

# Ejercicios

Julian Hernandez  
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#Ejercicio1  
**library**(readxl)  
tabla1 <- read\_excel("C:/Repo\_github/CIP-Data-Science/Module2/Clase5/tabla1.xlsx")  
View(tabla1)  
summary(tabla1)

##      Planta                      Producción  
## Length:18                      Min.    : 9.00  
## Class :character               1st Qu.:12.00  
## Mode  :character               Median :15.00  
##                                      Mean    :14.22  
##                                      3rd Qu.:17.00  
##                                      Max.    :18.00

tabla1

## # A tibble: 18 × 2  
##    Planta                      Producción  
##    <chr>                      <dbl>  
## 1 chiquimula                      10  
## 2 chiquimula                      12  
## 3 chiquimula                      15  
## 4 chiquimula                      18  
## 5 chiquimula                      9  
## 6 chiquimula                      17  
## 7 izabal                            15  
## 8 izabal                            17  
## 9 izabal                            18  
## 10 izabal                           12  
## 11 izabal                           13  
## 12 izabal                           11  
## 13 quetzaltenango                   12  
## 14 quetzaltenango                   17  
## 15 quetzaltenango                   15  
## 16 quetzaltenango                   15  
## 17 quetzaltenango                   18  
## 18 quetzaltenango                   12

**attach**(tabla1)  
names(tabla1)

## [1] "Planta"                      "Producción"

factor(Planta)

## [1] chiquimula    chiquimula    chiquimula    chiquimula    chiquimula  
## [6] chiquimula    izabal        izabal        izabal        izabal  
## [11] izabal        izabal        quetzaltenango quetzaltenango quetzaltenango  
## [16] quetzaltenango quetzaltenango quetzaltenango  
## Levels: chiquimula izabal quetzaltenango

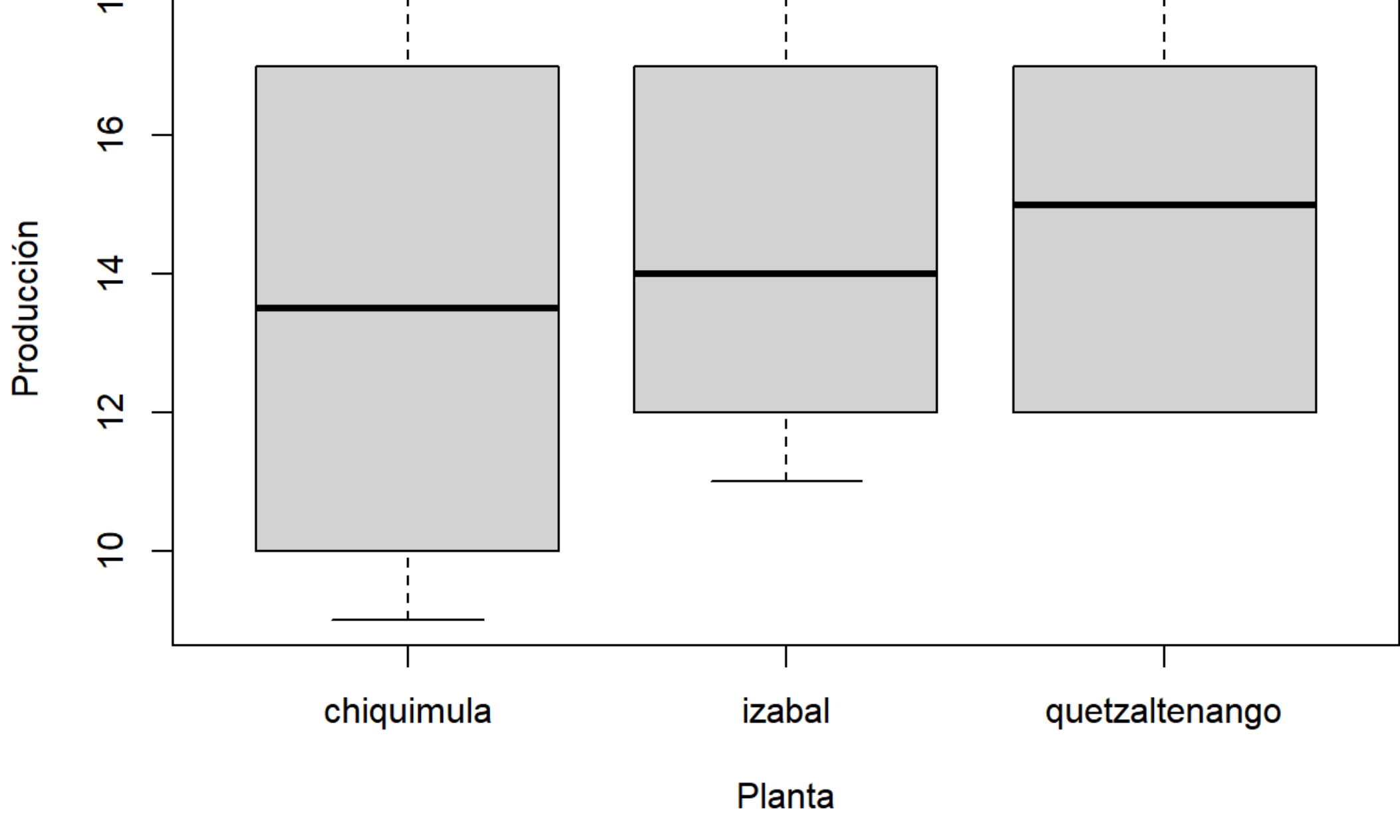
**library**(rapportools)

