RWorksheet_cabia#4b

Billy Brendan Cabia

2024-10-30

```
vector1 \leftarrow c(1, 2, 3, 4, 5)
zero_matrix <- matrix(0, nrow = 5, ncol = 5)</pre>
matrixr <- zero_matrix</pre>
for (i in 1:5) {
  for (j in 1:5) {
    matrixr[i, j] <- abs(vector1[i] - vector1[j])</pre>
  }
}
print(matrixr)
        [,1] [,2] [,3] [,4] [,5]
## [1,]
           0
                 1
                      2
## [2,]
           1
                0
                      1
## [3,]
                1
                      0 1
## [4,]
               2
                    1
## [5,]
# 2.
n <- 5
for (i in 1:n) {
  row_output <- paste(rep("*", i), collapse = " ")</pre>
  cat(row_output, "\n")
}
## *
## * *
3.
start <- as.numeric(readline(prompt = "Enter a starting number for Fibonacci sequence: "))</pre>
a <- 0
```

```
b <- 1
cat("Fibonacci sequence starting from", start, "up to 500:\n")
repeat {
    fib <- a + b

    if (fib > 500) {
        break
    }

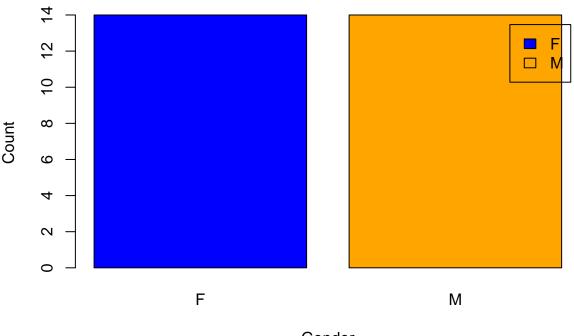
    if (fib >= start) {
        cat(fib, "\n")
    }

    a <- b
    b <- fib
}</pre>
```

```
# a.
library(readxl)
shoe_size <- read_excel("shoe_size.xlsx")</pre>
head(shoe_size)
## # A tibble: 6 x 3
   `Shoe Size` Height Gender
##
##
         <dbl> <dbl> <chr>
## 1
           6.5
                  66 F
           9
                   68 F
## 2
## 3
            8.5 64.5 F
## 4
            8.5 65 F
## 5
           10.5 70 M
                   64 F
            7
## 6
# b.
male_subset <- subset(shoe_size, Gender == "M")</pre>
female_subset <- subset(shoe_size, Gender == "F")</pre>
num_male <- nrow(male_subset)</pre>
num_female <- nrow(female_subset)</pre>
cat("Number of observations in Male:", num_male, "\n")
## Number of observations in Male: 14
cat("Number of observations in Female:", num_female, "\n")
## Number of observations in Female: 14
# c.
gender_counts <- table(shoe_size$Gender)</pre>
```

```
barplot(gender_counts,
    main = "Number of Males and Females",
    xlab = "Gender",
    ylab = "Count",
    col = c("blue", "orange"),
    legend = rownames(gender_counts),
    beside = TRUE)
```

Number of Males and Females

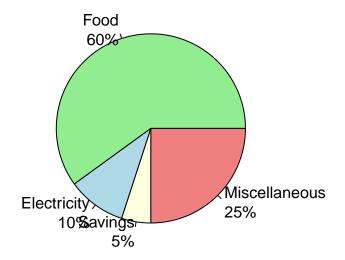


Gender

```
expenses <- c(60, 10, 5, 25)
labels <- c("Food", "Electricity", "Savings", "Miscellaneous")
colors <- c("lightgreen", "lightblue", "lightyellow", "lightcoral")

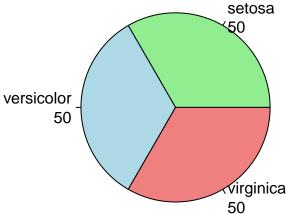
pie(expenses,
    labels = paste(labels, "\n", round((expenses / sum(expenses)) * 100, 1), "%", sep = ""),
    col = colors,
    main = "Monthly Income Distribution of Dela Cruz Family")</pre>
```

Monthly Income Distribution of Dela Cruz Family



```
# a.
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 ...
