Week 2 Exercises

Sue Susman MEd, BSN, RN

March 28, 2023

Table of Contents

Exercise 1

Read the sales_pipe.txt file into an R data frame as sales.

```
# Your code here
sales <- read.delim("sales_pipe.txt", sep = "|")
head(sales)

##   O..Row.ID       Order.ID Order.Date        Ship.Date      Ship.Mode
## 1         1 CA-2016-152156  11/8/2016 November 11 2016   Second Class
## 2         2 CA-2016-152156  11/8/2016 November 11 2016   Second Class
## 3         3 CA-2016-138688  6/12/2016     June 16 2016   Second Class
## 4         4 US-2015-108966 10/11/2015  October 18 2015 Standard Class
## 5         5 US-2015-108966 10/11/2015  October 18 2015 Standard Class
## 6         6 CA-2014-115812   6/9/2014     June 14 2014 Standard Class
##   Customer.ID   Customer.Name   Segment       Country            City
## 1    CG-12520     Claire Gute  Consumer United States       Henderson
## 2    CG-12520     Claire Gute  Consumer United States       Henderson
## 3    DV-13045 Darrin Van Huff Corporate United States     Los Angeles
## 4    SO-20335  Sean O'Donnell  Consumer United States Fort Lauderdale
## 5    SO-20335  Sean O'Donnell  Consumer United States Fort Lauderdale
## 6    BH-11710 Brosina Hoffman  Consumer United States     Los Angeles
##        State Postal.Code Region      Product.ID        Category Sub.Category
## 1   Kentucky       42420  South FUR-BO-10001798       Furniture    Bookcases
## 2   Kentucky       42420  South FUR-CH-10000454       Furniture       Chairs
## 3 California       90036   West OFF-LA-10000240 Office Supplies       Labels
## 4    Florida       33311  South FUR-TA-10000577       Furniture       Tables
## 5    Florida       33311  South OFF-ST-10000760 Office Supplies      Storage
## 6 California       90032   West FUR-FU-10001487       Furniture  Furnishings
##                                                       Product.Name    Sales
## 1                                Bush Somerset Collection Bookcase 261.9600
## 2      Hon Deluxe Fabric Upholstered Stacking Chairs, Rounded Back 731.9400
## 3        Self-Adhesive Address Labels for Typewriters by Universal  14.6200
## 4                    Bretford CR4500 Series Slim Rectangular Table 957.5775
## 5                                   Eldon Fold 'N Roll Cart System  22.3680
## 6 Eldon Expressions Wood and Plastic Desk Accessories, Cherry Wood  48.8600
##   Quantity Discount    Profit
## 1        2     0.00   41.9136
## 2        3     0.00  219.5820
## 3        2     0.00    6.8714
## 4        5     0.45 -383.0310
## 5        2     0.20    2.5164
## 6        7     0.00   14.1694
```

Exercise 2

You can extract a vector of columns names from a data frame using the colnames() function. Notice the first column has some odd characters. Change the column name for the FIRST column in the sales date frame to Row.ID.

Note: You will need to assign the first element of colnames to a single character.

```
# Your code here
colnames(sales)[1] <- "Row.ID"
```

Exercise 3

Convert both Order.ID and Order.Date to date vectors within the sales data frame. What is the number of days between the most recent order and the oldest order? How many years is that? How many weeks?