##  
## Adjuntando el paquete: 'rapportools'

## The following objects are masked from 'package:stats':  
##  
##    IQR, median, sd, var

## The following objects are masked from 'package:base':  
##  
##    max, mean, min, range, sum

boxplot(Producción~Planta)



#El diagrama de bigotes muestra que las plantas izabal y quetzaltenango tienen medias similares en comparación de chiquimula

aov(Producción~Planta)

## Call:  
##    aov(formula = Producción ~ Planta)  
##  
## Terms:  
##                      Planta Residuals  
## Sum of Squares    5.44444 139.66667  
## Deg. of Freedom        2        15  
##  
## Residual standard error: 3.051411  
## Estimated effects may be unbalanced

planta1=aov(Producción~Planta)  
summary(planta1)

##                      Df Sum Sq Mean Sq F value Pr(>F)  
## Planta                2    5.44    2.722    0.292   0.751  
## Residuals           15 139.67    9.311

TukeyHSD(planta1)

##    Tukey multiple comparisons of means  
##    95% family-wise confidence level  
##  
## Fit: aov(formula = Producción ~ Planta)  
##  
## \$Planta  
##                      diff                lwr        upr    p adj  
## izabal-chiquimula        0.8333333 -3.742716 5.409383 0.8848909  
## quetzaltenango-chiquimula 1.3333333 -3.242716 5.909383 0.7342293  
## quetzaltenango-izabal    0.5000000 -4.076049 5.076049 0.9566961

#Se acepta la hipótesis nula porque en ninguno de sus grupos su medida es mayor a 0.05

#Ejercicio2  
**library**(readxl)  
tabla2 <- read\_excel("C:/Repo\_github/CIP-Data-Science/Module2/Clase5/tabla2.xlsx")  
View(tabla2)  
summary(tabla2)

##      clon                      cantidad  
## Length:20                      Min.    : 4.400  
## Class :character               1st Qu.: 8.098  
## Mode  :character               Median :10.375  
##                                      Mean    :11.197  
##                                      3rd Qu.:15.447  
##                                      Max.    :17.390

tabla2

## # A tibble: 20 × 2  
##    clon cantidad  
##    <chr>        <dbl>  
## 1 clon1        8.69  
## 2 clon1        6.68  
## 3 clon1        6.83  
## 4 clon1        6.43  
## 5 clon1       10.3  
## 6 clon2        8  
## 7 clon2       16.4  
## 8 clon2       12.4  
## 9 clon2       11.0  
## 10 clon2       15.5  
## 11 clon3       17.4  
## 12 clon3       13.7  
## 13 clon3       15.6  
## 14 clon3       17.0  
## 15 clon3       15.4  
## 16 clon4       10.4  
## 17 clon4       9.16  
## 18 clon4       8.13  
## 19 clon4       4.4  
## 20 clon4       10.4

