and recoding items ... [116 item(s)] done [0.00s].
## creating transaction tree ... done [0.00s].
## checking subsets of size 1 2 3 4 5 6 done [0.01s].
## writing ... [74 rule(s)] done [0.00s].
## creating S4 object  ... done [0.00s].
```

```
rules
```

```
## set of 74 rules
```

Using a confidence level of 0.80 and support of 0.001 we have a model with 74 rules. An increase in minimum support will result in a decrease in the number of rules by the model. However, a slight decrease in the confidence level will result in a huge increase in the rules created by the models.

```
# Lets get more information on the rules formed
# More statistical information such as support, lift and confidence is also provided.
# ---
#
summary(rules)
```

```
## set of 74 rules
##
## rule length distribution (lhs + rhs):sizes
##  3  4  5  6
## 15 42 16  1
##
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
##   3.000   4.000   4.000   4.041   4.000   6.000
##
## summary of quality measures:
##     support           confidence        coverage             lift
##  Min.   :0.001067   Min.   :0.8000   Min.   :0.001067   Min.   : 3.356
##  1st Qu.:0.001067   1st Qu.:0.8000   1st Qu.:0.001333   1st Qu.: 3.432
##  Median :0.001133   Median :0.8333   Median :0.001333   Median : 3.795
##  Mean   :0.001256   Mean   :0.8504   Mean   :0.001479   Mean   : 4.823
##  3rd Qu.:0.001333   3rd Qu.:0.8889   3rd Qu.:0.001600   3rd Qu.: 4.877
##  Max.   :0.002533   Max.   :1.0000   Max.   :0.002666   Max.   :12.722
##      count
##  Min.   : 8.000
##  1st Qu.: 8.000
##  Median : 8.500
##  Mean   : 9.419
##  3rd Qu.:10.000
##  Max.   :19.000
##
## mining info:
##          data ntransactions support confidence
##  Transactions          7501   0.001        0.8
##                                                                                call
##  apriori(data = Transactions, parameter = list(supp = 0.001, conf = 0.8))
```

The set of 74 rules has a maximum rule length of 6 and a minimum of 3.

```
# lets take a peek at the first 5 rules of the associative model formed.
inspect(rules[1:5])
```

```
##     lhs                               rhs             support     confidence
## [1] {frozen smoothie, spinach}    => {mineral water} 0.001066524 0.8888889
```

```
## [2] {bacon, pancakes}             => {spaghetti}     0.001733102 0.8125000
## [3] {nonfat milk, turkey}         => {mineral water} 0.001199840 0.8181818
## [4] {ground beef, nonfat milk}    => {mineral water} 0.001599787 0.8571429
## [5] {mushroom cream sauce, pasta} => {escalope}      0.002532996 0.9500000
##     coverage    lift      count
## [1] 0.001199840  3.729058  8
## [2] 0.002133049  4.666587 13
## [3] 0.001466471  3.432428  9
## [4] 0.001866418  3.595877 12
## [5] 0.002666311 11.976387 19
```

The interpretation of this will require the understanding of several words. - Support -> How popular an itemset is, as measured by the proportion of transactions in which an itemset appears. - Confidence -> How often one item A appears whenever another item B appears in a transaction. This is usually a conditional probability. - Lift -> A rule with a lift of > 1 it would imply that those two occurrences are dependent on one another and useful for predicting.

Thus in the 5th rule with a confidence level ~ 0.95 means that it is very likely that these three items are bought together by every customer.

```
# So lets sort the rules by the confidence levels to see the items are mostly bought together
rules<-sort(rules, by="confidence", decreasing=TRUE)
inspect(rules[1:5])
```

```
##     lhs                         rhs                support confidence    coverage      lift count
## [1] {french fries,
##      mushroom cream sauce,
##      pasta}                 => {escalope}      0.001066524       1.00 0.001066524 12.606723     8
## [2] {ground beef,
##      light cream,
##      olive oil}             => {mineral water} 0.001199840       1.00 0.001199840  4.195190     9
## [3] {cake,
##      meatballs,
##      mineral water}         => {milk}          0.001066524       1.00 0.001066524  7.717078     8
## [4] {cake,
##      olive oil,
##      shrimp}                => {mineral water} 0.001199840       1.00 0.001199840  4.195190     9
## [5] {mushroom cream sauce,
##      pasta}                 => {escalope}      0.002532996       0.95 0.002666311 11.976387    19
```

The following rules with a confidence level of 1 means that the items are almost always bought in that combination. Therefore, the marketing division would have to find a way to create promotions on these items. For instance, a promotion campaign would be like buy french fries and get 50 percent off on Mushroom cream sauce.

Part 4: Anomaly Detection

