

R Markdown

This is an R Markdown document. Markdown is a simple formatting syntax for authoring HTML, PDF, and MS Word documents. For more details on using R Markdown see <http://rmarkdown.rstudio.com>.

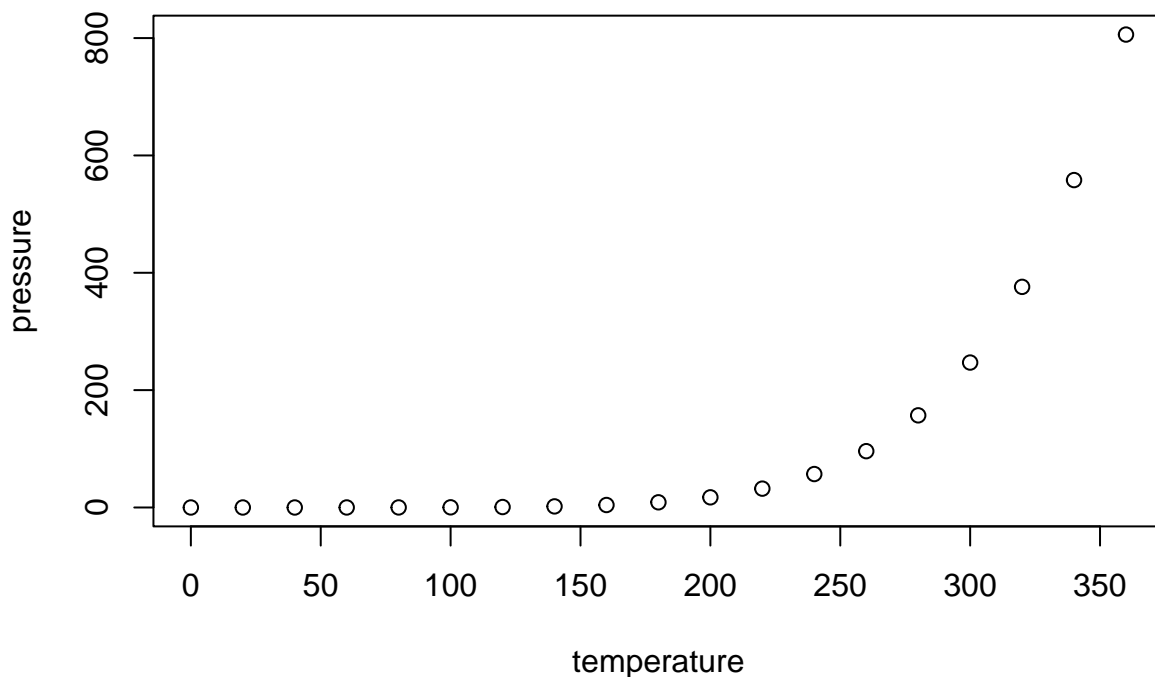
When you click the **Knit** button a document will be generated that includes both content as well as the output of any embedded R code chunks within the document. You can embed an R code chunk like this:

```
summary(cars)
```

```
##      speed      dist
##  Min.   : 4.0    Min.   :  2.00
## 1st Qu.:12.0    1st Qu.: 26.00
##  Median :15.0    Median : 36.00
##   Mean  :15.4    Mean   : 42.98
## 3rd Qu.:19.0    3rd Qu.: 56.00
##   Max.  :25.0    Max.   :120.00
```

Including Plots

You can also embed plots, for example:



Note that the `echo = FALSE` parameter was added to the code chunk to prevent printing of the R code that generated the plot.

Gráficos

Matriz penguins, se encuentra en classroom

```
#----- # Importación de matriz #-----
```

import data / from excel /browse / seleccionar archivo / aceptar

#————— # Exploración #————— #Matrices con extensión .xlsx

1.- Abrir librería

```
library(readxl)
```

```
penguins<-read_excel("penguins.xlsx")
```

```
dim(penguins)
```

```
## [1] 344 9
```

Nombre de las variables

```
colnames(penguins)
```

```
## [1] "ID"          "especie"      "isla"         "largo_pico_mm"
## [5] "grosor_pico_mm" "largo_aleta_mm" "masa_corporal_g" "genero"
## [9] "año"
```

