RWorksheet_Freires#4b

2024-10-29

Using Loop Function

for() loop

1. Using the for loop, create an R script that will display a 5x5 matrix as shown in Figure 1. It must contain vectorA = [1,2,3,4,5] and a 5 x 5 zero matrix. Hint Use abs() function to get the absolute value

```
vectorA <- c(1, 2, 3, 4, 5)
zero_matrix <- matrix(0, nrow = 5, ncol = 5)

for (i in 1:5) {
  for (j in 1:5) {
  zero_matrix[i, j] <- abs(vectorA[i] - vectorA[j])
  }
}
print(zero_matrix)
```

```
##      [,1] [,2] [,3] [,4] [,5]
## [1,]    0    1    2    3    4
## [2,]    1    0    1    2    3
## [3,]    2    1    0    1    2
## [4,]    3    2    1    0    1
## [5,]    4    3    2    1    0
```

2. Print the string "*" using for() function. The output should be the same as shown in Figure

```
for (i in 1:5) {
  cat(rep('"*"', i), "\n")
}
```

```
## "*"
## "*" "*"
## "*" "*" "*"
## "*" "*" "*" "*"
## "*" "*" "*" "*" "*"
```

3. Get an input from the user to print the Fibonacci sequence starting from the 1st input up to 500. Use repeat and break statements. Write the R Scripts and its output.

```
x <- 0
y <- 1

num <- readline(prompt = "Enter the starting number: ")
```

```
## Enter the starting number:
```

```
3
```

```
## [1] 3
```

```
repeat {
  num <- x + y
  if (num > 500) break
  x <- y
  y <- num
  print(num)
}
```

```
## [1] 1
## [1] 2
## [1] 3
## [1] 5
## [1] 8
## [1] 13
## [1] 21
## [1] 34
## [1] 55
## [1] 89
## [1] 144
## [1] 233
## [1] 377
```

Using Basic Graphics (plot(),barplot(),pie(),hist())

4. Import the dataset as shown in Figure 1 you have created previously.

a. What is the R script for importing an excel or a csv file? Display the first 6 rows of the dataset? Show your codes and its result

```
library(readxl)
data_table <- read_excel("/cloud/project/Worksheet#4/data_table.xlsx")
print(head(data_table))
```

```
## # A tibble: 6 x 3
##   shoe_size height gender
##       <dbl>  <dbl> <chr>
## 1       6.5   66   F
## 2       9     68   F
## 3       8.5   64.5 F
## 4       8.5   65   F
## 5      10.5   70   M
## 6       7     64   F
```

b. Create a subset for gender(female and male). How many observations are there in Male? How about in Female? Write the R scripts and its output.

```
males <- subset(data_table)
females <- subset(data_table)

n_males <- nrow(males)
n_females <- nrow(females)

cat("Number of Male observations: ", n_males, "\n")
```