Note: Use lubridate

```
# Your code here
library(lubridate)

## Attaching package: 'lubridate'

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

#Convert character to date format
sales$Order.ID <- mdy(sales$Order.ID)
class(sales$Order.ID)

## [1] "Date"

sales$Order.Date <- mdy(sales$Order.Date)
class(sales$Order.Date)

## [1] "Date"

start_date <- min(sales$Order.Date)
start_date

## [1] "2014-01-03"

end_date <- max(sales$Order.Date)
end_date

## [1] "2017-12-30"
```

```
start_date <- as.Date("2014-01-03")
end_date <- as.Date("2017-12-30")

#Total number of days
num_days <- as.numeric(difftime(end_date, start_date, units = "days"))
num_days_rounded <- round(num_days, 2)
print(paste0(num_days_rounded, " days"))

## [1] "1457 days"

#Total number of weeks
num_days <- as.numeric(difftime(end_date, start_date, units = "weeks"))
num_days_rounded <- round(num_days, 2)
print(paste0(num_days_rounded, " weeks"))

## [1] "208.14 weeks"

# Total number of Years
num_days <- as.numeric(difftime(end_date, start_date, units = "weeks"))/52.25
num_days_rounded <- round(num_days, 2)
print(paste0(num_days_rounded, " years"))

## [1] "3.98 years"
```

Exercise 4

What is the average number of days it takes to ship an order?

```
# Your code here
library(lubridate)

sales$Ship.Date <- mdy(sales$Ship.Date)
class(sales$Ship.Date)

## [1] "Date"

# assuming the sales data is stored in a data frame called 'sales'

# convert the Order.Date and Ship.Date columns to Date objects
sales$Order.Date <- as.Date(sales$Order.Date, format = "%m/%d/%Y")
sales$Ship.Date <- as.Date(sales$Ship.Date, format = "%m/%d/%Y")

# calculate the number of days it takes to ship each order
days_to_ship <- as.numeric(difftime(sales$Ship.Date, sales$Order.Date, units = "days"))

# calculate the average number of days it takes to ship an order
avg_days_to_ship <- mean(days_to_ship, na.rm = TRUE)

# print the result
print(paste0("The average number of days it takes to ship an order is ", round(avg_days_to_ship, 2), " days."))

## [1] "The average number of days it takes to ship an order is 3.91 days."
```

Exercise 5

How many customers have the first name Bill? You will need to split the customer name into first and last name segments and then use a regular expression to match the first name bill. Use the length() function to determine the number of customers with the first name Bill in the sales data.

```
# Your code here
library(stringr)

# Split the "Customer.Name" column into first and last name segments
names <- str_split(sales$Customer.Name, pattern = " ", simplify = TRUE)
head(names)

##      [,1]      [,2]        [,3]  
## [1,] "Claire"  "Gute"      ""    
## [2,] "Claire"  "Gute"      ""    
## [3,] "Darrin"  "Van"       "Huff"
## [4,] "Sean"    "O'Donnell" ""    
## [5,] "Sean"    "O'Donnell" ""    
## [6,] "Brosina" "Hoffman"   ""    

# Extract the first names
first_names <- names[, 1]
head(first_names)

## [1] "Claire"  "Claire"  "Darrin"  "Sean"    "Sean"    "Brosina"

# Count the number of customers with the first name "Bill"
num_bills <- length(grep("^Bill$", first_names, ignore.case = TRUE))
head(num_bills)

## [1] 37
```

Exercise 6

How many mentions of the word ‘table’ are there in the Product.Name column? **Note you can do this in one line of code**

```
# Your code here
num_tables <- sum(grepl("table", sales$Product.Name, ignore.case = TRUE))
head(num_tables)

## [1] 371
```

Exercise 7

Create a table of counts for each state in the sales data. The counts table should be ordered alphabetically from A to Z.

```
# Your code here
state_counts <- sort(table(sales$State))
head(state_counts)

## 
## District of Columbia              Wyoming              Montana
##               1               1               2
##           Maine   West Virginia    North Dakota
##               4               4               7
```

Exercise 8

Create an alphabetically ordered barplot for each sales Category in the State of Texas.