Tipo de variables

```
str(penguins)
```

```
## tibble [344 x 9] (S3: tbl_df/tbl/data.frame)
## $ ID          : chr [1:344] "i1" "i2" "i3" "i4" ...
## $ especie     : chr [1:344] "Adelie" "Adelie" "Adelie" "Adelie" ...
## $ isla        : chr [1:344] "Torgersen" "Torgersen" "Torgersen" "Torgersen" ...
## $ largo_pico_mm : num [1:344] 39.1 39.5 40.3 37.8 36.7 39.3 38.9 39.2 34.1 42 ...
## $ grosor_pico_mm : num [1:344] 18.7 17.4 18 18.1 19.3 20.6 17.8 19.6 18.1 20.2 ...
## $ largo_aleta_mm : num [1:344] 181 186 195 190 193 190 181 195 193 190 ...
## $ masa_corporal_g: num [1:344] 3750 3800 3250 3700 3450 ...
## $ genero      : chr [1:344] "male" "female" "female" "female" ...
## $ año         : num [1:344] 2007 2007 2007 2007 2007 ...
```

En busca de valores perdidos (NA's)

```
anyNA(penguins)
```

```
## [1] FALSE
```

Estadística descriptiva

```
summary(penguins)
```

```
##      ID          especie          isla          largo_pico_mm
## Length:344      Length:344      Length:344      Min.       :32.10
## Class :character Class :character Class :character 1st Qu.:39.20
## Mode  :character Mode  :character Mode  :character Median    :44.45
##                                     Mean     :43.92
```

```
##                                     3rd Qu.:48.50
##                                     Max.      :59.60
## grosor_pico_mm largo_aleta_mm masa_corporal_g genero
## Min.      :13.10 Min.      :172.0 Min.      :2700 Length:344
## 1st Qu.   :15.60 1st Qu.   :190.0 1st Qu.   :3550 Class :character
## Median    :17.30 Median    :197.0 Median    :4050 Mode  :character
## Mean      :17.15 Mean      :200.9 Mean      :4202
## 3rd Qu.   :18.70 3rd Qu.   :213.2 3rd Qu.   :4756
## Max.      :21.50 Max.      :231.0 Max.      :6300
## año
## Min.      :2007
## 1st Qu.   :2007
## Median    :2008
## Mean      :2008
## 3rd Qu.   :2009
## Max.      :2009
```