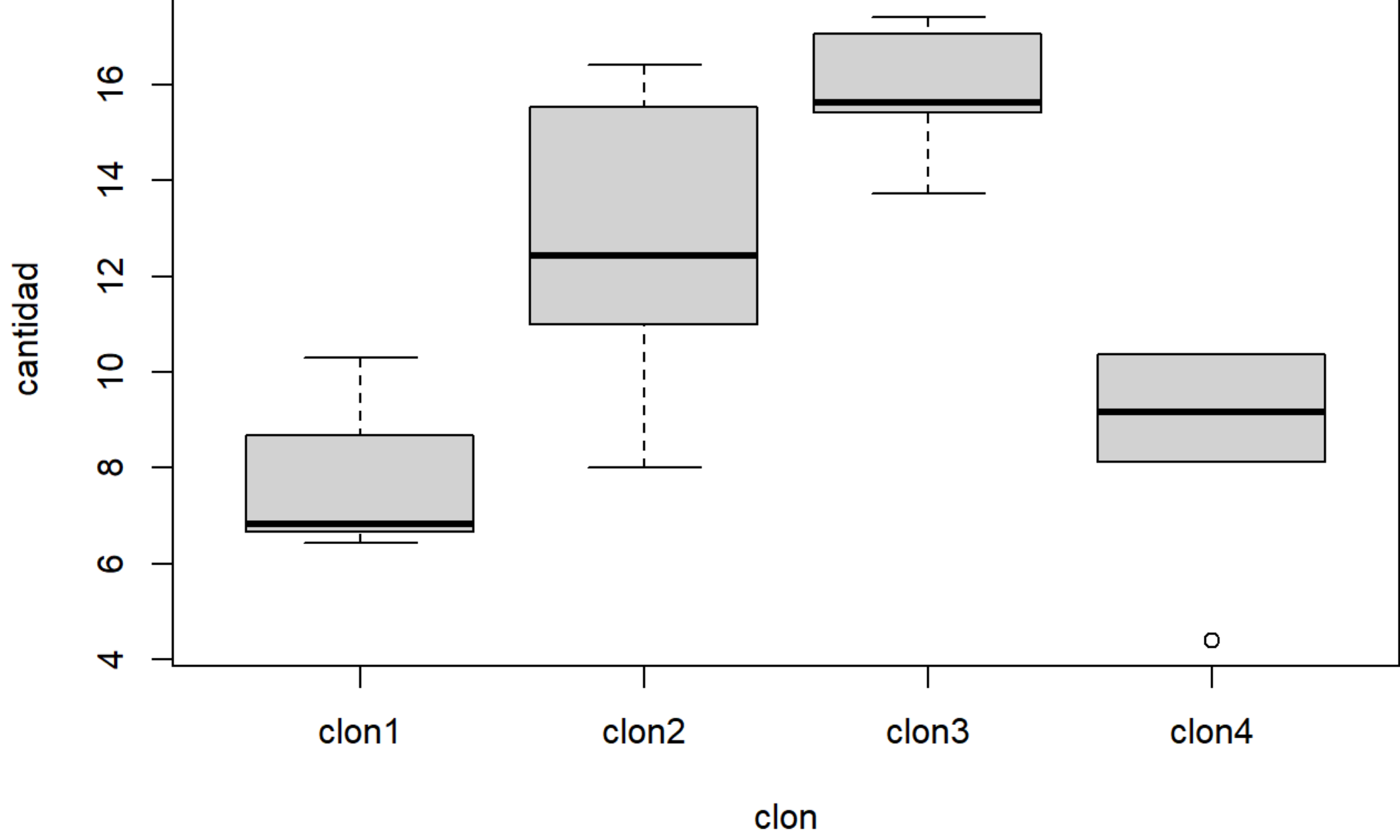
**attach**(tabla2)  
names(tabla2)