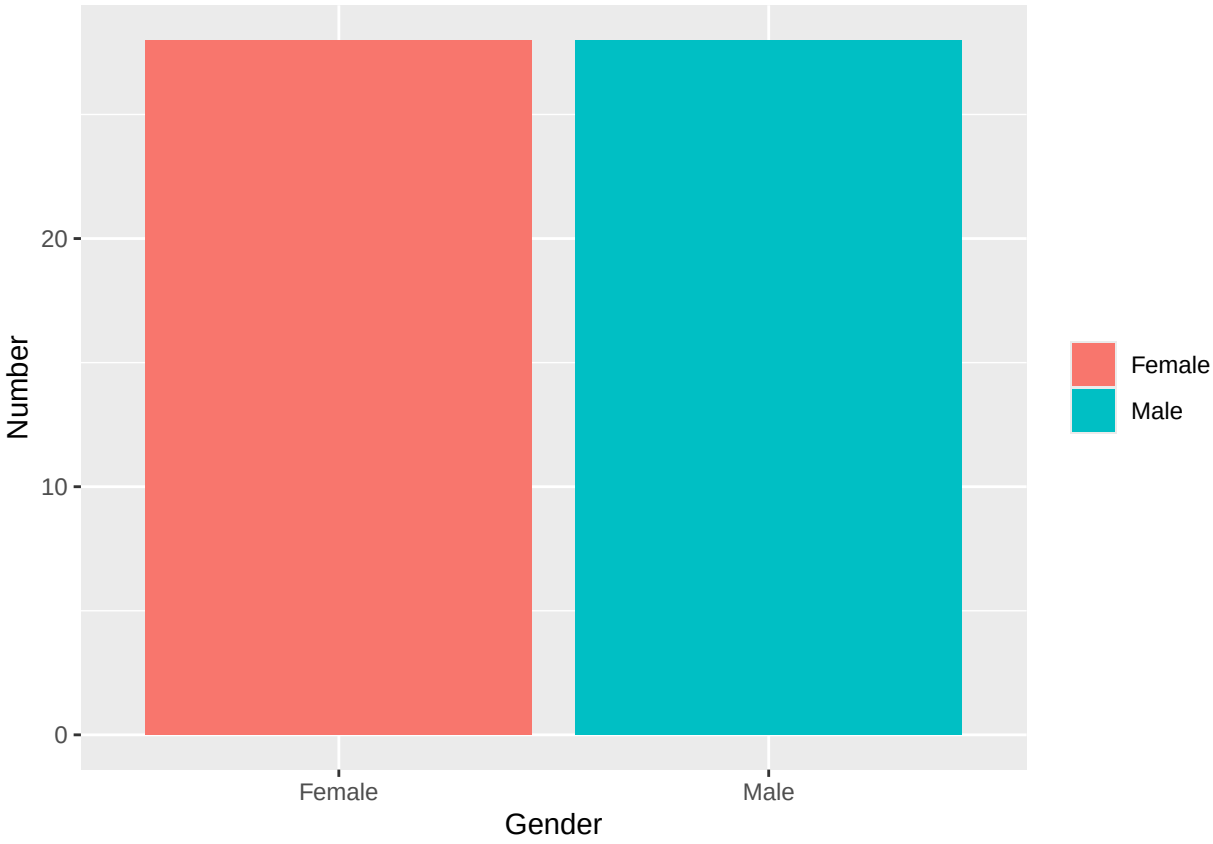
```
## Number of Male observations:  28
```

```
cat("Number of Female observations: ", n_females, "\n")
```

```
## Number of Female observations:  28
```

c. Create a graph for the number of males and females for Household Data. Use plot(), chart type = barplot. Make sure to place title, legends, and colors. Write the R scripts and its result.

```r
library(ggplot2)


  Gender = c("Male", "Female")
  Number = c(28, 28)
  data_table <- data.frame(Gender, Number)

ggplot(data_table, aes(x = Gender, y = Number, fill = Gender)) +
  geom_bar(stat = "identity") +
  theme(legend.title = element_blank())
```