#-----# Configuración de la matriz #-----

penguins\$especie

```
## [1] "Adelie" "Adelie" "Adelie" "Adelie" "Adelie" "Adelie"
## [7] "Adelie" "Adelie" "Adelie" "Adelie" "Adelie" "Adelie"
## [13] "Adelie" "Adelie" "Adelie" "Adelie" "Adelie" "Adelie"
## [19] "Adelie" "Adelie" "Adelie" "Adelie" "Adelie" "Adelie"
## [25] "Adelie" "Adelie" "Adelie" "Adelie" "Adelie" "Adelie"
## [31] "Adelie" "Adelie" "Adelie" "Adelie" "Adelie" "Adelie"
## [37] "Adelie" "Adelie" "Adelie" "Adelie" "Adelie" "Adelie"
## [43] "Adelie" "Adelie" "Adelie" "Adelie" "Adelie" "Adelie"
## [49] "Adelie" "Adelie" "Adelie" "Adelie" "Adelie" "Adelie"
## [55] "Adelie" "Adelie" "Adelie" "Adelie" "Adelie" "Adelie"
## [61] "Adelie" "Adelie" "Adelie" "Adelie" "Adelie" "Adelie"
## [67] "Adelie" "Adelie" "Adelie" "Adelie" "Adelie" "Adelie"
## [73] "Adelie" "Adelie" "Adelie" "Adelie" "Adelie" "Adelie"
## [79] "Adelie" "Adelie" "Adelie" "Adelie" "Adelie" "Adelie"
## [85] "Adelie" "Adelie" "Adelie" "Adelie" "Adelie" "Adelie"
## [91] "Adelie" "Adelie" "Adelie" "Adelie" "Adelie" "Adelie"
## [97] "Adelie" "Adelie" "Adelie" "Adelie" "Adelie" "Adelie"
## [103] "Adelie" "Adelie" "Adelie" "Adelie" "Adelie" "Adelie"
## [109] "Adelie" "Adelie" "Adelie" "Adelie" "Adelie" "Adelie"
## [115] "Adelie" "Adelie" "Adelie" "Adelie" "Adelie" "Adelie"
## [121] "Adelie" "Adelie" "Adelie" "Adelie" "Adelie" "Adelie"
## [127] "Adelie" "Adelie" "Adelie" "Adelie" "Adelie" "Adelie"
## [133] "Adelie" "Adelie" "Adelie" "Adelie" "Adelie" "Adelie"
## [139] "Adelie" "Adelie" "Adelie" "Adelie" "Adelie" "Adelie"
## [145] "Adelie" "Adelie" "Adelie" "Adelie" "Adelie" "Adelie"
## [151] "Adelie" "Adelie" "Gentoo" "Gentoo" "Gentoo" "Gentoo"
## [157] "Gentoo" "Gentoo" "Gentoo" "Gentoo" "Gentoo" "Gentoo"
## [163] "Gentoo" "Gentoo" "Gentoo" "Gentoo" "Gentoo" "Gentoo"
## [169] "Gentoo" "Gentoo" "Gentoo" "Gentoo" "Gentoo" "Gentoo"
## [175] "Gentoo" "Gentoo" "Gentoo" "Gentoo" "Gentoo" "Gentoo"
## [181] "Gentoo" "Gentoo" "Gentoo" "Gentoo" "Gentoo" "Gentoo"
## [187] "Gentoo" "Gentoo" "Gentoo" "Gentoo" "Gentoo" "Gentoo"
## [193] "Gentoo" "Gentoo" "Gentoo" "Gentoo" "Gentoo" "Gentoo"
## [199] "Gentoo" "Gentoo" "Gentoo" "Gentoo" "Gentoo" "Gentoo"
```

```
## [205] "Gentoo"      "Gentoo"      "Gentoo"      "Gentoo"      "Gentoo"      "Gentoo"
## [211] "Gentoo"      "Gentoo"      "Gentoo"      "Gentoo"      "Gentoo"      "Gentoo"
## [217] "Gentoo"      "Gentoo"      "Gentoo"      "Gentoo"      "Gentoo"      "Gentoo"
## [223] "Gentoo"      "Gentoo"      "Gentoo"      "Gentoo"      "Gentoo"      "Gentoo"
## [229] "Gentoo"      "Gentoo"      "Gentoo"      "Gentoo"      "Gentoo"      "Gentoo"
## [235] "Gentoo"      "Gentoo"      "Gentoo"      "Gentoo"      "Gentoo"      "Gentoo"
## [241] "Gentoo"      "Gentoo"      "Gentoo"      "Gentoo"      "Gentoo"      "Gentoo"
## [247] "Gentoo"      "Gentoo"      "Gentoo"      "Gentoo"      "Gentoo"      "Gentoo"
## [253] "Gentoo"      "Gentoo"      "Gentoo"      "Gentoo"      "Gentoo"      "Gentoo"
## [259] "Gentoo"      "Gentoo"      "Gentoo"      "Gentoo"      "Gentoo"      "Gentoo"
## [265] "Gentoo"      "Gentoo"      "Gentoo"      "Gentoo"      "Gentoo"      "Gentoo"
## [271] "Gentoo"      "Gentoo"      "Gentoo"      "Gentoo"      "Gentoo"      "Gentoo"
## [277] "Chinstrap"   "Chinstrap"   "Chinstrap"   "Chinstrap"   "Chinstrap"   "Chinstrap"
## [283] "Chinstrap"   "Chinstrap"   "Chinstrap"   "Chinstrap"   "Chinstrap"   "Chinstrap"
## [289] "Chinstrap"   "Chinstrap"   "Chinstrap"   "Chinstrap"   "Chinstrap"   "Chinstrap"
## [295] "Chinstrap"   "Chinstrap"   "Chinstrap"   "Chinstrap"   "Chinstrap"   "Chinstrap"
## [301] "Chinstrap"   "Chinstrap"   "Chinstrap"   "Chinstrap"   "Chinstrap"   "Chinstrap"
## [307] "Chinstrap"   "Chinstrap"   "Chinstrap"   "Chinstrap"   "Chinstrap"   "Chinstrap"
## [313] "Chinstrap"   "Chinstrap"   "Chinstrap"   "Chinstrap"   "Chinstrap"   "Chinstrap"
## [319] "Chinstrap"   "Chinstrap"   "Chinstrap"   "Chinstrap"   "Chinstrap"   "Chinstrap"
## [325] "Chinstrap"   "Chinstrap"   "Chinstrap"   "Chinstrap"   "Chinstrap"   "Chinstrap"
## [331] "Chinstrap"   "Chinstrap"   "Chinstrap"   "Chinstrap"   "Chinstrap"   "Chinstrap"
## [337] "Chinstrap"   "Chinstrap"   "Chinstrap"   "Chinstrap"   "Chinstrap"   "Chinstrap"
## [343] "Chinstrap"   "Chinstrap"
```