## [1] "clon"                      "cantidad"

factor(clon)

## [1] clon1 clon1 clon1 clon1 clon1 clon1 clon2 clon2 clon2 clon2 clon2 clon3 clon3  
## [13] clon3 clon3 clon3 clon4 clon4 clon4 clon4 clon4 clon4  
## Levels: clon1 clon2 clon3 clon4

**library**(rapportools)  
boxplot(cantidad~clon)



#El diagrama de bigotes muestra que los clones tienen medias diferentes en todos sus grupos

planta2=aov(cantidad~clon)  
summary(planta2)

##                      Df Sum Sq Mean Sq F value    Pr(>F)  
## clon                3 213.63    71.21   12.53 0.000181 \*\*\*  
## Residuals           16    98.93    5.68  
## ---  
## Signif. codes:  0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

TukeyHSD(planta2)

##    Tukey multiple comparisons of means  
##    95% family-wise confidence level  
##  
## Fit: aov(formula = cantidad ~ clon)  
##  
## \$clon  
##                      diff                lwr        upr    p adj  
## clon2-clon1    4.886    0.5724502 9.1995498 0.0237858  
## clon3-clon1    8.056    3.7424502 12.3695498 0.0003472  
## clon4-clon1    0.702    -3.6155498 5.0155498 0.9655112  
## clon3-clon2    3.170    -1.1435498 7.4835498 0.1943027  
## clon4-clon2    -4.184    -8.4975498 0.1295498 0.0588980  
## clon4-clon3    -7.354   -11.6675498 -3.0404502 0.0008694

#Se acepta la hipótesis alternativa porque en al menos uno de sus grupos es mayor a 0.05

#Ejercicio3  
**library**(readxl)  
tabla3 <- read\_excel("C:/Repo\_github/CIP-Data-Science/Module2/Clase5/tabla3.xlsx")  
View(tabla3)  
summary(tabla3)

##      temperatura                      valor  
## Length:15                      Min.    :23.0  
## Class :character               1st Qu.:27.5  
## Mode  :character               Median :30.0  
##                                      Mean    :30.0  
##                                      3rd Qu.:33.0  
##                                      Max.    :39.0

tabla3

## # A tibble: 15 × 2  
##    temperatura valor  
##    <chr>        <dbl>  
## 1 50c            34  
## 2 50c            24  
## 3 50c            36  
## 4 50c            39  
## 5 50c            32  
## 6 60c            30  
## 7 60c            31  
## 8 60c            34  
## 9 60c            23  
## 10 60c           27  
## 11 70c           23  
## 12 70c           28  
## 13 70c           28  
## 14 70c           30  
## 15 70c           31