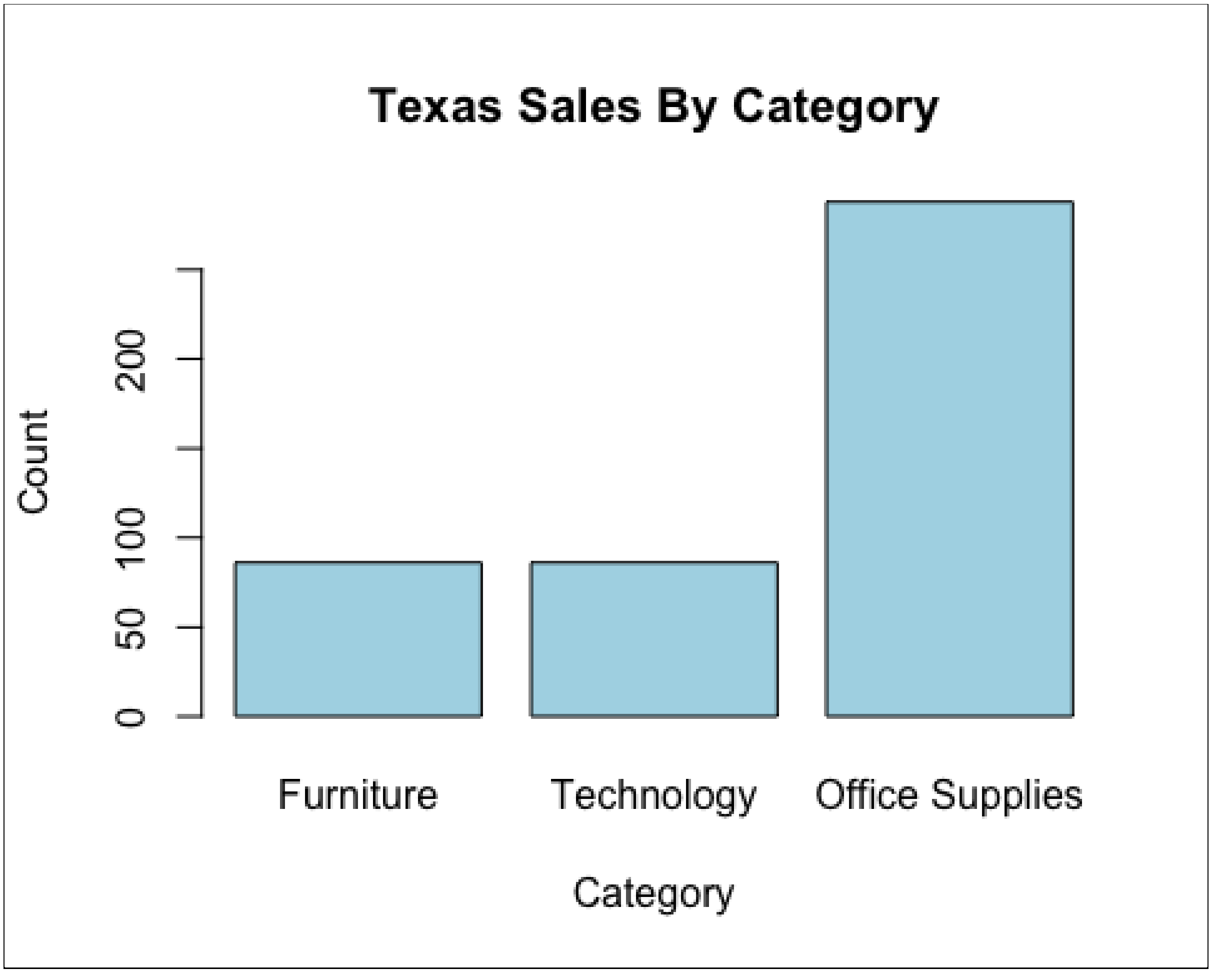
```
# Your code here
tx_sales <- subset(sales, State == "Texas")
head(tx_sales)
```

```
##     Row.ID Order.ID Order.Date  Ship.Date      Ship.Mode Customer.ID
## 15      15     <NA> 2015-11-22 2015-11-26 Standard Class    HP-14815
## 16      16     <NA> 2015-11-22 2015-11-26 Standard Class    HP-14815
## 78      78     <NA> 2017-12-09 2017-12-11    First Class    KB-16600
## 79      79     <NA> 2014-11-26 2014-12-01   Second Class    JE-15745
## 89      89     <NA> 2016-04-05 2016-04-10   Second Class    GM-14455
## 345    345     <NA> 2015-12-20 2015-12-24 Standard Class    CS-12130
##     Customer.Name     Segment       Country       City State Postal.Code
## 15  Harold Pawlan Home Office United States Fort Worth Texas       76106
## 16  Harold Pawlan Home Office United States Fort Worth Texas       76106
## 78    Ken Brennan   Corporate United States    Houston Texas       77041
## 79     Joel Eaton    Consumer United States    Houston Texas       77070
## 89   Gary Mitchum Home Office United States    Houston Texas       77095
## 345  Chad Sievert    Consumer United States     Austin Texas       78745
##      Region      Product.ID        Category Sub.Category
## 15  Central OFF-AP-10002311 Office Supplies   Appliances
## 16  Central OFF-BI-10000756 Office Supplies      Binders
## 78  Central OFF-ST-10000615 Office Supplies      Storage
## 79  Central FUR-FU-10003194       Furniture  Furnishings
## 89  Central OFF-ST-10003442 Office Supplies      Storage
## 345 Central OFF-ST-10000107 Office Supplies      Storage
##                                                        Product.Name
## 15  Holmes Replacement Filter for HEPA Air Cleaner, Very Large Room, HEPA Filter
## 16                         Storex DuraTech Recycled Plastic Frosted Binders
## 78            SimpliFile Personal File, Black Granite, 15w x 6-15/16d x 11-1/4h
## 79                  Eldon Expressions Desk Accessory, Wood Pencil Holder, Oak
## 89                                            Eldon Portable Mobile Manager
## 345                                          Fellowes Super Stor/Drawer
##       Sales Quantity Discount    Profit
## 15   68.810        5      0.8 -123.8580
## 16    2.544        3      0.8   -3.8160
## 78   27.240        3      0.2    2.7240
## 79   19.300        5      0.6  -14.4750
## 89  158.368        7      0.2   13.8572
## 345  88.800        4      0.2   -2.2200
```

```
tx_category_counts <- sort(table(tx_sales$Category))
head(tx_category_counts)
```

```
## 
##       Furniture      Technology Office Supplies 
##              86              86             288 
```

```
barplot(tx_category_counts, main = c("Texas Sales By Category"), xlab = "Category", ylab = "Count", col =
"lightblue")
```