                 : Factor w/ 3 levels "setosa", "versicolor", ..: 1 1 1 1 1 1 1 1 1 1 ...
## $ Species
mean_values <- colMeans(iris[, 1:4])</pre>
print(mean_values)
## Sepal.Length Sepal.Width Petal.Length Petal.Width
       5.843333
                    3.057333
                                 3.758000
                                               1.199333
##
species_counts <- table(iris$Species)</pre>
colors <- c("lightgreen", "lightblue", "lightcoral")</pre>
pie(species_counts,
    labels = paste(names(species_counts), "\n", species_counts, sep = ""),
    col = colors,
    main = "Species Distribution in Iris Dataset")
```

Species Distribution in Iris Dataset



```
setosa_subset <- iris[iris$Species == "setosa", ]</pre>
versicolor_subset <- iris[iris$Species == "versicolor", ]</pre>
virginica_subset <- iris[iris$Species == "virginica", ]</pre>
setosa_last_six <- tail(setosa_subset, 6)</pre>
versicolor_last_six <- tail(versicolor_subset, 6)</pre>
virginica_last_six <- tail(virginica_subset, 6)</pre>
print("Last six rows of Setosa:")
## [1] "Last six rows of Setosa:"
print(setosa_last_six)
      Sepal.Length Sepal.Width Petal.Length Petal.Width Species
                                           1.9
## 45
                5.1
                             3.8
                                                       0.4 setosa
## 46
                4.8
                             3.0
                                           1.4
                                                       0.3 setosa
## 47
                5.1
                                                       0.2 setosa
                             3.8
                                           1.6
## 48
                4.6
                             3.2
                                           1.4
                                                       0.2 setosa
## 49
                5.3
                                                       0.2 setosa
                             3.7
                                           1.5
## 50
                5.0
                             3.3
                                           1.4
                                                       0.2 setosa
print("Last six rows of Versicolor:")
```

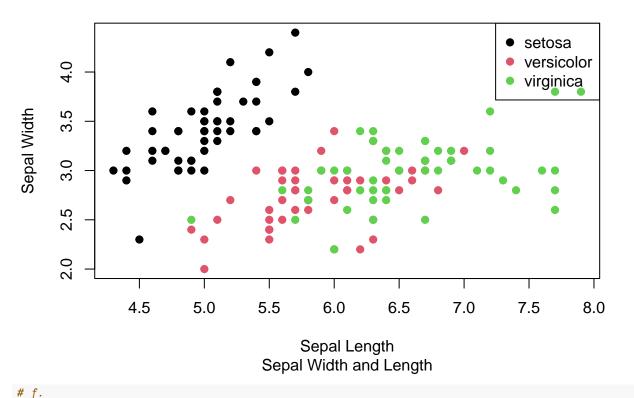
```
## [1] "Last six rows of Versicolor:"
```

print(versicolor_last_six)

```
##
       Sepal.Length Sepal.Width Petal.Length Petal.Width
                                                              Species
## 95
                5.6
                             2.7
                                           4.2
                                                       1.3 versicolor
                             3.0
                                           4.2
## 96
                5.7
                                                       1.2 versicolor
                                                       1.3 versicolor
## 97
                5.7
                             2.9
                                           4.2
## 98
                                          4.3
                6.2
                             2.9
                                                       1.3 versicolor
## 99
                5.1
                             2.5
                                           3.0
                                                       1.1 versicolor
## 100
                5.7
                             2.8
                                           4.1
                                                       1.3 versicolor
print("Last six rows of Virginica:")
```

```
## [1] "Last six rows of Virginica:"
print(virginica_last_six)
