Data Analysis using R programming

```r
# loading the dataset into R
dataset <- read.csv("movies.csv")


# Printing the structure of the dataset
str(dataset)
```

```
## 'data.frame':    2000 obs. of  13 variables:
##  $ Title            : chr  "Avatar: The Way of Water" "Guillermo del Toro's Pinocchio" "Bullet Train"
##  $ Rating           : num  8 7.8 7.3 8 NA 5.9 6.1 6.9 8.2 7.8 ...
##  $ Year             : int  2022 2022 2022 2022 2022 2022 2022 2022 2022 2022 ...
##  $ Month            : chr  "December" "December" "August" "November" ...
##  $ Certificate      : chr  "PG-13" "PG" "R" "R" ...
##  $ Runtime          : chr  "192" "117" "127" "114" ...
##  $ Directors        : chr  "James Cameron" "Guillermo del Toro, Mark Gustafson" "David Leitch" "Marti
##  $ Stars            : chr  "Sam Worthington, Zoe Saldana, Sigourney Weaver, Stephen Lang" "Ewan McGr
##  $ Genre            : chr  "Action, Adventure, Fantasy" "Animation, Drama, Family" "Action, Comedy, 
##  $ Filming_location : chr  "New Zealand" "USA" "Japan" "Ireland" ...
##  $ Budget           : chr  "$350,000,000" "$35,000,000" "$85,900,000" "Unknown" ...
##  $ Income           : chr  "$681,081,686" "$71,614" "$239,268,602" "$19,720,823" ...
##  $ Country_of_origin: chr  "United States" "United States, Mexico, France" "Japan, United States" "I
```

```r
# List the variables in the dataset
names(dataset)
```

```
##  [1] "Title"             "Rating"            "Year"
##  [4] "Month"             "Certificate"       "Runtime"
##  [7] "Directors"         "Stars"             "Genre"
## [10] "Filming_location"  "Budget"            "Income"
## [13] "Country_of_origin"
```

```r
# Printing the top 15 rows of the dataset
head(dataset, 15)
```

```
##                            Title Rating Year    Month Certificate Runtime
## 1        Avatar: The Way of Water    8.0 2022 December       PG-13     192
## 2  Guillermo del Toro's Pinocchio    7.8 2022 December          PG     117
## 3                     Bullet Train    7.3 2022   August           R     127
## 4       The Banshees of Inisherin    8.0 2022 November           R     114
## 5                            M3gan     NA 2022  January       PG-13     102
## 6                     Emancipation    5.9 2022 December           R     132
## 7                        Amsterdam    6.1 2022  October           R     134
## 8                     Violent Night    6.9 2022 December           R     112
## 9                        The Whale    8.2 2022 December           R     117
```