```
# Installing anomalize package
# ---
#
#install.packages("anomalize")
```

```
# Load tidyverse and anomalize
# ---
#
library(tidyverse)
```

```
## -- Attaching packages --------------------------------------- tidyverse 1.3.1 --

## v tibble  3.1.6     v purrr   0.3.4
## v tidyr   1.2.0     v stringr 1.4.0
## v readr   2.1.2     v forcats 0.5.1

## -- Conflicts ------------------------------------------ tidyverse_conflicts() --
## x dplyr::arrange()      masks plyr::arrange()
## x readr::col_factor()   masks scales::col_factor()
## x purrr::compact()      masks plyr::compact()
## x dplyr::count()        masks plyr::count()
## x purrr::discard()      masks scales::discard()
## x tidyr::expand()       masks Matrix::expand()
## x dplyr::failwith()     masks plyr::failwith()
## x dplyr::filter()       masks stats::filter()
## x dplyr::id()           masks plyr::id()
## x dplyr::lag()          masks stats::lag()
## x latticeExtra::layer() masks ggplot2::layer()
## x purrr::lift()         masks caret::lift()
## x purrr::map()          masks mclust::map()
## x dplyr::mutate()       masks plyr::mutate()
## x tidyr::pack()         masks Matrix::pack()
## x arules::recode()      masks dplyr::recode()
## x dplyr::rename()       masks plyr::rename()
## x dplyr::summarise()    masks plyr::summarise()
## x dplyr::summarize()    masks plyr::summarize()
## x tidyr::unpack()       masks Matrix::unpack()
```

```
library(anomalize)
```

```
## == Use anomalize to improve your Forecasts by 50%! ============================
## Business Science offers a 1-hour course - Lab #18: Time Series Anomaly Detection!
## </> Learn more at: https://university.business-science.io/p/learning-labs-pro </>
```

```
# load data and convert it to as_tbl_time
anom <- read.csv('http://bit.ly/CarreFourSalesDataset')
head(anom)
```