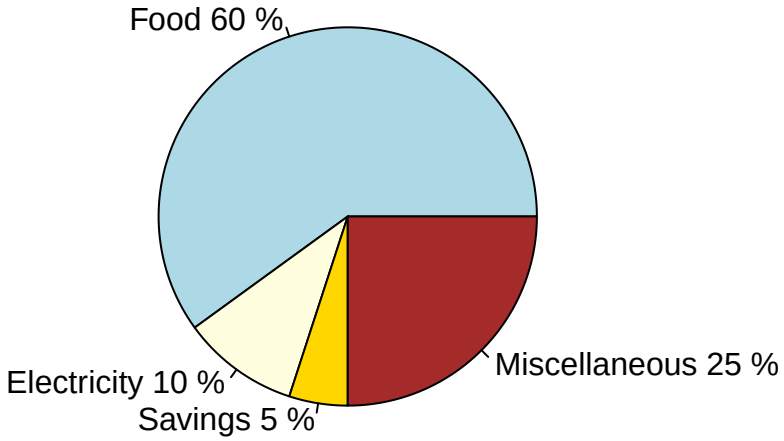


5. The monthly income of Dela Cruz family was spent on the following: Food Electricity Savings Miscellaneous 60 10 5 25

a. Create a piechart that will include labels in percentage.Add some colors and title of the chart. Write the R scripts and show its output.

```r
library(ggplot2)

   bills <- c(60, 10, 5, 25)
   categories <- c("Food", "Electricity", "Savings", "Miscellaneous")

   percentages <- round(bills / sum(bills) * 100, 1)
   labels <- paste(categories, percentages, "%")
```

```
pie(
  bills,
  main = "Dela Cruz Family Monthly Income",
  col = c("lightblue", "lightyellow", "gold", "brown"),
  labels = labels,
)
```



6. Use the iris dataset. data(iris)

a. Check for the structure of the dataset using the str() function.

- Describe what you have seen in the output.
- Based on my observations, the iris data set is a data frame that has 5 variables and 150 obs. The following variables are Sepal.Length, Sepal.Width, Petal.Length, Petal.Width, and Species with 3 Factor Levels5

```
data(iris)
str(iris)
```

```
## 'data.frame':    150 obs. of  5 variables:
##  $ Sepal.Length: num  5.1 4.9 4.7 4.6 5 5.4 4.6 5 4.4 4.9 ...
##  $ Sepal.Width : num  3.5 3 3.2 3.1 3.6 3.9 3.4 3.4 2.9 3.1 ...
##  $ Petal.Length: num  1.4 1.4 1.3 1.5 1.4 1.7 1.4 1.5 1.4 1.5 ...
##  $ Petal.Width : num  0.2 0.2 0.2 0.2 0.2 0.4 0.3 0.2 0.2 0.1 ...
##  $ Species     : Factor w/ 3 levels "setosa","versicolor",..: 1 1 1 1 1 1 1 1 1 1 ...
```

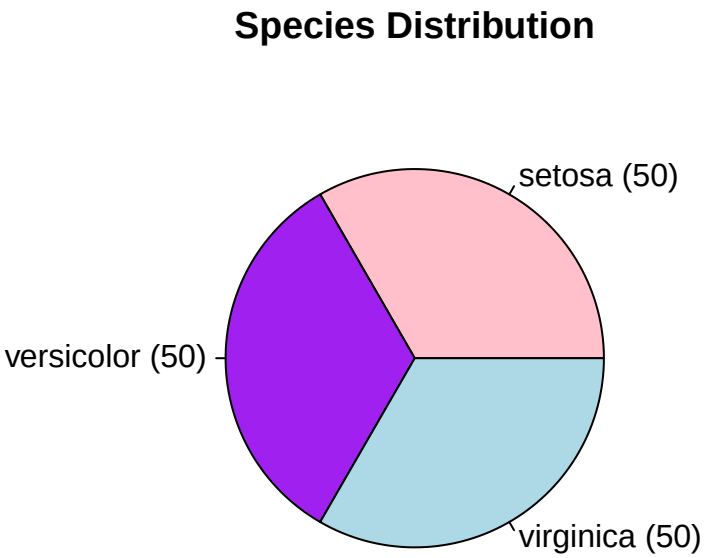
b. Create an R object that will contain the mean of the sepal.length, sepal.width,petal.length,and petal.width. What is the R script and its result?

```
data(iris)
value <- colMeans(iris[, 1:4])
print(value)
```

```
## Sepal.Length  Sepal.Width Petal.Length  Petal.Width
##     5.843333     3.057333     3.758000     1.199333
```

c. Create a pie chart for the Species distribution. Add title, legends, and colors. Write the R script and its result.

```r
data(iris)

species_data <- table(iris$Species)

labels <- paste(names(species_data), species_data, sep = " (")
labels <- paste(labels, ")", sep = "")

pie(
  species_data,
  labels = labels,
  col = c("pink", "purple", "lightblue"),
  main = "Species Distribution"
)
```



