Assignment10

Sathish

2024-02-06

R Markdown

This is an R Markdown document. Markdown is a simple formatting syntax for authoring HTML, PDF, and MS Word documents. For more details on using R Markdown see http://rmarkdown.rstudio.com.

When you click the **Knit** button a document will be generated that includes both content as well as the output of any embedded R code chunks within the document. You can embed an R code chunk like this:

```
data <- read.csv("C:/Users/sathi/Downloads/HumberMart.csv")
str(data)
```

```
## 'data.frame':    499 obs. of  12 variables:
##  $ Date         : chr  "01-05-2019" "03-08-2019" "03-03-2019" "1/27/2019" ...
##  $ Invoice.ID   : chr  "750-67-8428" "226-31-3081" "631-41-3108" "123-19-1176" ...
##  $ City         : chr  "Toronto" "Vancouver" "Toronto" "Toronto" ...
##  $ Customer.type: chr  "Member" "Normal" "Normal" "Member" ...
##  $ Gender       : chr  "Female" "Female" "Female" "Male" ...
##  $ Product.line : chr  "Health and beauty" "Electronic accessories" "Home and lifestyle" "Health and
##  $ 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 ...
##  $ Payment      : chr  "Ewallet" "Cash" "Credit card" "Ewallet" ...
##  $ cogs         : num  522.8 76.4 324.3 465.8 604.2 ...
##  $ Rating       : num  9.1 9.6 7.4 8.4 5.3 4.1 5.8 8 7.2 5.9 ...
```

```
columns <- colnames(data)
print(columns)
```

```
##  [1] "Date"          "Invoice.ID"    "City"          "Customer.type"
##  [5] "Gender"        "Product.line"  "Unit.price"    "Quantity"
##  [9] "Tax"           "Payment"       "cogs"          "Rating"
```

```
top_rows <- head(data, 15)
show(top_rows)
```

```
##          Date  Invoice.ID      City Customer.type Gender           Product.line
## 1  01-05-2019 750-67-8428   Toronto        Member Female      Health and beauty
## 2  03-08-2019 226-31-3081 Vancouver        Normal Female Electronic accessories
## 3  03-03-2019 631-41-3108   Toronto        Normal Female     Home and lifestyle
## 4   1/27/2019 123-19-1176   Toronto        Member   Male      Health and beauty
```

```
## 5  02-08-2019 373-73-7910   Toronto        Normal   Male      Sports and travel
## 6   3/25/2019 699-14-3026 Vancouver        Normal Female Electronic accessories
## 7   2/25/2019 355-53-5943   Toronto        Member Female Electronic accessories
## 8   2/24/2019 315-22-5665 Vancouver        Normal Female     Home and lifestyle
## 9  01-10-2019 665-32-9167   Toronto        Member Female      Health and beauty
## 10  2/20/2019 692-92-5582  Montreal        Member Female     Food and beverages
## 11 02-06-2019 351-62-0822  Montreal        Member Female    Fashion accessories
## 12 03-09-2019 529-56-3974  Montreal        Member Female Electronic accessories
## 13 02-12-2019 365-64-0515   Toronto        Normal Female Electronic accessories
## 14 02-07-2019 252-56-2699   Toronto        Normal Female     Food and beverages
## 15  3/29/2019 829-34-3910   Toronto        Normal Female      Health and beauty
##    Unit.price Quantity     Tax     Payment   cogs Rating
## 1       74.69        7 26.1415     Ewallet 522.83    9.1
## 2       15.28        5  3.8200        Cash  76.40    9.6
## 3       46.33        7 16.2155 Credit card 324.31    7.4
## 4       58.22        