```
## 10                  The Fabelmans    7.8 2022 November       PG-13     151
## 11                       The Menu    7.5 2022 November           R     107
## 12                        Babylon    7.7 2022 December           R     188
## 13                              X    6.6 2022    March           R     105
## 14                  Bones and All    7.0 2022 November           R     131
## 15                     Black Adam    6.5 2022  October       PG-13     125
##                           Directors
## 1                       James Cameron
## 2  Guillermo del Toro, Mark Gustafson
## 3                        David Leitch
## 4                      Martin McDonagh
## 5                     Gerard Johnstone
## 6                        Antoine Fuqua
## 7                      David O Russell
## 8                        Tommy Wirkola
## 9                     Darren Aronofsky
## 10                    Steven Spielberg
## 11                          Mark Mylod
## 12                     Damien Chazelle
## 13                             Ti West
## 14                    Luca Guadagnino
## 15                 Jaume Collet Serra
##                                                                    Stars
## 1             Sam Worthington, Zoe Saldana, Sigourney Weaver, Stephen Lang
## 2                  Ewan McGregor, David Bradley, Gregory Mann, Burn Gorman
## 3            Brad Pitt, Joey King, Aaron Taylor Johnson, Brian Tyree Henry
## 4                 Colin Farrell, Brendan Gleeson, Kerry Condon, Pat Shortt
## 5                Jenna Davis, Amie Donald, Allison Williams, Violet McGraw
## 6                  Will Smith, Ben Foster, Charmaine Bingwa, Gilbert Owuor
## 7  Christian Bale, Margot Robbie, John David Washington, Alessandro Nivola
## 8             David Harbour, John Leguizamo, Beverly D Angelo, Alex Hassell
## 9                          Brendan Fraser, Sadie Sink, Ty Simpkins, Hong Chau
## 10              