d. Subset the species into setosa, versicolor, and virginica. Write the R scripts and show the last six (6) rows of each species.

```r
setosa_sub <- subset(iris, Species == "setosa")
versicolor_sub <- subset(iris, Species == "versicolor")
virginica_sub <- subset(iris, Species == "virginica")

print(tail(setosa_sub))
```

```
##    Sepal.Length Sepal.Width Petal.Length Petal.Width Species
## 45          5.1         3.8          1.9         0.4  setosa
## 46          4.8         3.0          1.4         0.3  setosa
## 47          5.1         3.8          1.6         0.2  setosa
## 48          4.6         3.2          1.4         0.2  setosa
## 49          5.3         3.7          1.5         0.2  setosa
## 50          5.0         3.3          1.4         0.2  setosa
```

```r
print(tail(versicolor_sub))
```

```
##     Sepal.Length Sepal.Width Petal.Length Petal.Width    Species
## 95           5.6         2.7          4.2         1.3 versicolor
## 96           5.7         3.0          4.2         1.2 versicolor
## 97           5.7         2.9          4.2         1.3 versicolor
```

```
## 98           6.2         2.9          4.3         1.3 versicolor
## 99           5.1         2.5          3.0         1.1 versicolor
## 100          5.7         2.8          4.1         1.3 versicolor
```

```
print(tail(virginica_sub))
```

```
##     Sepal.Length Sepal.Width Petal.Length Petal.Width   Species
## 145          6.7         3.3          5.7         2.5 virginica
## 146          6.7         3.0          5.2         2.3 virginica
## 147          6.3         2.5          5.0         1.9 virginica
## 148          6.5         3.0          5.2         2.0 virginica
## 149          6.2         3.4          5.4         2.3 virginica
## 150          5.9         3.0          5.1         1.8 virginica
```

e. Create a scatterplot of the sepal.length and sepal.width using the different species(setosa,versicolor,virginica). Add a title = "Iris Dataset", subtitle = "Sepal width and length, labels for the x and y axis, the pch symbol and colors should be based on the species.

```
library(ggplot2)
data(iris)

iris$Species <- as.factor(iris$Species)

scatter_plot <- ggplot(iris, aes(x = Sepal.Length, y = Sepal.Width, color = Species, shape = Species)) +
  ggtitle("Iris Dataset") +
  labs(subtitle = "Sepal Width and Length", x = "Sepal Length", y = "Sepal Width") +
  geom_point(size = 3) +
  scale_color_manual(values = c("setosa" = "pink", "versicolor" = "purple", "virginica" = "lightblue")) +
  scale_shape_manual(values = c(16, 17, 18))


print(scatter_plot)
```

Hint: Need to convert to factors the species to store categorical variables.

f. Interpret the result.

- The results show the Sepal Width and Length of each species, The setosa has the most width than length , the versicolor has more length than width, and the virginica has the most length than width

Basic Cleaning and Transformation of Objects

7. Import the alexa-file.xlsx. Check on the variations. Notice that there are extra whitespaces among black variants (Black Dot, Black Plus, Black Show, Black Spot). Also on the white variants (White Dot, White Plus, White Show, White Spot).

```
library(readxl)
alexa <- read_excel("/cloud/project/Worksheet#4/alexa_file.xlsx")
print(alexa)
```

```
## # A tibble: 3,150 x 5
##    rating date                variation          verified_reviews      feedback
##     <dbl> <dttm>              <chr>              <chr>                    <dbl>
##  1      5 2018-07-31 00:00:00 Charcoal Fabric    Love my Echo!                1
##  2      5 2018-07-31 00:00:00 Charcoal Fabric    Loved it!                    1
##  3      4 2018-07-31 00:00:00 Walnut Finish      Sometimes while play~        1
##  4      5 2018-07-31 00:00:00 Charcoal Fabric    I have had a lot of ~        1
##  5      5 2018-07-31 00:00:00 Charcoal Fabric    Music                        1
##  6      5 2018-07-31 00:00:00 Heather Gray Fabric I received the echo ~       1
##  7      3 2018-07-31 00:00:00 Sandstone Fabric   Without having a cel~        1
##  8      5 2018-07-31 00:00:00 Charcoal Fabric    I think this is the ~        1
##  9      5 2018-07-30 00:00:00 Heather Gray Fabric looks great                 1
## 10      5 2018-07-30 00:00:00 Heather Gray Fabric Love it! I've listen~       1
```

```
## # i 3,140 more rows
```

a. Rename the white and black variants by using gsub() function.