8 23.2880     Ewallet 465.76    8.4
## 5       86.31        7 30.2085     Ewallet 604.17    5.3
## 6       85.39        7 29.8865     Ewallet 597.73    4.1
## 7       68.84        6 20.6520     Ewallet 413.04    5.8
## 8       73.56       10 36.7800     Ewallet 735.60    8.0
## 9       36.26        2  3.6260 Credit card  72.52    7.2
## 10      54.84        3  8.2260 Credit card 164.52    5.9
## 11      14.48        4  2.8960     Ewallet  57.92    4.5
## 12      25.51        4  5.1020        Cash 102.04    6.8
## 13      46.95        5 11.7375     Ewallet 234.75    7.1
## 14      43.19       10 21.5950     Ewallet 431.90    8.2
## 15      71.38       10 35.6900        Cash 713.80    5.7
```

```r
filter_product_lines <- function(data, target_city, min_rating = 9) {
  filtered_lines <- data[data$City == target_city & data$Rating > min_rating, "Product.line"]
  return(filtered_lines)
}

target_city <- "Toronto"

high_rating_lines_in_city <- filter_product_lines(data, target_city)

print(unique(high_rating_lines_in_city))
```

```
## [1] "Health and beauty"      "Electronic accessories" "Home and lifestyle"
## [4] "Food and beverages"     "Sports and travel"
```

```r
library(dplyr)
filteredData <- filter(data, Quantity > 5)
head(filteredData)
```

```
##         Date  Invoice.ID      City Customer.type Gender           Product.line
## 1 01-05-2019 750-67-8428   Toronto        Member Female      Health and beauty
## 2 03-03-2019 631-41-3108   Toronto        Normal Female     Home and lifestyle
## 3  1/27/2019 123-19-1176   Toronto        Member   Male      Health and beauty
## 4 02-08-2019 373-73-7910   Toronto        Normal   Male      Sports and travel
## 5  3/25/2019 699-14-3026 Vancouver        Normal Female Electronic accessories
## 6  2/25/2019 355-53-5943   Toronto        Member Female Electronic accessories
```

```
##   Unit.price Quantity     Tax     Payment   cogs Rating
## 1      74.69        7 26.1415     Ewallet 522.83    9.1
## 2      46.33        7 16.2155 Credit card 324.31    7.4
## 3      58.22        8 23.2880     Ewallet 465.76    8.4
## 4      86.31        7 30.2085     Ewallet 604.17    5.3
## 5      85.39        7 29.8865     Ewallet 597.73    4.1
## 6      68.84        6 20.6520     Ewallet 413.04    5.8
```

```
data$TotalSales <- data$Unit.price * data$Quantity + data$Tax

aggregated_df <- data %>%
  group_by(Customer.type, Product.line, Payment) %>%
  summarise(TotalSales = sum(TotalSales), .groups = 'drop')
head(aggregated_df)
```

```
## # A tibble: 6 x 4
##   Customer.type Product.line           Payment     TotalSales
##   <chr>         <chr>                  <chr>            <dbl>
## 1 Member        Electronic accessories Cash             6487.
## 2 Member        Electronic accessories Credit card      4140.
## 3 Member        Electronic accessories Ewallet          3986.
## 4 Member        Fashion accessories    Cash             1332.
## 5 Member        Fashion accessories    Credit card      2483.
## 6 Member        Fashion accessories    Ewallet          3135.
```

```
library(tidyr)

# Pivoting the data to a wider format
wide_df <- aggregated_df %>%
  pivot_wider(names_from = Product.line, values_from = TotalSales)
head(wide_df)
```