#1.- Convertir las variables categóricas a factores

```
penguins$especie<-factor(penguins$especie,
                          levels=c("Adelie", "Gentoo", "Chinstrap"))
```

```
penguins$isla<-factor(penguins$isla,
                      levels=c("Torgersen", "Biscoe", "Dream"))
```

```
penguins$genero
```

```
## [1] "male"  "female" "female" "female" "female" "male"  "female" "male"
## [9] "female" "male"  "female" "female" "female" "male"  "male"  "female"
## [17] "female" "male"  "female" "male"  "female" "male"  "female" "male"
## [25] "male"  "female" "male"  "female" "female" "male"  "female" "male"
## [33] "female" "male"  "female" "male"  "male"  "female" "female" "male"
## [41] "female" "male"  "female" "male"  "female" "male"  "male"  "female"
## [49] "female" "male"  "female" "male"  "female" "male"  "female" "male"
## [57] "female" "male"  "female" "male"  "female" "male"  "female" "male"
## [65] "female" "male"  "female" "male"  "female" "male"  "female" "male"
## [73] "female" "male"  "female" "male"  "female" "male"  "female" "male"
## [81] "female" "male"  "female" "male"  "female" "male"  "male"  "female"
## [89] "male"  "female" "female" "male"  "female" "male"  "female" "male"
## [97] "female" "male"  "female" "male"  "female" "male"  "female" "male"
## [105] "female" "male"  "female" "male"  "female" "male"  "female" "male"
## [113] "female" "male"  "female" "male"  "female" "male"  "female" "male"
## [121] "female" "male"  "female" "male"  "female" "male"  "female" "male"
## [129] "female" "male"  "female" "male"  "female" "male"  "female" "male"
## [137] "female" "male"  "female" "male"  "female" "male"  "female" "male"
## [145] "female" "male"  "male"  "female" "female" "male"  "female" "male"
## [153] "female" "male"  "female" "male"  "male"  "female" "female" "male"
## [161] "female" "male"  "female" "male"  "female" "male"  "female" "male"
```

```
## [169] "female" "male" "female" "male" "male" "female" "female" "male"
## [177] "female" "male" "female" "male" "female" "male" "male" "female"
## [185] "female" "male" "female" "male" "female" "male" "female" "male"
## [193] "female" "male" "female" "male" "male" "female" "female" "male"
## [201] "female" "male" "female" "male" "female" "male" "female" "male"
## [209] "female" "male" "female" "male" "female" "male" "female" "male"
## [217] "female" "male" "female" "male" "female" "male" "female" "male"
## [225] "male" "female" "female" "male" "female" "male" "female" "male"
## [233] "female" "male" "female" "male" "female" "male" "female" "male"
## [241] "female" "male" "female" "male" "female" "male" "female" "male"
## [249] "male" "female" "female" "male" "female" "male" "female" "male"
## [257] "female" "male" "female" "male" "female" "male" "female" "male"
## [265] "female" "male" "female" "male" "female" "male" "female" "male"
## [273] "female" "male" "female" "male" "female" "male" "male" "female"
## [281] "male" "female" "female" "male" "female" "male" "female" "male"
## [289] "female" "male" "female" "male" "male" "female" "female" "male"
## [297] "female" "male" "female" "male" "female" "male" "female" "male"
## [305] "female" "male" "female" "male" "female" "male" "male" "female"
## [313] "female" "male" "female" "male" "male" "female" "male" "female"
## [321] "female" "male" "female" "male" "male" "female" "female" "male"
## [329] "female" "male" "female" "male" "female" "male" "male" "female"
## [337] "male" "female" "female" "male" "female" "male" "male" "female"
```

```
penguins$genero<-factor(penguins$genero,
                        levels=c("male", "female"))