```
##        Date    Sales
## 1  1/5/2019 548.9715
## 2  3/8/2019  80.2200
## 3  3/3/2019 340.5255
## 4 1/27/2019 489.0480
## 5  2/8/2019 634.3785
## 6 3/25/2019 627.6165
```

First we have to format the Date column as date attribute.

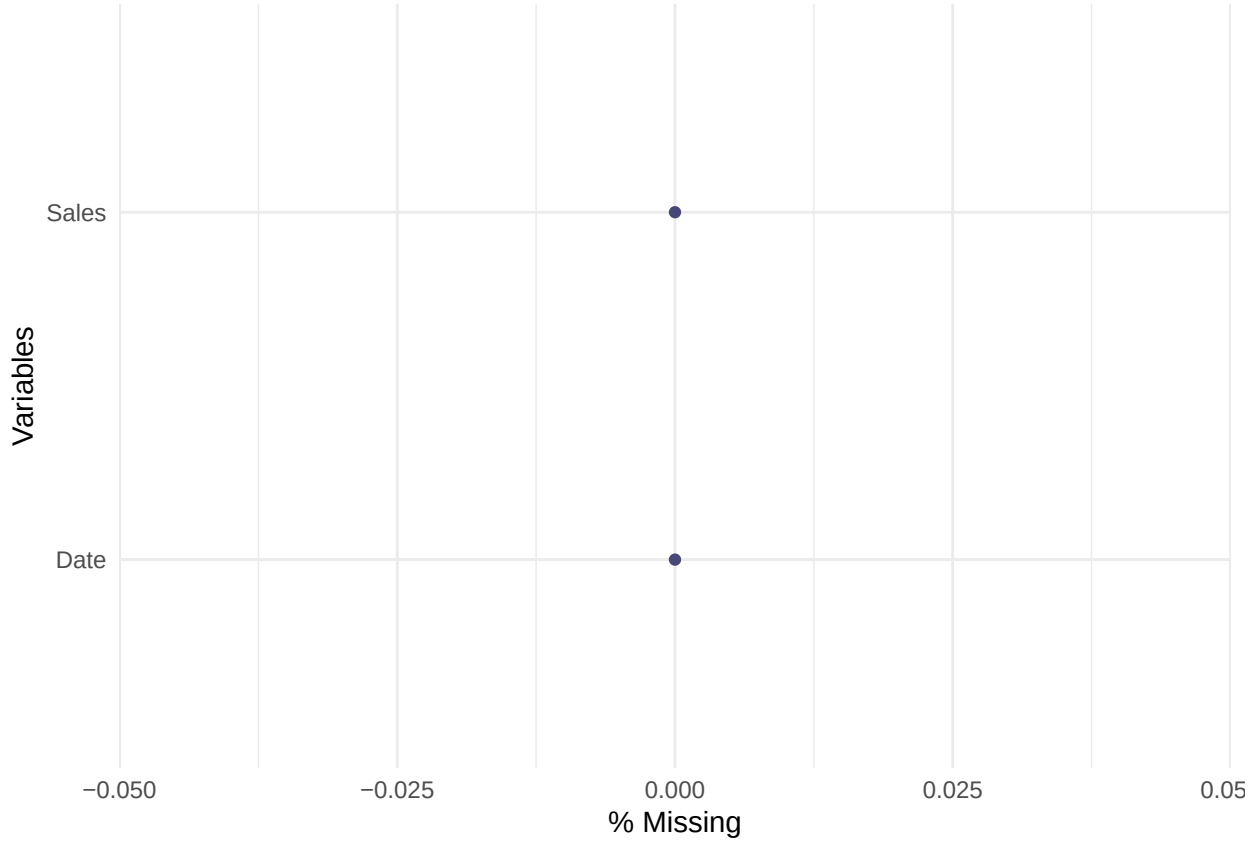
```
# conversion to date
anom$Date <- as.Date(anom$Date , format = "%m/%d/%y")
dim(anom)
```

```
## [1] 1000    2
```

For the Carrefour sales data, there are 1000 rows and 2 columns

```
library(naniar)
gg_miss_var(anom, show_pct = TRUE)
```

```
## Warning: It is deprecated to specify ‘guide = FALSE‘ to remove a guide. Please
## use ‘guide = "none"‘ instead.
```




```
colSums(is.na(anom))
```

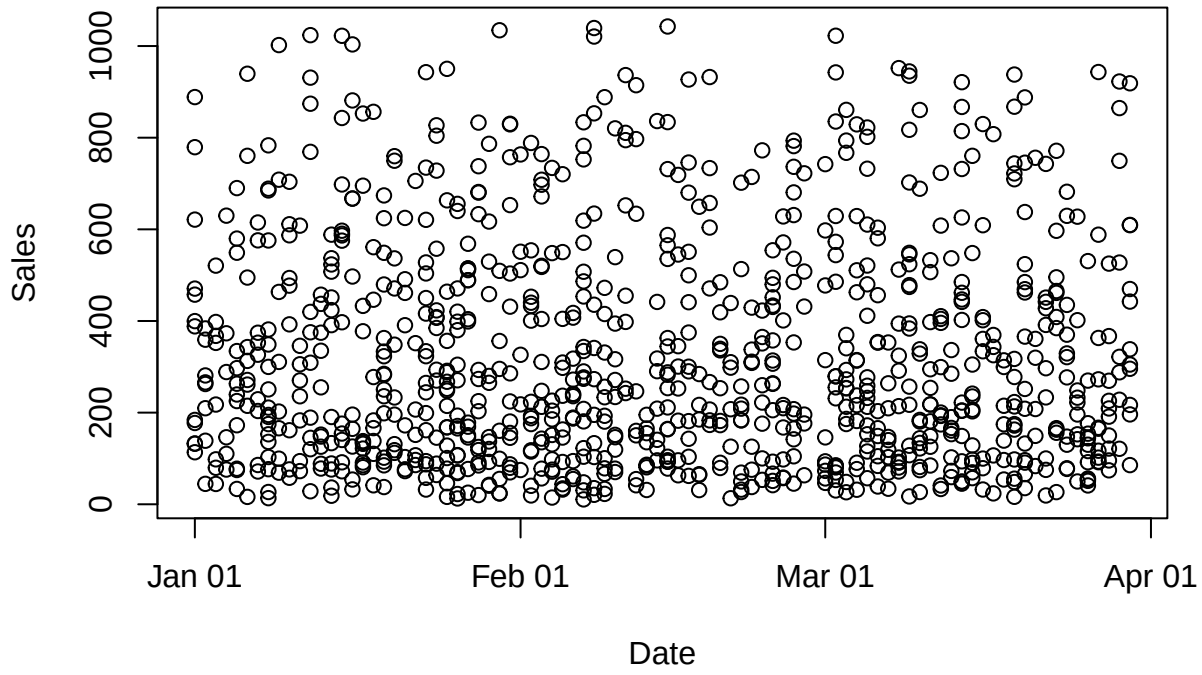
```
##  Date Sales
##     0     0
```

There are no missing values in the sales Data First lets convert the df to a different format.