       Sepal.Length Sepal.Width Petal.Length Petal.Width
##
                                                             Species
                             3.3
## 145
                6.7
                                           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
                                           5.2
## 148
                6.5
                             3.0
                                                       2.0 virginica
## 149
                6.2
                             3.4
                                           5.4
                                                       2.3 virginica
## 150
                5.9
                             3.0
                                           5.1
                                                       1.8 virginica
# e.
iris$Species <- as.factor(iris$Species)</pre>
plot(iris$Sepal.Length, iris$Sepal.Width,
     col = iris$Species,
     pch = 19,
     main = "Iris Dataset",
     sub = "Sepal Width and Length",
     xlab = "Sepal Length",
     ylab = "Sepal Width")
legend("topright", legend = levels(iris$Species), col = 1:3, pch = 19)
```

Iris Dataset



J.
Pie Chart. The pie chart visually represents the distribution of species, making it easy to see which
#Scatterplot, The scatterplot illustrates the relationship between sepal length and width, revealing ho

```
library(readxl)
alexa_data <- read_excel("alexa_file.xlsx")</pre>
str(alexa_data)
## tibble [3,150 x 5] (S3: tbl_df/tbl/data.frame)
                     : num [1:3150] 5 5 4 5 5 5 3 5 5 5 ...
##
   $ date
                     : POSIXct[1:3150], format: "2018-07-31" "2018-07-31" ...
##
  $ variation
                   : chr [1:3150] "Charcoal Fabric" "Charcoal Fabric" "Walnut Finish" "Charcoal Fabr
## $ verified_reviews: chr [1:3150] "Love my Echo!" "Loved it!" "Sometimes while playing a game, you c
                 : num [1:3150] 1 1 1 1 1 1 1 1 1 1 ...
a.
alexa_data$variation <- gsub("Black Dot", "BlackDot", alexa_data$variation)</pre>
alexa_data$variation <- gsub("Black Plus", "BlackPlus", alexa_data$variation)</pre>
alexa_data$variation <- gsub("Black Show", "BlackShow", alexa_data$variation)
alexa_data$variation <- gsub("Black Spot", "BlackSpot", alexa_data$variation)</pre>
 # Fix "White" variants
alexa_data$variation <- gsub("White Dot", "WhiteDot", alexa_data$variation)</pre>
alexa_data$variation <- gsub("White Plus", "WhitePlus", alexa_data$variation)</pre>
alexa_data$variation <- gsub("White Show", "WhiteShow", alexa_data$variation)
alexa_data$variation <- gsub("White Spot", "WhiteSpot", alexa_data$variation)</pre>
alexa data$variation[1052:2000]
    [1] "White Spot" "Black Spot" "Black Spot" "Black Spot" "Black Spot"
##
    [6] "White Spot" "Black Spot" "Black Spot" "Black Spot" "Black Spot"
##
   [11] "Black Spot" "White Spot" "White Spot" "Black Spot" "White Spot"
##
   [16] "White Spot" "White Spot" "Black Spot" "Black Spot"
   [21] "White Spot" "Black Spot" "Black Spot" "White Spot"
##
   [26] "Black Spot" "Black Spot" "White Spot" "Black Spot" "Black Spot"
##
##
   [31] "Black Spot" "Black Spot" "White Spot" "Black Spot" "White
   [36] "Black Spot" "Black Spot" "White Spot" "White Spot" "Black
   [41] "Black Spot" "Black Spot" "Black Spot" "White Spot" "White
##
   [46] "Black Spot" "Black Spot" "Black Spot" "White Spot" "Black Spot"
##
   [51] "Black Spot" "Black Spot" "Black Spot" "White Spot"
##
   [56] "Black Spot" "White Spot" "Black Spot" "White Spot" "Black Spot"
##
   [61] "Black Spot" "White Spot" "White Spot" "White Spot" "Black Spot"
   [66] "Black Spot" "Black Spot" "White Spot" "White Spot" "Black Spot"
##
   [71] "Black Spot" "Black Spot" "White Spot" "Black Spot" "Black
   [76] "Black Spot" "Black Spot" "Black Spot" "Black Spot" "Black Spot"
##
   [81] "Black Spot" "Black Spot" "Black Spot" "Black Spot"
##
##
   [86] "White Spot" "White Spot" "Black Spot" "Black Spot"
   [91] "White Spot" "Black Spot" "Black Spot" "Black Spot" "Black Spot"
   [96] "White Spot" "Black Spot" "Black Spot" "Black Spot"
##
## [101] "White Spot" "Black Spot" "Black Spot" "White Spot" "Black Spot"
## [106] "White Spot" "Black Spot" "Black Spot" "Black Spot" "Black Spot"
## [111] "Black Spot" "Black Spot" "Black Spot" "White Spot" "Black Spot"
## [116] "White Spot" "Black Spot" "Black Spot" "Black Spot" "Black
## [121] "Black Spot" "White Spot" "Black Spot" "White Spot" "Black Spot"
## [126] "White Spot" "Black Spot" "Black Spot" "Black Spot" "White Spot"
## [131] "White Spot" "Black Spot" "White Spot" "Black Spot" "Black Spot"
```

```
## [136] "Black Spot" "Black Spot" "White Spot" "Black Spot" "White Spot"
## [141] "Black Spot" "Black Spot" "Black Spot" "White Spot" "Black Spot"
                Spot" "Black
                             Spot" "White Spot" "White Spot" "Black Spot"
## [146] "Black
## [151] "Black
                Spot" "Black
                             Spot" "White Spot" "White
                                                        Spot" "Black Spot"