penguins$año
```

```
## [1] 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007
## [16] 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007
## [31] 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007
## [46] 2007 2007 2007 2007 2007 2008 2008 2008 2008 2008 2008 2008 2008 2008 2008
## [61] 2008 2008 2008 2008 2008 2008 2008 2008 2008 2008 2008 2008 2008 2008 2008
## [76] 2008 2008 2008 2008 2008 2008 2008 2008 2008 2008 2008 2008 2008 2008 2008
## [91] 2008 2008 2008 2008 2008 2008 2008 2008 2008 2008 2009 2009 2009 2009 2009
## [106] 2009 2009 2009 2009 2009 2009 2009 2009 2009 2009 2009 2009 2009 2009 2009
## [121] 2009 2009 2009 2009 2009 2009 2009 2009 2009 2009 2009 2009 2009 2009 2009
## [136] 2009 2009 2009 2009 2009 2009 2009 2009 2009 2009 2009 2009 2009 2009 2009
## [151] 2009 2009 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007
## [166] 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007
## [181] 2007 2007 2007 2007 2007 2007 2008 2008 2008 2008 2008 2008 2008 2008 2008
## [196] 2008 2008 2008 2008 2008 2008 2008 2008 2008 2008 2008 2008 2008 2008 2008
## [211] 2008 2008 2008 2008 2008 2008 2008 2008 2008 2008 2008 2008 2008 2008 2008
## [226] 2008 2008 2008 2008 2008 2008 2008 2009 2009 2009 2009 2009 2009 2009 2009
## [241] 2009 2009 2009 2009 2009 2009 2009 2009 2009 2009 2009 2009 2009 2009 2009
## [256] 2009 2009 2009 2009 2009 2009 2009 2009 2009 2009 2009 2009 2009 2009 2009
## [271] 2009 2009 2009 2009 2009 2009 2007 2007 2007 2007 2007 2007 2007 2007 2007
## [286] 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007
## [301] 2007 2007 2008 2008 2008 2008 2008 2008 2008 2008 2008 2008 2008 2008 2008
## [316] 2008 2008 2008 2008 2008 2009 2009 2009 2009 2009 2009 2009 2009 2009 2009
## [331] 2009 2009 2009 2009 2009 2009 2009 2009 2009 2009 2009 2009 2009 2009 2009
```

```
penguins$año<-factor(penguins$año,
                    levels=c("2007", "2008", "2009"))
```

```
str(penguins)

## tibble [344 x 9] (S3: tbl_df/tbl/data.frame)
## $ ID          : chr [1:344] "i1" "i2" "i3" "i4" ...
## $ especie     : Factor w/ 3 levels "Adelie","Gentoo",...: 1 1 1 1 1 1 1 1 1 1 ...
## $ isla        : Factor w/ 3 levels "Torgersen","Biscoe",...: 1 1 1 1 1 1 1 1 1 1 ...
## $ largo_pico_mm : num [1:344] 39.1 39.5 40.3 37.8 36.7 39.3 38.9 39.2 34.1 42 ...
## $ grosor_pico_mm : num [1:344] 18.7 17.4 18 18.1 19.3 20.6 17.8 19.6 18.1 20.2 ...
## $ largo_aleta_mm : num [1:344] 181 186 195 190 193 190 181 195 193 190 ...
## $ masa_corporal_g: num [1:344] 3750 3800 3250 3700 3450 ...
## $ genero      : Factor w/ 2 levels "male","female": 1 2 2 2 2 1 2 1 2 1 ...
## $ año         : Factor w/ 3 levels "2007","2008",...: 1 1 1 1 1 1 1 1 1 1 ...

summary(penguins)

##      ID          especie      isla      largo_pico_mm
## Length:344      Adelie   :152   Torgersen: 52   Min.    :32.10
## Class :character  Gentoo   :124   Biscoe  :168   1st Qu.:39.20
## Mode  :character  Chinstrap: 68   Dream   :124   Median :44.45
##                                     Mean    :43.92
##                                     3rd Qu.:48.50
##                                     Max.    :59.60
## grosor_pico_mm largo_aleta_mm masa_corporal_g genero      año
## Min.    :13.10   Min.    :172.0   Min.    :2700   male   :170   2007:110
## 1st Qu.:15.60   1st Qu.:190.0   1st Qu.:3550   female:174   2008:114
## Median :17.30   Median :197.0   Median :4050               2009:120
## Mean    :17.15   Mean    :200.9   Mean    :4202
## 3rd Qu.:18.70   3rd Qu.:213.2   3rd Qu.:4756
## Max.    :21.50   Max.    :231.0   Max.    :6300
```