Exercise 9

Find the average profit by region. **Note: You will need to use the aggregate() function to do this. To understand how the function works type ?aggregate in the console.**

```
# Your code here
region_profit <- aggregate(Profit ~ Region, data = sales, FUN = mean)
head(region_profit)

##    Region   Profit
## 1 Central 20.46822
## 2    East 29.91937
## 3   South 11.27720
## 4    West 32.77000

##    Region   Profit
## 1 Central 17.09271
## 2    East 32.13581
## 3   South 28.85767
## 4    West 33.84903
```

Exercise 10

Find the average profit by order year.

Note: You will need to use the aggregate() function to do this. To understand how the function works type ?aggregate in the console.

```
# Your code here
year_profit <- aggregate(Profit ~ as.numeric(format(as.Date(Order.Date), "%Y")), data = sales, FUN = mean)
head(year_profit)
```

```
##   as.numeric(format(as.Date(Order.Date), "%Y"))   Profit
## 1                                          2014 32.24582
## 2                                          2015 21.58676
## 3                                          2016 30.10960
## 4                                          2017 21.31825
```

```
##   as.numeric(format(as.Date(Order.Date), "%Y"))   Profit
## 1                                          2014 24.85899
## 2                                          2015 29.31427
## 3                                          2016 31.61777
## 4                                          2017 28.21234
```