                Spot" "Black Spot" "Black Spot" "White Spot" "Black Spot"
## [156] "White
## [161] "Black Spot" "White Spot" "Black Spot" "Black Spot" "Black Spot"
## [166] "Black
                Spot" "Black Spot" "Black Spot" "White Spot" "White Spot"
                             Spot" "Black Spot" "White
                                                        Spot" "Black Spot"
## [171] "Black
                Spot" "White
                Spot" "Black
                                          Spot" "Black
  [176] "Black
                             Spot" "White
                                                        Spot" "Black
                                                                      Spot"
                             Spot" "Black Spot" "Black
  [181] "White
                Spot" "Black
                                                        Spot" "Black
                Spot" "Black
  [186] "Black
                             Spot" "Black
                                           Spot" "White
                                                        Spot" "White
## [191] "Black
                Spot" "White
                             Spot" "White
                                           Spot" "White
                                                        Spot" "Black
                Spot" "Black
                             Spot" "Black Spot" "White
## [196] "Black
                                                        Spot" "Black
                                          Spot" "Black
## [201] "White
                Spot" "White
                             Spot" "White
                                                        Spot" "Black
## [206] "Black
                Spot" "Black
                             Spot" "Black Spot" "Black
                                                        Spot" "Black
                                                                      Spot"
## [211] "White
                Spot" "White
                             Spot" "Black Spot" "White Spot" "White
                                                                      Spot"
  [216] "White
                Spot" "Black
                             Spot" "Black Spot" "Black Spot" "White
                                                                      Spot"
                             Spot" "White
                                           Spot" "White
                                                        Spot" "White
                Spot" "Black
  [221] "White
                Spot" "Black
                                          Spot" "Black
  [226] "White
                             Spot" "White
                                                        Spot" "Black Spot"
                             Spot" "White Spot" "White
                Spot" "Black
## [231] "Black
                                                        Spot" "White Spot"
## [236] "Black Spot" "Black
                             Spot" "Black Spot" "White Spot" "White Spot"
                             Spot" "Black Spot" "Black Spot" "White Spot"
## [241] "Black
                Spot" "White
## [246] "Black
                Spot" "White
                             Spot" "Black Spot" "White Spot" "Black Spot"
  [251] "Black
                Spot" "Black
                             Spot" "Black Spot" "Black Spot" "Black Spot"
                             Spot" "Black Spot" "Black
  [256] "Black
                Spot" "Black
                                                        Spot" "Black
                Spot" "Black
                                                        Spot" "Black
  [261] "White
                             Spot" "Black Spot" "Black
                Spot" "Black
  [266] "White
                             Spot" "Black
                                          Spot" "White
                                                        Spot" "Black
                Spot" "Black
                             Spot" "Black Spot" "Black Spot" "Black
## [271] "Black
                                                        Spot" "Black
## [276] "Black
                Spot" "Black
                             Spot" "Black Spot" "White
                             Spot" "Black Spot" "Black
                Spot" "White
                                                        Spot" "White
## [281] "Black
## [286] "Black
                Spot" "Black
                             Spot" "White Spot" "Black Spot" "Black
                                                                      Spot"
  [291] "Black
                Spot" "Black
                             Spot" "Black Spot" "Black Spot" "Black
                                                                      Spot"
  [296] "Black
                Spot" "White
                             Spot" "Black
                                          Spot" "Black Spot" "Black
                Spot" "Black