—Este paso no es necesario.—

2.- Creamos una nueva matriz de datos donde se seleccionan las columnas de la 2 a la 9.

```
penguins1<-penguins[,2:9]
colnames(penguins)

## [1] "ID"          "especie"      "isla"         "largo_pico_mm"
## [5] "grosor_pico_mm" "largo_aleta_mm" "masa_corporal_g" "genero"
## [9] "año"

#----- # Librerías #-----

install.packages("ggplot2")

## Installing package into '/cloud/lib/x86_64-pc-linux-gnu-library/4.2'
## (as 'lib' is unspecified)

library(ggplot2)
```

Boxplot

#

1.- Creación de un vector de color

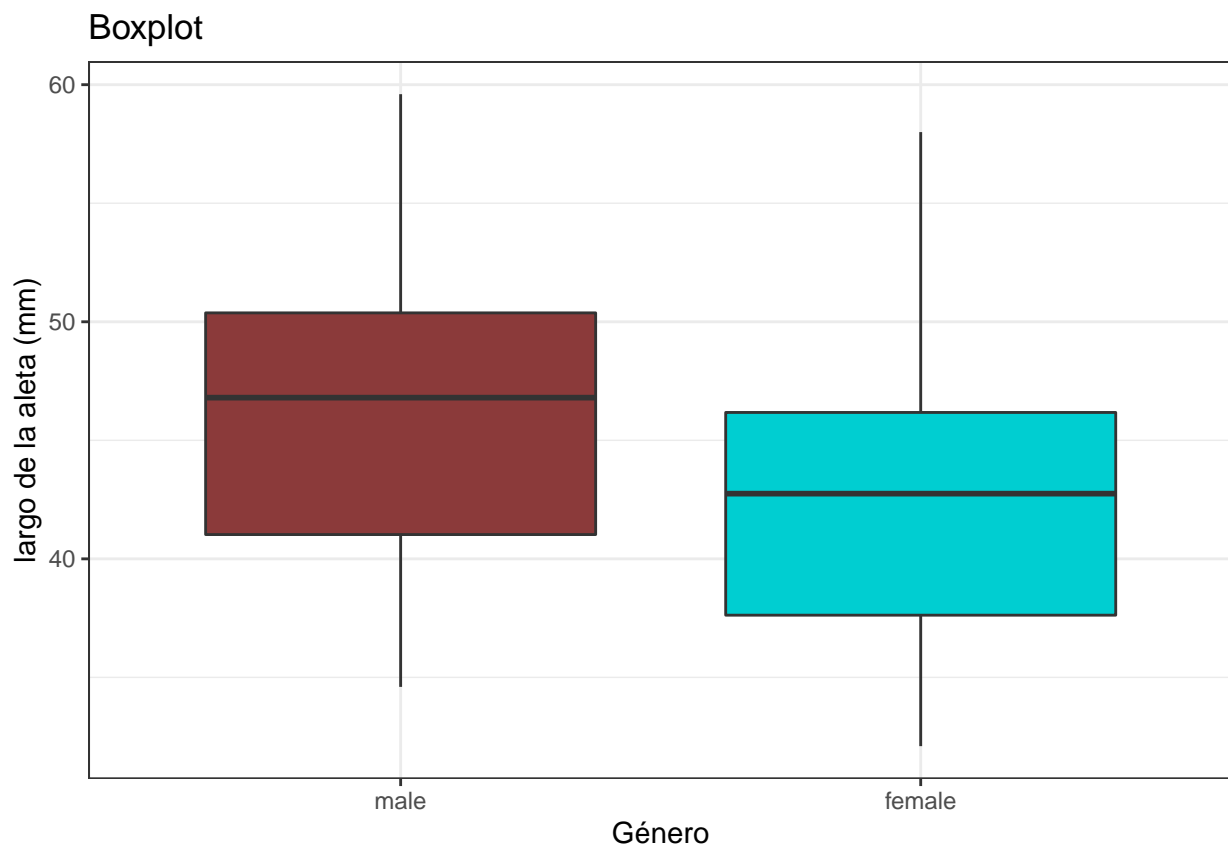
```
color=c("indianred4","darkturquoise")
```