Syntax:

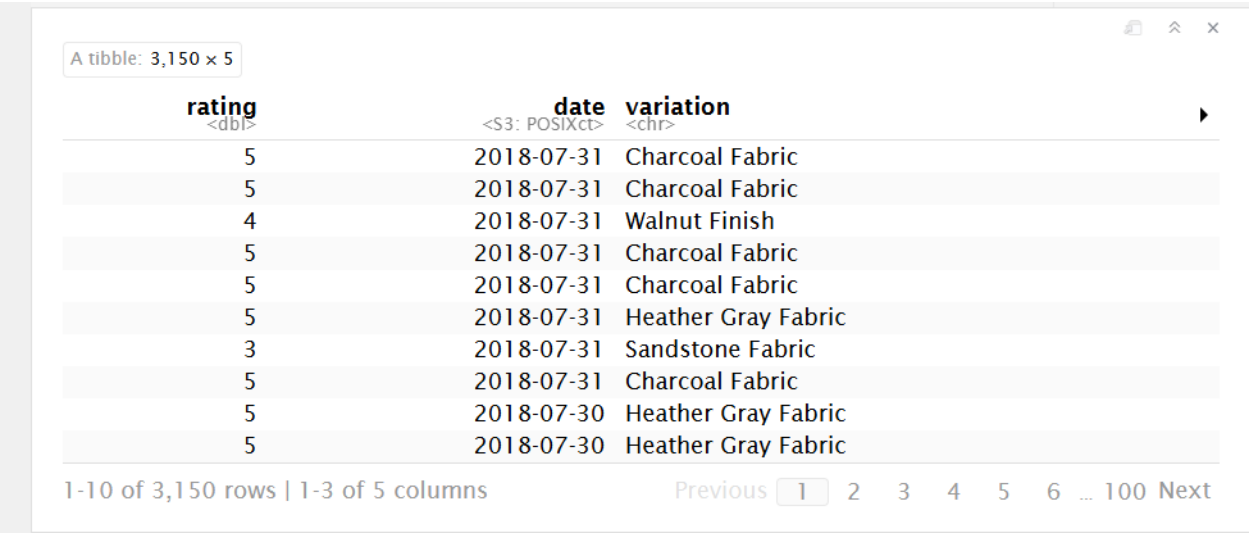
RObject$columnName <- gsub("OldName","NewName",RObject$columnName)

Write the R scripts and show an example of the output by getting a snippet. To embed an image into Rmd, use the function below: # knitr::include_graphics("file path")

```
variation <- gsub("Black Dot", "BlackDot", alexa$variation)
variation <- gsub("Black Plus", "BlackPlus", alexa$variation)
variation <- gsub("Black Show", "BlackShow", alexa$variation)
variation <- gsub("Black Spot", "BlackSpot", alexa$variation)

variation <- gsub("White Dot", "WhiteDot", alexa$variation)
variation <- gsub("White Plus", "WhitePlus", alexa$variation)
variation <- gsub("White Show", "WhiteShow", alexa$variation)
variation <- gsub("White Spot", "WhiteSpot", alexa$variation)

print(alexa)
```

```
## # A tibble: 3,150 x 5
##    rating date                variation           verified_reviews      feedback
##     <dbl> <dttm>              <chr>               <chr>                    <dbl>
##  1      5 2018-07-31 00:00:00 Charcoal Fabric     Love my Echo!                1
##  2      5 2018-07-31 00:00:00 Charcoal Fabric     Loved it!                    1
##  3      4 2018-07-31 00:00:00 Walnut Finish       Sometimes while play~        1
##  4      5 2018-07-31 00:00:00 Charcoal Fabric     I have had a lot of ~        1
##  5      5 2018-07-31 00:00:00 Charcoal Fabric     Music                        1
##  6      5 2018-07-31 00:00:00 Heather Gray Fabric I received the echo ~        1
##  7      3 2018-07-31 00:00:00 Sandstone Fabric    Without having a cel~        1
##  8      5 2018-07-31 00:00:00 Charcoal Fabric     I think this is the ~        1
##  9      5 2018-07-30 00:00:00 Heather Gray Fabric looks great                  1
## 10      5 2018-07-30 00:00:00 Heather Gray Fabric Love it! I've listen~        1
## # i 3,140 more rows
```

```
knitr::include_graphics("alexa_snippet.png")
```