                             Spot" "Black Spot" "Black Spot" "Black
## [301] "White
                                                                      Spot"
                Spot" "Black
                             Spot" "White Spot" "White
  [306] "Black
                                                        Spot" "Black Spot"
## [311] "Black
                Spot" "Black
                             Spot" "Black Spot" "Black Spot" "Black Spot"
## [316] "Black
                Spot" "White
                             Spot" "Black Spot" "Black Spot" "White
## [321] "White
                Spot" "Black
                             Spot" "Black Spot" "Black Spot" "Black Spot"
                             Spot" "Black Spot" "Black Spot" "White Spot"
## [326] "White
                Spot" "Black
  [331] "White
                Spot" "Black
                             Spot" "Black Spot" "Black Spot" "Black Spot"
                Spot" "Black
  [336] "Black
                             Spot" "Black Spot" "Black Spot" "Black Spot"
                Spot" "Black
                             Spot" "Black Spot" "Black Spot" "White
  [341] "White
                Spot" "White
                             Spot" "Black Spot" "Black
                                                        Spot" "Black
  [346] "Black
                                                                      Show"
  [351] "Black
                Show" "Black
                             Show" "Black Show" "White
                                                        Show" "White
                                           Show" "Black
  [356] "Black
                Show" "White
                             Show" "Black
                                                        Show" "Black
                                           Show" "Black
                                                        Show" "Black
## [361] "Black
                Show" "Black
                             Show" "White
                                           Show" "Black
                                                        Show" "White
                Show" "Black
                             Show" "Black
  [366] "Black
                                                                      Show"
                Show" "Black
                                           Show" "Black
  [371] "Black
                             Show" "Black
                                                        Show" "White
                                           Show" "Black
                Show" "Black
  [376] "Black
                             Show" "Black
                                                        Show" "White
                Show" "Black
                             Show" "Black
                                           Show" "Black
                                                        Show" "Black
## [381] "Black
                Show" "Black
## [386] "Black
                             Show" "Black
                                           Show" "Black Show" "White
                Show" "Black
                             Show" "White Show" "White Show" "Black
## [391] "White
## [396] "Black Show" "White Show" "White Show" "Black Show" "Black Show"
## [401] "Black Show" "Black Show" "Black Show" "White Show" "Black Show"
```

```
## [406] "Black
                 Show" "Black
                               Show" "Black Show" "Black
                                                           Show" "Black
                                             Show" "Black
   [411] "Black
                 Show" "White
                               Show" "White
                                                           Show" "Black
                 Show" "Black
                               Show" "Black
                                             Show" "Black
  [416] "Black
                                                           Show" "Black
  [421] "Black
                 Show" "Black
                               Show" "White
                                             Show" "White
                                                           Show" "Black
                 Show" "White
                                             Show" "Black
   [426] "Black
                               Show" "Black
                                                           Show" "Black
   [431] "Black
                 Show" "Black
                               Show" "Black
                                             Show" "Black
                                                           Show" "White
   [436] "Black
                 Show" "White
                               Show" "Black
                                             Show" "Black
                                                           Show" "Black
   [441] "Black
                                             Show" "Black
                 Show" "Black
                               Show" "Black