Michelle Williams, Gabriel LaBelle, Paul Dano, Judd Hirsch
## 11               Ralph Fiennes, Anya Taylor Joy, Nicholas Hoult, Hong Chau
## 12                        Brad Pitt, Margot Robbie, Jean Smart, Olivia Wilde
## 13                           Mia Goth, Jenna Ortega, Brittany Snow, Kid Cudi
## 14          Timoth e Chalamet, Taylor Russell, Mark Rylance, Kendle Coffey
## 15              Dwayne Johnson, Aldis Hodge, Pierce Brosnan, Noah Centineo
##                           Genre Filming_location       Budget       Income
## 1  Action, Adventure, Fantasy      New Zealand $350,000,000 $681,081,686
## 2    Animation, Drama, Family              USA  $35,000,000      $71,614
## 3    Action, Comedy, Thriller            Japan  $85,900,000 $239,268,602
## 4                Comedy, Drama          Ireland      Unknown  $19,720,823
## 5    Horror, Sci-Fi, Thriller      New Zealand      Unknown      Unknown
## 6             Action, Thriller          Unknown $120,000,000      Unknown
## 7      Comedy, Drama, History              USA  $80,000,000  $31,245,810
## 8       Action, Comedy, Crime           Canada  $20,000,000  $59,595,460
## 9                       Drama              USA      Unknown   $1,858,238
## 10                      Drama              USA  $40,000,000   $9,500,361
## 11   Comedy, Horror, Thriller              USA  $35,000,000  $65,878,071
## 12     Comedy, Drama, History              USA  $78,000,000       $1,470
## 13  Horror, Mystery, Thriller      New Zealand   $1,000,000  $14,779,858
## 14     Drama, Horror, Romance              USA  $16,000,000  $14,134,907
## 15 Action, Adventure, Fantasy              USA $195,000,000 $391,273,355
```

```
##                              Country_of_origin
## 1                                United States
## 2                United States, Mexico, France
## 3                         Japan, United States
## 4       Ireland, United Kingdom, United States
## 5                                United States
## 6                                United States
## 7                          United States, Japan
## 8                         United States, Canada
## 9                                United States
## 10                               United States
## 11                               United States
## 12                               United States
## 13                        United States, Canada
## 14                         Italy, United States
## 15 United States, Canada, New Zealand, Hungary
```