```
anomX <- as_tibble(anom, date)
class(anomX)
```

```
## [1] "tbl_df"     "tbl"        "data.frame"
```

```
plot (anomX)
```




```
install.packages("devtools")
```

```
## Warning: package 'devtools' is in use and will not be installed
```

```
devtools::install_github("twitter/AnomalyDetection")
```

```
## Downloading GitHub repo twitter/AnomalyDetection@HEAD
```

```
## crayon       (1.5.0 -> 1.5.1) [CRAN]
## vctrs        (0.3.8 -> 0.4.0) [CRAN]
## magrittr     (2.0.2 -> 2.0.3) [CRAN]
## fansi        (1.0.2 -> 1.0.3) [CRAN]
## RColorBrewer (1.1-2 -> 1.1-3) [CRAN]
```

```
## Installing 5 packages: crayon, vctrs, magrittr, fansi, RColorBrewer
```

```
## Installing packages into 'C:/Users/Captain Simon/Documents/R/win-library/4.1'
## (as 'lib' is unspecified)

##
##   There are binary versions available but the source versions are later:
##              binary source needs_compilation
## vctrs         0.3.8  0.4.0              TRUE
## magrittr      2.0.2  2.0.3              TRUE
## RColorBrewer  1.1-2  1.1-3             FALSE
##
## package 'crayon' successfully unpacked and MD5 sums checked
## package 'fansi' successfully unpacked and MD5 sums checked

## Warning: cannot remove prior installation of package 'fansi'

## Warning in file.copy(savedcopy, lib, recursive = TRUE): problem copying C:
## \Users\Captain Simon\Documents\R\win-library\4.1\00LOCK\fansi\libs\x64\fansi.dll
## to C:\Users\Captain Simon\Documents\R\win-library\4.1\fansi\libs\x64\fansi.dll:
## Permission denied

## Warning: restored 'fansi'

##
## The downloaded binary packages are in
##  C:\Users\Captain Simon\AppData\Local\Temp\RtmpYn2r4e\downloaded_packages

## installing the source packages 'vctrs', 'magrittr', 'RColorBrewer'

## Warning in i.p(...): installation of package 'vctrs' had non-zero exit status

## Warning in i.p(...): installation of package 'magrittr' had non-zero exit status

## * checking for file 'C:\Users\Captain Simon\AppData\Local\Temp\RtmpYn2r4e\remotes1e28df41ffa\twitter-
## * preparing 'AnomalyDetection':
## * checking DESCRIPTION meta-information ... OK
## * checking for LF line-endings in source and make files and shell scripts
## * checking for empty or unneeded directories
## * building 'AnomalyDetection_1.0.tar.gz'
##

## Installing package into 'C:/Users/Captain Simon/Documents/R/win-library/4.1'
## (as 'lib' is unspecified)
```

```
library(AnomalyDetection)
```

```
sales_an <- AnomalyDetectionVec (x = anomX$Sales,period = 3 , direction= "both", plot = TRUE)
```

Conclusions

The data provided was accurate and more than sufficient to perform all the analysis that was initially intended for the project. The marketing team will find insight and leads on various topics such as: - product distribution. - marketing strategies and much more