                                                           Show" "Black
                                                                         Show"
   [446] "Black
                 Show" "White
                               Show" "Black
                                             Show" "Black
                                                           Show" "White
                 Show" "White
                                             Show" "White
   [451] "Black
                               Show" "White
                                                           Show" "White
   [456] "Black
                 Show" "White
                               Show" "Black
                                             Show" "White
                                                           Show" "Black
   [461] "White
                 Show" "Black
                               Show" "Black
                                             Show" "White
                                                           Show" "Black
                 Show" "Black
                               Show" "White
                                             Show" "Black
                                                           Show" "Black
   [466] "Black
                 Show" "White
                                             Show" "Black
   [471] "White
                               Show" "Black
                                                           Show" "Black
                                             Show" "Black
   [476] "Black
                 Show" "Black
                               Show" "Black
                                                           Show" "White
                                                                         Show"
                 Show" "Black
                               Show" "Black
                                             Show" "White
                                                           Show" "Black
   [481] "Black
                                                                         Show"
                                             Show" "Black
   [486] "Black
                 Show" "Black
                               Show" "White
                                                           Show" "Black
                                                                         Show"
##
                 Show" "Black
                               Show" "Black
                                             Show" "Black
                                                           Show" "Black
   [491] "Black
                 Show" "Black
                                             Show" "Black
   [496] "White
                               Show" "Black
                                                           Show" "White
                 Show" "Black
                                                           Show" "Black
                               Show" "White
                                             Show" "Black
   [501] "Black
                                                                         Show"
##
   [506] "Black
                 Show" "White
                               Show" "Black
                                             Show" "White
                                                           Show" "Black
   [511] "Black
                 Show" "Black
                               Show" "Black
                                             Show" "White
                                                           Show" "White
   [516] "Black
                 Show" "Black
                               Show" "Black
                                             Show" "Black
                                                           Show" "Black
##
                                                                         Show"
                                             Show" "Black
   [521] "Black
                 Show" "White
                               Show" "Black
                                                           Show" "Black
                                                                         Show"
                 Show" "White
                                             Show" "Black
   [526] "Black
                               Show" "White
                                                           Show" "Black
##
   [531] "Black
                 Show" "Black
                               Show" "Black
                                             Show" "Black
                                                           Show" "White
   [536] "White
                                                           Show" "Black
                 Show" "White
                               Show" "Black
                                             Show" "Black
##
   [541] "Black
                 Show" "Black
                               Show" "Black
                                             Show" "Black
                                                           Show" "Black