A tibble: 3,150 × 5

rating <dbl>	date <S3: POSIXct>	variation <chr>
5	2018-07-31	Charcoal Fabric
5	2018-07-31	Charcoal Fabric
4	2018-07-31	Walnut Finish
5	2018-07-31	Charcoal Fabric
5	2018-07-31	Charcoal Fabric
5	2018-07-31	Heather Gray Fabric
3	2018-07-31	Sandstone Fabric
5	2018-07-31	Charcoal Fabric
5	2018-07-30	Heather Gray Fabric
5	2018-07-30	Heather Gray Fabric

1-10 of 3,150 rows | 1-3 of 5 columns Previous 1 2 3 4 5 6 … 100 Next

b. Get the total number of each variations and save it into another object. Save the object as variations.RData.

Write the R scripts. What is its result?

Hint: Use the dplyr package. Make sure to install it before loading the package.

Syntax for dplyr

RObject %>% count(RObject$columnName)

```
library(dplyr)
```

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

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

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

```
variations <- alexa %>%
  count(alexa$variation)

  save(variations, file = "/cloud/project/Worksheet#4/variations.RData")
  load("variations.RData")

  print(variations)
```

```
## # A tibble: 16 x 2
##    `alexa$variation`               n
##    <chr>                       <int>
##  1 Black                         261
##  2 Black  Dot                   516
##  3 Black  Plus                  270
##  4 Black  Show                  265
##  5 Black  Spot                  241
##  6 Charcoal Fabric              430
##  7 Configuration: Fire TV Stick 350
##  8 Heather Gray Fabric          157
##  9 Oak Finish                    14
## 10 Sandstone Fabric              90
## 11 Walnut Finish                  9
## 12 White                         91
## 13 White  Dot                   184
## 14 White  Plus                   78
## 15 White  Show                   85
## 16 White  Spot                  109
```

Sample Output

c. From the variations.RData, create a barplot(). Complete the details of the chart which include the title, color, labels of each bar.

```
load("variations.RData")
library(kableExtra)
```

```
##
## Attaching package: 'kableExtra'
```

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

```
variation_counts <- setNames(variations$n, variations$variation)
```