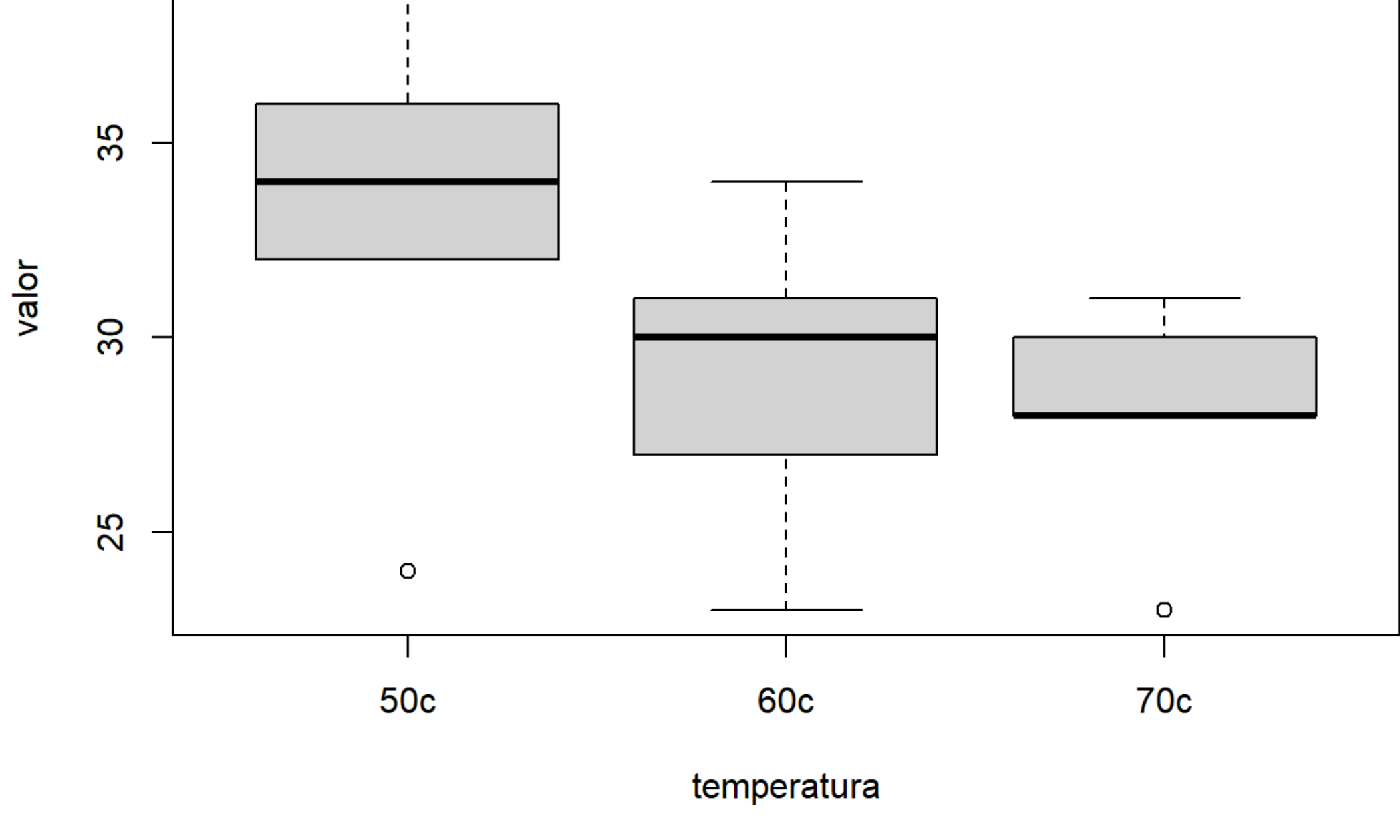
**attach**(tabla3)  
names(tabla3)

## [1] "temperatura"                      "valor"

factor(temperatura)

## [1] 50c 50c 50c 50c 50c 60c 60c 60c 60c 60c 70c 70c 70c 70c 70c  
## Levels: 50c 60c 70c

**library**(rapportools)  
boxplot(valor~temperatura)



#El diagrama de bigotes muestra que las temperaturas 60°C y 70°C tienen medias iguales en comparación con la temperatura 50°C

planta3=aov(valor~temperatura)  
summary(planta3)

##                      Df Sum Sq Mean Sq F value    Pr(>F)  
## temperatura        2        70    35.00    1.78    0.21  
## Residuals           12    236    19.67

TukeyHSD(planta3)

##    Tukey multiple comparisons of means  
##    95% family-wise confidence level  
##  
## Fit: aov(formula = valor ~ temperatura)  
##  
## \$temperatura  
##                      diff                lwr        upr    p adj  
## 60c-50c        -4   -11.482712 3.482712 0.3591042  
## 70c-50c        -5   -12.482712 2.482712 0.2166815  
## 70c-60c        -1    -8.482712 6.482712 0.9327141

#Se acepta la hipótesis nula porque en todos sus grupos es mayor a 0.05