```
## # A tibble: 6 x 8
##   Customer.type Payment     `Electronic accessories` `Fashion accessories`
##   <chr>         <chr>                          <dbl>                 <dbl>
## 1 Member        Cash                           6487.                 1332.
## 2 Member        Credit card                    4140.                 2483.
## 3 Member        Ewallet                        3986.                 3135.
## 4 Normal        Cash                           7118.                 3122.
## 5 Normal        Credit card                    4373.                 1410.
## 6 Normal        Ewallet                        3809.                 2262.
## # i 4 more variables: `Food and beverages` <dbl>, `Health and beauty` <dbl>,
## #   `Home and lifestyle` <dbl>, `Sports and travel` <dbl>
```

```
data <- na.omit(data)
head(data)
```

```
##         Date  Invoice.ID      City Customer.type Gender           Product.line
## 1 01-05-2019 750-67-8428   Toronto        Member Female      Health and beauty
## 2 03-08-2019 226-31-3081 Vancouver        Normal Female Electronic accessories
## 3 03-03-2019 631-41-3108   Toronto        Normal Female     Home and lifestyle
## 4  1/27/2019 123-19-1176   Toronto        Member   Male      Health and beauty
```

```
## 5 02-08-2019 373-73-7910   Toronto        Normal   Male      Sports and travel
## 6  3/25/2019 699-14-3026 Vancouver        Normal Female Electronic accessories
##   Unit.price Quantity     Tax     Payment   cogs Rating TotalSales
## 1      74.69        7 26.1415     Ewallet 522.83    9.1   548.9715
## 2      15.28        5  3.8200        Cash  76.40    9.6    80.2200
## 3      46.33        7 16.2155 Credit card 324.31    7.4   340.5255
## 4      58.22        8 23.2880     Ewallet 465.76    8.4   489.0480
## 5      86.31        7 30.2085     Ewallet 604.17    5.3   634.3785
## 6      85.39        7 29.8865     Ewallet 597.73    4.1   627.6165
```

```
data <- data[!duplicated(data), ]
head(data)
```

```
##         Date  Invoice.ID      City Customer.type Gender           Product.line
## 1 01-05-2019 750-67-8428   Toronto        Member Female      Health and beauty
## 2 03-08-2019 226-31-3081 Vancouver        Normal Female Electronic accessories
## 3 03-03-2019 631-41-3108   Toronto        Normal Female     Home and lifestyle
## 4  1/27/2019 123-19-1176   Toronto        Member   Male      Health and beauty
## 5 02-08-2019 373-73-7910   Toronto        Normal   Male      Sports and travel
## 6  3/25/2019 699-14-3026 Vancouver        Normal Female Electronic accessories
##   Unit.price