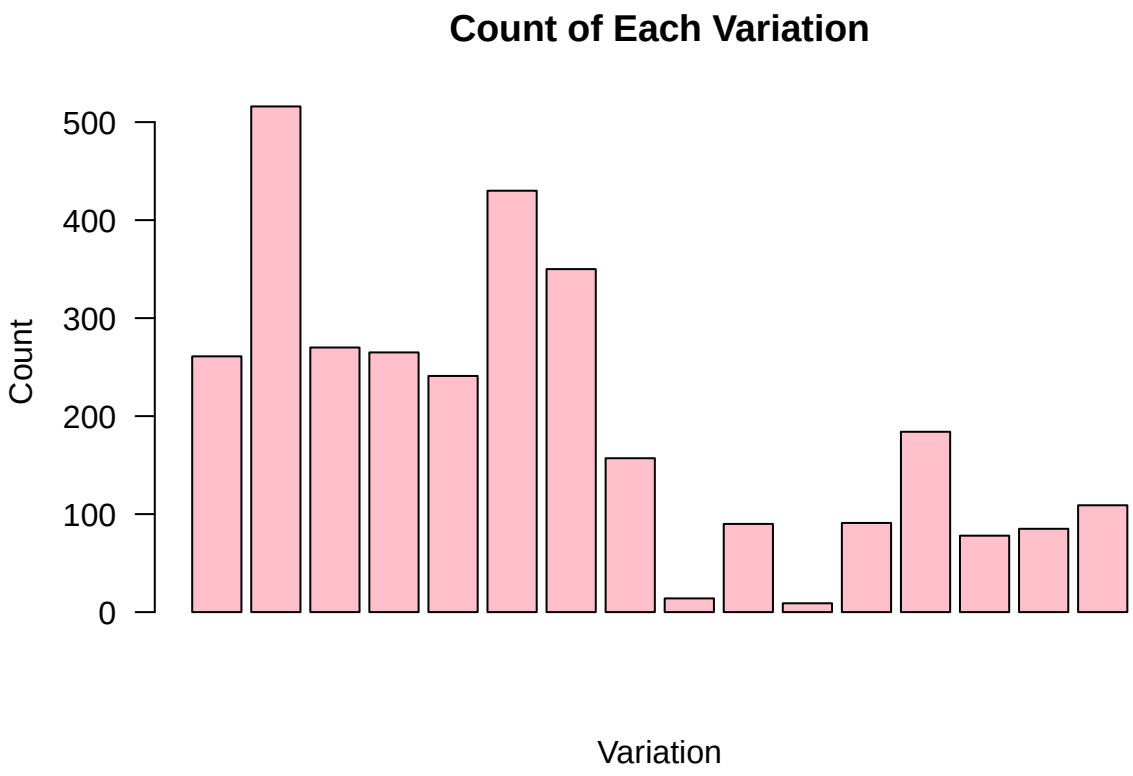
```
## Warning: Unknown or uninitialised column: `variation`.
```

```
load("variations.RData")

variations_data <- data.frame(variations)

kable(variations_data, col.names = c("Variation", "Total"),
      align = c("l", "c"))
```

Variation	Total
Black	261
Black Dot	516
Black Plus	270
Black Show	265
Black Spot	241
Charcoal Fabric	430
Configuration: Fire TV Stick	350
Heather Gray Fabric	157
Oak Finish	14
Sandstone Fabric	90
Walnut Finish	9
White	91
White Dot	184
White Plus	78
White Show	85
White Spot	109

```
barplot(
  variation_counts,
  main = "Count of Each Variation",
  col = "pink",
  xlab = "Variation",
  ylab = "Count",
  las = 2,
  names.arg = variations$variation
)
```

```
## Warning: Unknown or uninitialised column: `variation`.
```



d. Create a barplot() for the black and white variations. Plot it in 1 frame, side by side. Complete the details of the chart.

```
library(ggplot2)
library(gridExtra)
```

```
##
## Attaching package: 'gridExtra'
```

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

```
black_var <- data.frame(
  variation = c("Black", "Black Plus", "Black Show", "Black Spot", "Black Dot"),
  Count = c(250, 300, 200, 100, 500)
)

white_var <- data.frame(
  variation = c("White", "White Dot", "White Plus", "White Show", "White Spot"),
  Count = c(100, 150, 80, 90, 120)
)

plot_black <- ggplot(black_var, aes(x = variation, y = Count, fill = variation)) +
  geom_bar(stat = "identity") +
  labs(title = "Black Variants", y = "Variants", x = "Total Numbers") +
  theme_minimal() +
  theme(
    legend.position = "none",
    axis.text.y = element_text(size = 8)
  )
```

```r
plot_white <- ggplot(white_var, aes(x = variation, y = Count, fill = variation)) +
  geom_bar(stat = "identity") +
  labs(title = "White Variants", y = "Variants", x = "Total Numbers") +
  theme_minimal() +
  theme(
    legend.position = "none",
    axis.text.y = element_text(size = 8)
  )

grid.arrange(plot_black, plot_white, ncol = 2)
```