```r
# User defined function to calculate profit based on the budget and the income
calculate_profit <- function(dataset) {
  dataset$profit <- dataset$income - dataset$budget
  return(dataset)
}

# Filtering rows based on ratings
new_df <- dataset[dataset$rating > 8.5, ]


# Creating a new data frame by joining dependant and independant variables

dependent_var <- c("Rating", "Income")
independent_var <- c("Budget", "Year", "Runtime")

new_df2 <- cbind(dataset[, dependent_var], dataset[, independent_var])


# Removing missing values
dataset <- dataset[complete.cases(dataset), ]
dataset <- na.omit(dataset)


# Removing duplicated data
dataset <- unique(dataset)

# Re-ordering rows in descending order
dataset <- dataset[order(dataset$Year, decreasing = TRUE), ]
dataset <- dataset[order(dataset$Rating, decreasing = TRUE), ]


# Renaming some of the column names
colnames(dataset) <- c("Movie Title", "Rating", "Year", "Month", "Certificate", "Runtime",
"Directors", "Cast", "Genre", "Location", "Budget", "Income", "Country")

# Adding new variables by using a mathematical function
dataset$Year_2x <- dataset$Year * 2
```

```r
# Creating a training set using a random number generator engine
set.seed(123)
train_index <- sample(1:nrow(dataset), 0.8 * nrow(dataset))
train_set <- dataset[train_index, ]
test_set <- dataset[-train_index, ]

# Printing the summary statistics of the dataset
summary(dataset)
```

```
##  Movie Title            Rating           Year         Month
##  Length:1998        Min.   :1.900   Min.   :2003   Length:1998
##  Class :character   1st Qu.:6.125   1st Qu.:2007   Class :character
##  Mode  :character   Median :6.700   Median :2012   Mode  :character
##                     Mean   :6.668   Mean   :2012
##                     3rd Qu.:7.300   3rd Qu.:2017
##                     Max.   :9.600   Max.   :2022
##  Certificate          Runtime           Directors            Cast
##  Length:1998        Length:1998        Length:1998        Length:1998
##  Class :character   Class :character   Class :character   Class :character
##  Mode  :character   Mode  :character   Mode  :character   Mode  :character
##
##
##
##     Genre              Location            Budget             Income
##  Length:1998        Length:1998        Length:1998        Length:1998
##  Class :character   Class :character   Class :character   Class :character
##  Mode  :character   Mode  :character   Mode  :character   Mode  :character
##
##
##
##    Country             Year_2x
##  Length:1998        Min.   :4006
##  Class :character   1st Qu.:4014
##  Mode  :character   Median :4024
##                     Mean   :4025
##                     3rd Qu.:4034
##                     Max.   :4044
```

```r
# Using the income variables and performing these statistical functions
mean(dataset$Rating)
```

```
## [1] 6.667618
```

```r
median(dataset$Rating)
```

```
## [1] 6.7
```

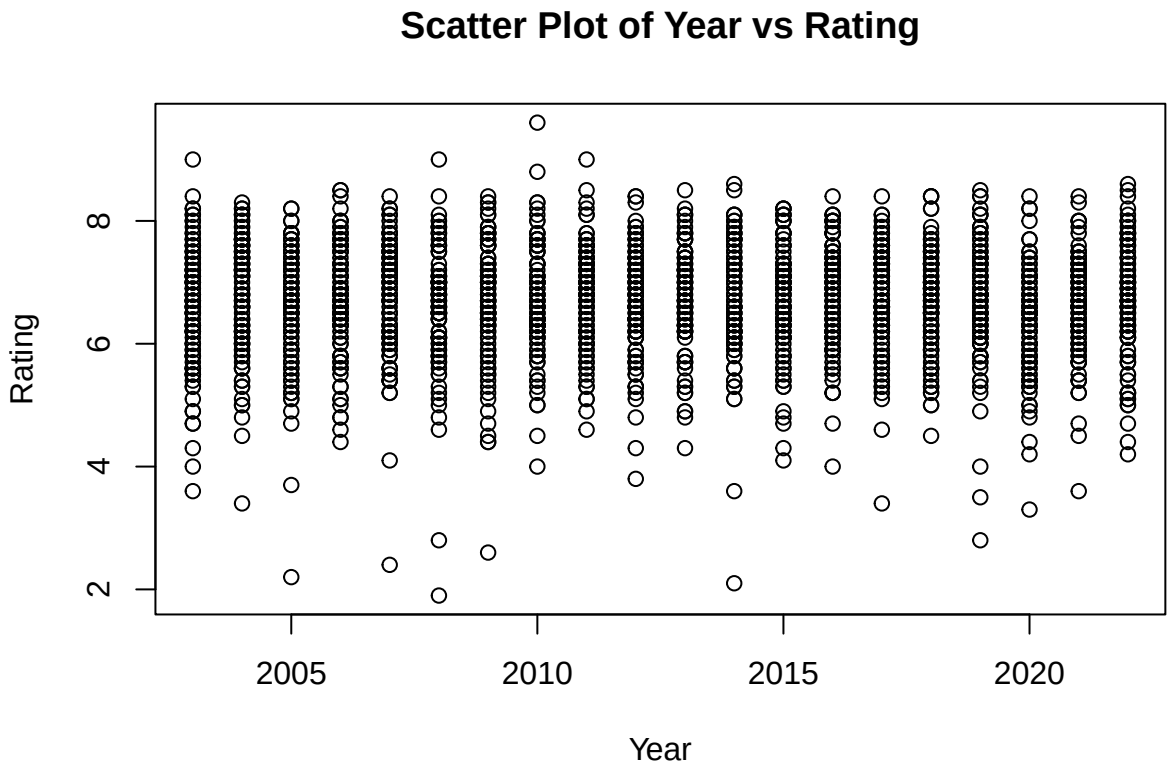
```r
mode(dataset$Rating)
```

```
## [1] "numeric"
```

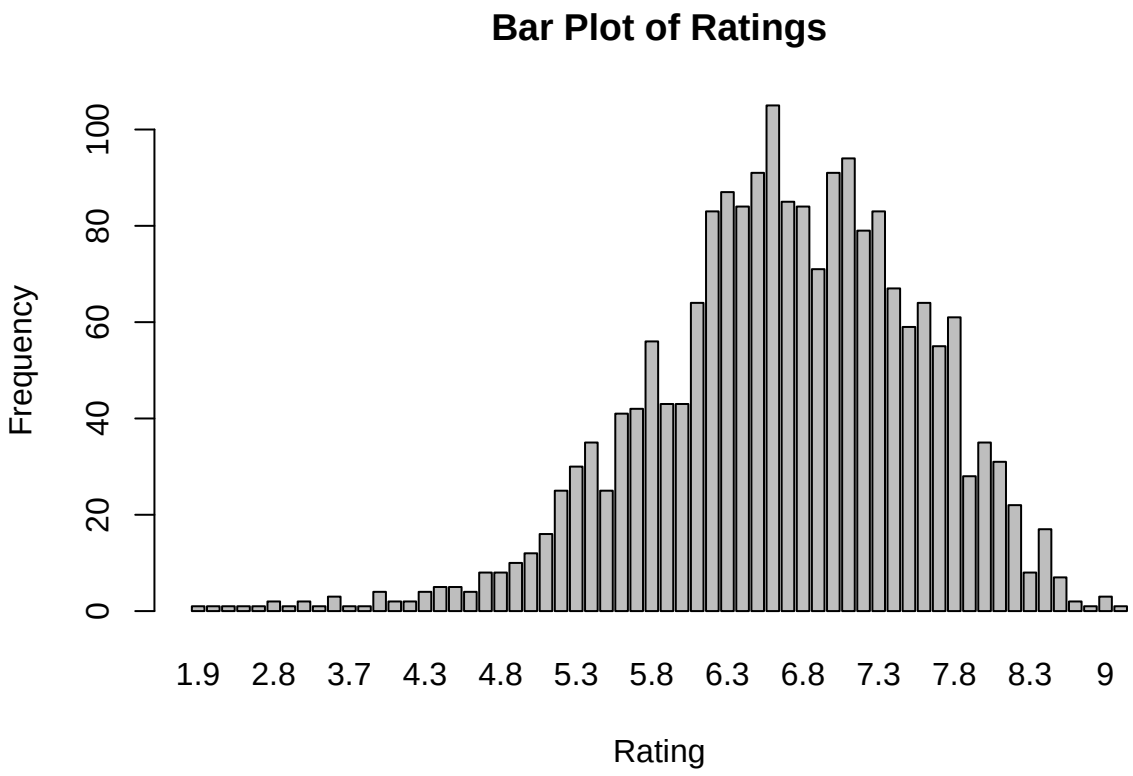
```
range(dataset$Rating)
```

```
## [1] 1.9 9.6
```

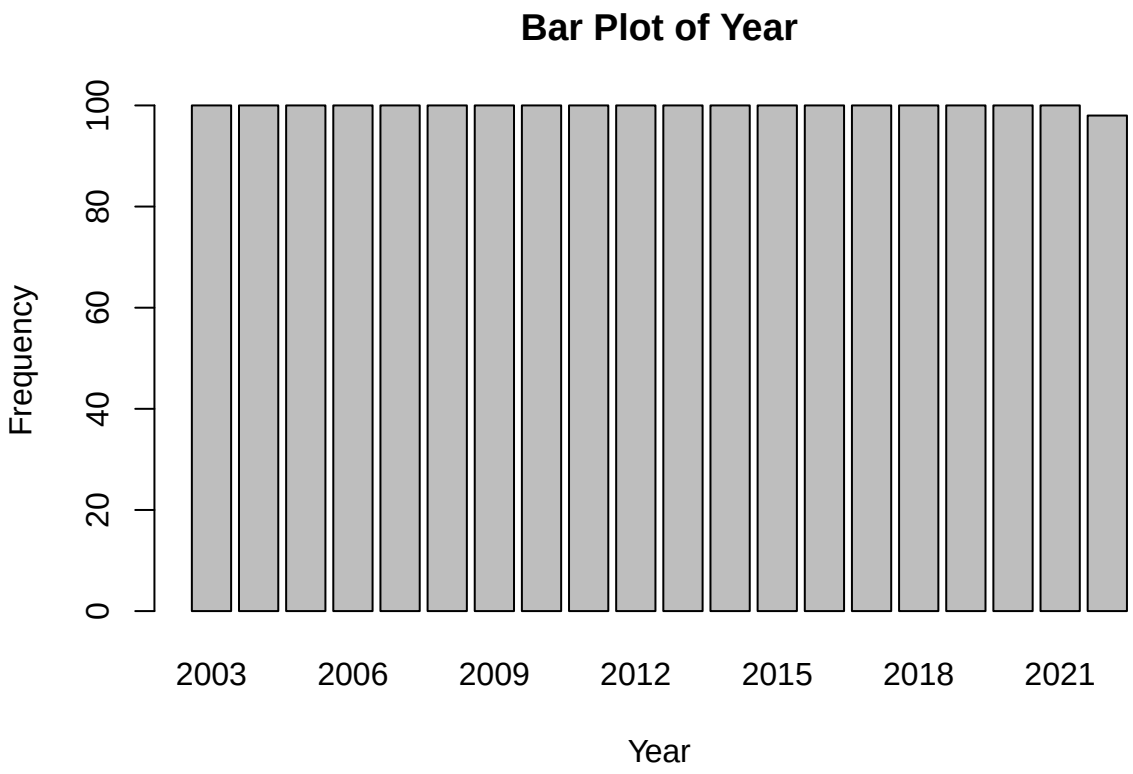
```
# Scatter plot for year vs rating
plot(dataset$Year, dataset$Rating, xlab = "Year", ylab = "Rating", main = "Scatter Plot of Year vs Rati
```




```
# Bar plot for the budget and income variables
barplot(table(dataset$Rating), xlab = "Rating", ylab = "Frequency", main = "Bar Plot of Ratings")
```




```
barplot(table(dataset$Year), xlab = "Year", ylab = "Frequency", main = "Bar Plot of Year")
```




```r
# Finding the correlation between year released and ratings
model <- lm(Rating ~ Year, data = dataset)
summary(model)
```

```
##
## Call:
## lm(formula = Rating ~ Year, data = dataset)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -4.7784 -0.5312  0.0336  0.6360  2.9264
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept) 11.482389   7.136100   1.609    0.108
## Year        -0.002392   0.003546  -0.675    0.500
##
## Residual standard error: 0.9132 on 1996 degrees of freedom
## Multiple R-squared:  0.000228,   Adjusted R-squared:  -0.0002729
## F-statistic: 0.4552 on 1 and 1996 DF,  p-value: 0.4999
```