   [546] "White
                 Show" "Black
                               Show" "Black
                                             Show" "Black
                                                           Show" "Black
                               Show" "Black
                                             Show" "Black
                 Show" "Black
                                                           Show" "Black
   [551] "Black
                 Show" "Black
                               Show" "White
                                             Show" "Black
##
   [556] "White
                                                           Show" "Black
                                                                         Show"
##
   [561] "White
                 Show" "Black
                               Show" "Black
                                             Show" "Black
                                                           Show" "White
                                                                         Show"
   [566] "Black
                 Show" "Black
                               Show" "Black
                                             Show" "Black
                                                           Show" "Black
                 Show" "White
                                             Show" "Black
   [571] "Black
                               Show" "Black
                                                           Show" "White
                 Show" "Black
                                             Show" "Black
                               Show" "White
                                                           Show" "Black
   [576] "Black
                                             Show" "Black
   [581] "Black
                 Show" "White
                               Show" "Black
                                                           Show" "White
##
                                             Show" "Black
   [586] "Black
                 Show" "White
                               Show" "White
                                                           Show" "Black
   [591] "Black
                 Show" "Black
                               Show" "Black
                                             Show" "Black
                                                           Show" "White
                 Show" "Black
                               Show" "Black
                                             Show" "Black
                                                           Show" "Black
   [596] "Black
                 Show" "Black
                               Show" "Black
                                             Show" "Black
                                                           Show" "White
##
   [601] "Black
   [606] "Black
                 Show" "Black
                               Show" "Black
                                             Show" "Black
                                                           Show" "Black
                 Show" "White
                                             Show" "Black
   [611] "White
                               Show" "Black
                                                           Show" "Black
   [616] "Black
                 Show" "Black
                               Show" "White
                                             Show" "Black
                                                           Show" "White
                                                                         Show"
   [621] "Black
                 Show" "Black
                               Show" "Black
                                             Show" "Black
                                                           Show" "Black
##
                 Show" "Black
                               Show" "White
                                             Show" "Black
                                                           Show" "Black
   [626] "White
                 Show" "White
                                             Show" "Black
   [631] "Black
                               Show" "Black
                                                           Show" "Black
                                             Show" "White
                 Show" "Black
                               Show" "Black
                                                           Show" "Black
##
   [636] "Black
                                                                         Show"
   [641] "Black
                 Show" "Black
                               Show" "Black
                                             Show" "White
                                                           Show" "Black
                 Show" "Black
                               Show" "Black
                                             Show" "Black
   [646] "Black
                                                           Show" "Black