Quantity     Tax     Payment   cogs Rating TotalSales
## 1      74.69        7 26.1415     Ewallet 522.83    9.1   548.9715
## 2      15.28        5  3.8200        Cash  76.40    9.6    80.2200
## 3      46.33        7 16.2155 Credit card 324.31    7.4   340.5255
## 4      58.22        8 23.2880     Ewallet 465.76    8.4   489.0480
## 5      86.31        7 30.2085     Ewallet 604.17    5.3   634.3785
## 6      85.39        7 29.8865     Ewallet 597.73    4.1   627.6165
```

```
data <- data[order(-data$Rating), ]
head(data)
```

```
##           Date  Invoice.ID      City Customer.type Gender
## 61   2/15/2019 285-68-5083 Vancouver        Member Female
## 63  02-03-2019 347-34-2234  Montreal        Member Female
## 160  3/27/2019 423-57-2993  Montreal        Normal Female
## 388  2/20/2019 725-56-0833   Toronto        Normal Female
## 24   2/17/2019 636-48-8204   Toronto        Normal Female
## 68  01-07-2019 109-28-2512  Montreal        Member Female
##               Product.line Unit.price Quantity     Tax     Payment   cogs
## 61     Home and lifestyle      24.74        3  3.7110 Credit card  74.22
## 63     Home and lifestyle      55.07        9 24.7815     Ewallet 495.63
## 160     Sports and travel      93.39        6 28.0170     Ewallet 560.34
## 388     Health and beauty      32.32       10 16.1600 Credit card 323.20
## 24  Electronic accessories      34.56        5  8.6400     Ewallet 172.80
## 68     Fashion accessories      97.61        6 29.2830     Ewallet 585.66
##     Rating TotalSales
## 61    10.0    77.9310
## 63    10.0   520.4115
## 160   10.0   588.3570
## 388   10.0   339.3600
## 24     9.9   181.4400
## 68     9.9   614.9430
```

```r
colnames(data)[colnames(data) == "Customer.type"] <- "Customer_type"
colnames(data)[colnames(data) == "Unit.price"] <- "Unit_price"
colnames(data)[colnames(data) == "Invoice.ID"] <- "Invoice_ID"
columns <- colnames(data)
print(columns)
```

```
##  [1] "Date"          "Invoice_ID"    "City"          "Customer_type"
##  [5] "Gender"        "Product.line"  "Unit_price"    "Quantity"
##  [9] "Tax"           "Payment"       "cogs"          "Rating"
## [13] "TotalSales"
```

```r
data$DoubleUnitPrice <- data$Unit_price * 2
head(data)
```

```