                 Show" "White
                                             Show" "White
                                                           Show" "Black
   [651] "Black
                               Show" "Black
                                             Show" "Black
                 Show" "Black
                               Show" "Black
   [656] "Black
                                                           Show" "Black
                 Show" "Black
                               Show" "Black Show" "White Show" "Black Show"
  [661] "White
                Show" "Black
                               Show" "Black Show" "Black Show" "Black Show"
## [666] "Black
## [671] "White
                Show" "Black Show" "Black Show" "White Show" "White Show"
```

```
## [676] "Black Show" "White Show" "Black Show" "White Show" "Black Show"
## [681] "Black Show" "Black Show" "Black Show" "Black Show" "Black Show"
## [686] "White Show" "Black Show" "Black Show" "Black Show" "White Show"
## [691] "White Show" "Black Show" "Black Show" "Black Show" "Black Show"
## [696] "Black Show" "Black Show" "Black Show" "Black Show" "Black Plus"
## [701] "Black Plus" "White Plus" "Black Plus" "Black Plus" "White Plus"
## [706] "White Plus" "Black Plus" "Black Plus" "White Plus" "White Plus"
## [711] "Black Plus" "Black Plus" "Black Plus" "Black Plus" "White Plus"
## [716] "Black Plus" "Black Plus" "Black Plus" "Black Plus" "Black Plus"
## [721] "White Plus" "Black Plus" "Black Plus" "Black Plus" "White Plus"
## [726] "Black Plus" "Black Plus" "Black Plus" "Black Plus" "Black Plus"
## [731] "Black Plus" "Black Plus" "Black Plus" "Black Plus" "Black Plus"
## [736] "Black Plus" "Black Plus" "Black Plus" "Black Plus" "Black Plus"
## [741] "Black Plus" "Black Plus" "Black Plus" "Black Plus" "Black Plus"
## [746] "Black Plus" "Black Plus" "Black Plus" "Black Plus" "Black Plus"
## [751] "White Plus" "Black Plus" "Black Plus" "Black Plus" "White Plus"
  [756] "Black Plus" "Black Plus" "White Plus" "Black Plus" "White Plus"
## [761] "White Plus" "Black Plus" "Black Plus" "Black Plus" "Black Plus"
## [766] "White Plus" "Black Plus" "Black Plus" "Black Plus" "Black Plus"
## [771] "Black Plus" "Black Plus" "Black Plus" "Black Plus" "Black Plus"
## [776] "White Plus" "Black Plus" "Black Plus" "Black Plus" "Black Plus"
## [781] "Black Plus" "Black Plus" "Black Plus" "Black Plus" "Black Plus"
## [786] "Black Plus" "Black Plus" "Black Plus" "Black Plus" "Black Plus"
## [791] "Black Plus" "Black Plus" "Black Plus" "Black Plus" "Black Plus"
## [796] "Black Plus" "Black Plus" "Black Plus" "Black Plus" "Black Plus"
## [801] "Black Plus" "Black Plus" "White Plus" "Black Plus" "Black Plus"
## [806] "Black Plus" "Black Plus" "Black Plus" "Black Plus" "Black Plus"
  [811] "White Plus" "Black Plus" "Black Plus" "White Plus" "Black Plus"
## [816] "Black Plus" "Black Plus" "Black Plus" "White Plus" "Black Plus"
## [821] "Black Plus" "Black Plus" "Black Plus" "Black Plus"
## [826] "Black Plus" "Black Plus" "Black Plus" "Black Plus" "Black Plus"
  [831] "White Plus" "Black Plus" "Black Plus" "Black Plus" "Black Plus"
  [836] "Black Plus" "White Plus" "Black Plus" "Black Plus" "Black Plus"
  [841] "White Plus" "Black Plus" "White Plus" "Black Plus" "Black Plus"
## [846] "Black Plus" "Black Plus" "Black Plus" "White Plus" "Black Plus"
## [851] "Black Plus" "Black Plus" "White Plus" "Black Plus" "White Plus"
## [856] "White Plus" "Black Plus" "Black Plus" "Black Plus" "Black Plus"
## [861] "Black Plus" "White Plus" "Black Plus" "Black Plus" "Black Plus"
## [866] "White Plus" "Black Plus" "Black Plus" "Black Plus" "Black Plus"
## [871] "Black Plus" "White Plus" "Black Plus" "Black Plus"
## [876] "Black Plus" "Black Plus" "Black Plus" "Black Plus" "White Plus"
## [881] "White Plus" "Black Plus" "Black Plus" "Black Plus" "Black Plus"
  [886] "White Plus" "White Plus" "Black Plus" "White Plus"
## [891] "White Plus" "Black Plus" "Black Plus" "White Plus" "Black Plus"
## [896] "White Plus" "Black Plus" "White Plus" "Black Plus" "Black Plus"
## [901] "Black Plus" "Black Plus" "Black Plus" "Black Plus"
  [906] "Black Plus" "Black Plus" "Black Plus" "Black Plus" "Black Plus"
  [911] "Black Plus" "Black Plus" "Black Plus" "Black Plus"
  [916] "Black Plus" "White Plus" "Black Plus" "Black Plus"
## [921] "White Plus" "White Plus" "Black Plus" "Black Plus" "Black Plus"
## [926] "Black Plus" "White Plus" "Black Plus" "Black Plus" "Black Plus"
## [931] "Black Plus" "White Plus" "Black Plus" "Black Plus" "Black Plus"
## [936] "Black Plus" "Black Plus" "Black Plus" "White Plus" "White Plus"
## [941] "Black Plus" "Black Plus" "White Plus" "Black Plus" "White Plus"
```

```
## [946] "Black Plus" "Black Plus" "Black Plus" "Black Plus"
```

b.

```
library(knitr)
values <- c(10, 5, 14)
names <- c(4, 6, 8)
colors <- c("red", "green", "blue")
barplot(values, names.arg=names, col=colors, main="Change bar width", width=c(1, 0.5, 1.5))</pre>
```

Change bar width