##           Date  Invoice_ID      City Customer_type Gender
## 61   2/15/2019 285-68-5083 Vancouver        Member Female
## 63  02-03-2019 347-34-2234  Montreal        Member Female
## 160  3/27/2019 423-57-2993  Montreal        Normal Female
## 388  2/20/2019 725-56-0833   Toronto        Normal Female
## 24   2/17/2019 636-48-8204   Toronto        Normal Female
## 68  01-07-2019 109-28-2512  Montreal        Member Female
##               Product.line Unit_price Quantity     Tax     Payment   cogs
## 61      Home and lifestyle      24.74        3  3.7110 Credit card  74.22
## 63      Home and lifestyle      55.07        9 24.7815     Ewallet 495.63
## 160      Sports and travel      93.39        6 28.0170     Ewallet 560.34
## 388      Health and beauty      32.32       10 16.1600 Credit card 323.20
## 24  Electronic accessories      34.56        5  8.6400     Ewallet 172.80
## 68     Fashion accessories      97.61        6 29.2830     Ewallet 585.66
##     Rating TotalSales DoubleUnitPrice
## 61    10.0    77.9310           49.48
## 63    10.0   520.4115          110.14
## 160   10.0   588.3570          186.78
## 388   10.0   339.3600           64.64
## 24     9.9   181.4400           69.12
## 68     9.9   614.9430          195.22
```

```r
set.seed(123) # Ensure reproducibility
trainingIndex <- sample(1:nrow(data), 0.8 * nrow(data)) # 80% for training
trainingSet <- data[trainingIndex, ]
head(trainingSet)
```

```
##           Date  Invoice_ID      City Customer_type Gender       Product.line
## 209  3/28/2019 573-58-9734  Montreal        Normal Female Food and beverages
## 23   3/15/2019 273-16-6619  Montreal        Normal   Male Home and lifestyle
## 208  3/18/2019 263-87-5680 Vancouver        Member Female Home and lifestyle
## 383  1/14/2019 868-52-7573  Montreal        Normal Female Food and beverages
## 44  03-04-2019 228-96-1411 Vancouver        Member Female Food and beverages
## 213  3/20/2019 142-63-6033  Montreal        Normal   Male Home and lifestyle
##     Unit_price Quantity     Tax     Payment   cogs Rating TotalSales
## 209      30.37        3  4.5555     Ewallet  91.11    5.1    95.6655
## 23       33.20        2  3.3200 Credit card  66.40    4.4    69.7200
## 208      28.53       10 14.2650     Ewallet 285.30    7.8   299.5650
```

```
## 383      99.69        5 24.9225        Cash 498.45    9.9   523.3725
## 44       98.70        8 39.4800        Cash 789.60    7.6   829.0800
## 213      92.36        5 23.0900     Ewallet 461.80    4.9   484.8900
##     DoubleUnitPrice
## 209           60.74
## 23            66.40
## 208           57.06
## 383          199.38
## 44           197.40
## 213          184.72
```

```
summary(data)
```

```
##      Date              Invoice_ID            City           Customer_type
##  Length:499         Length:499         Length:499         Length:499
##  Class :character   Class :character   Class :character   Class :character
##  Mode  :character   Mode  :character   Mode  :character   Mode  :character
##
##
##
##     Gender          Product.line         Unit_price       Quantity
##  Length:499         Length:499         Min.   :10.59   Min.   : 1.000
##  Class :character   Class :character   1st Qu.:30.51   1st Qu.: 3.000
##  Mode  :character   Mode  :character   Median :52.59   Median : 6.000
##                                        Mean   :54.86   Mean   : 5.689
##                                        3rd Qu.:77.83   3rd Qu.: 8.000
##                                        Max.   :99.96   Max.   :10.000
##       Tax            Payment               cogs            Rating
##  Min.   : 0.627   Length:499         Min.   : 12.54   Min.   : 4.000
##  1st Qu.: 6.413   Class :character   1st Qu.:128.27   1st Qu.: 5.600
##  Median :12.835   Mode  :character   Median :256.70   Median : 7.000
##  Mean   :15.714                      Mean   :314.29   Mean   : 7.013
##  3rd Qu.:22.923                      3rd Qu.:458.45   3rd Qu.: 8.450
##  Max.   :49.980                      Max.   :999.60   Max.   :10.000
##    TotalSales      DoubleUnitPrice
##  Min.   :  13.17   Min.   : 21.18
##  1st Qu.: 134.68   1st Qu.: 61.02
##  Median : 269.54   Median :105.18
##  Mean   : 330.00   Mean   :109.71
##  3rd Qu.: 481.38   3rd Qu.:155.65
##  Max.   :1049.58   Max.   :199.92
```

```
mean(data$Quantity)
```

```
## [1] 5.689379
```

```
median(data$Quantity)
```

```
## [1] 6
```

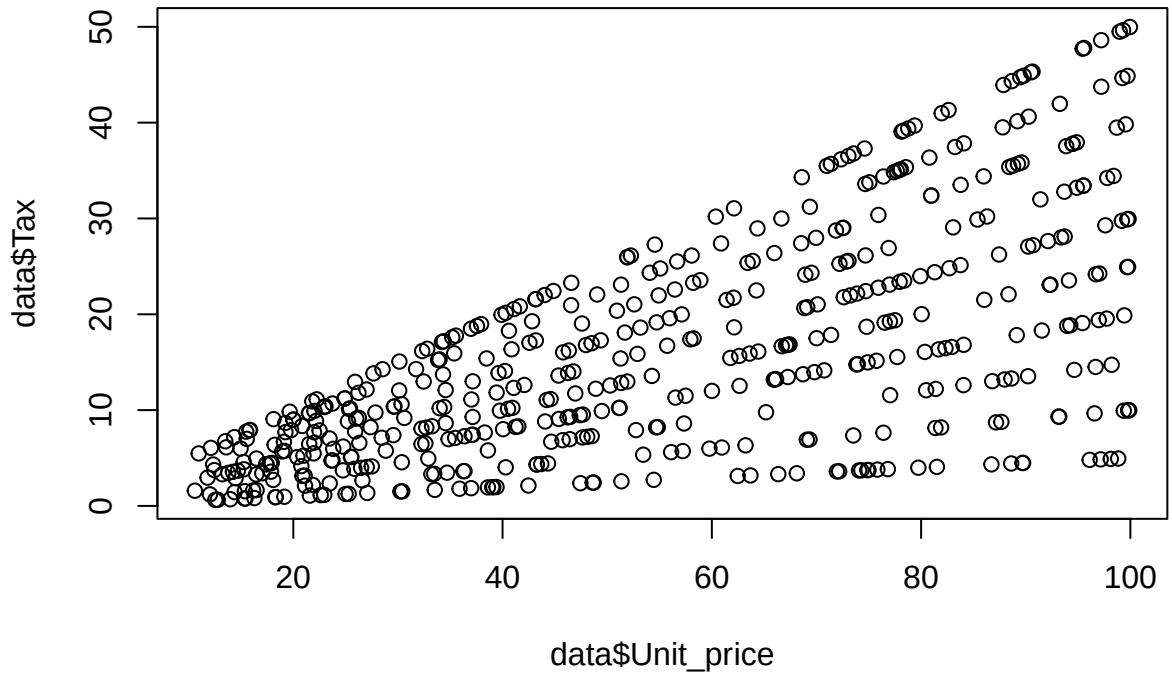
```r
Mode <- function(x) {
  ux <- unique(x)
  ux[which.max(tabulate(match(x, ux)))]
}
Mode(data$Quantity)
```

```
## [1] 10
```

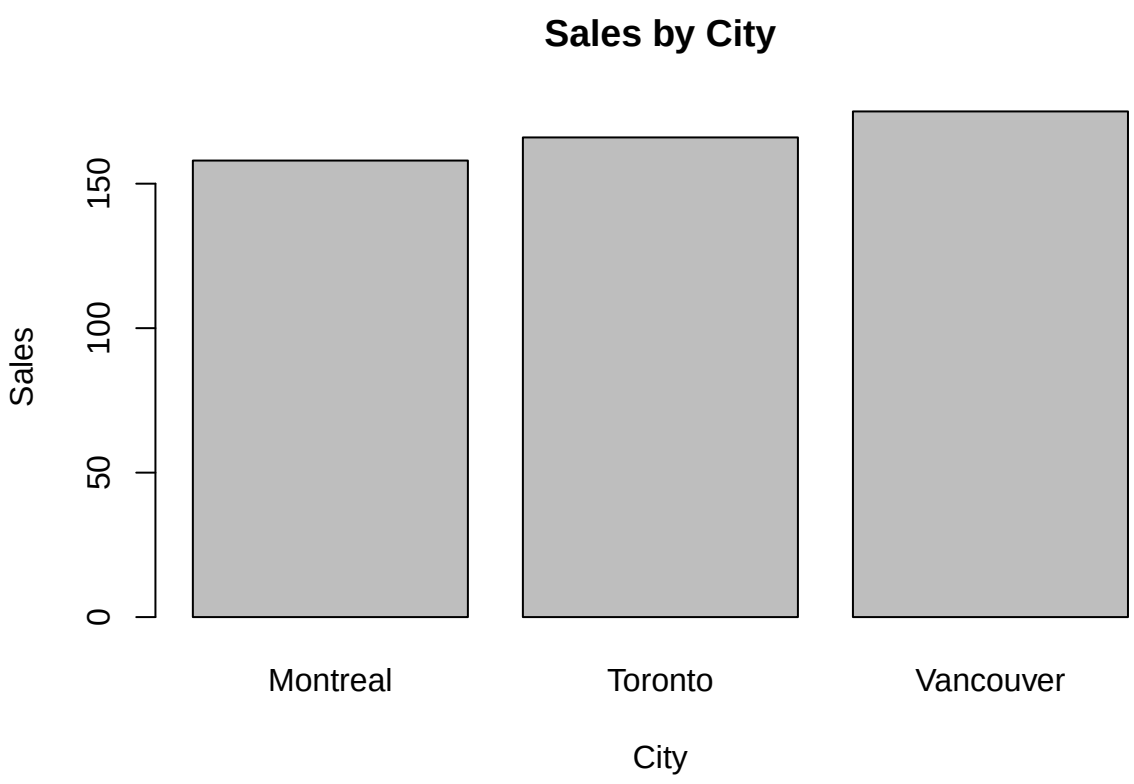
```r
range(data$Quantity)
```

```
## [1]  1 10
```

```r
plot(data$Unit_price,data$Tax)
```




```r
barplot(table(data$City), main="Sales by City", xlab="City", ylab="Sales")
```




```
cor(data$Unit_price, data$Rating)
```

```
## [1] -0.0162657
```

```
model <- lm(Rating ~ Unit_price, data=data)
summary(model)
```

```
##
## Call:
## lm(formula = Rating ~ Unit_price, data = data)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -3.04585 -1.44892 -0.02823  1.43856  3.02661
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)  7.070428   0.174987  40.405   <2e-16 ***
## Unit_price  -0.001039   0.002865  -0.363    0.717
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 1.718 on 497 degrees of freedom
## Multiple R-squared:  0.0002646,  Adjusted R-squared:  -0.001747
## F-statistic: 0.1315 on 1 and 497 DF,  p-value: 0.717
```