2.- Creacion del grafico

```
BX<-ggplot(penguins, aes(x=genero, y=largo_pico_mm))+  
  geom_boxplot(fill=color)+  
  ggtitle("Boxplot")+  
  xlab("Género")+  
  ylab("largo de la aleta (mm)")+  
  theme_bw()
```

3.- Visualización del boxplot

BX



#

Gráfico de barras

1.- Creación de un vector de color

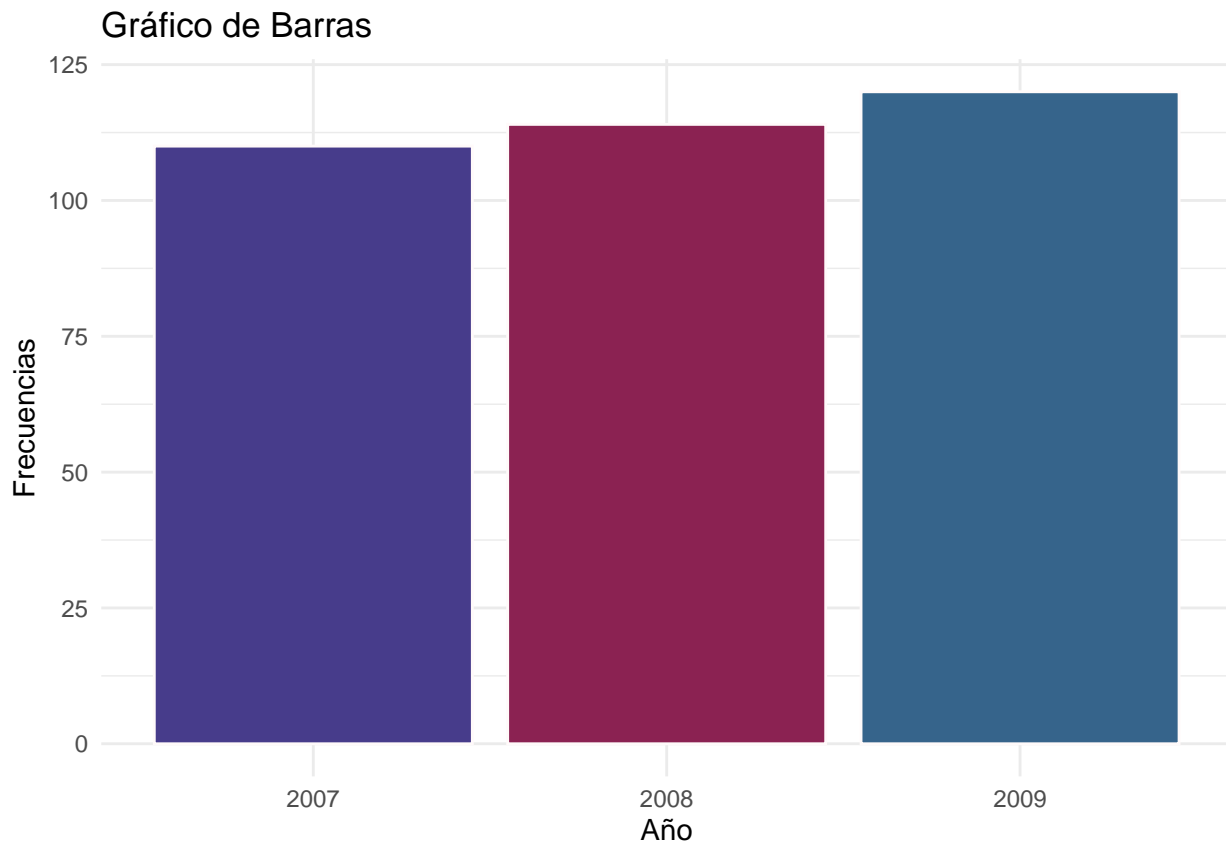
```
color=c("slateblue4", "violetred4", "steelblue4")
```

2.- Creación del gráfico

```
GB1<-ggplot(penguins, aes(x=año))+  
  geom_bar(colour= "snow", fill=color)+  
  ggtitle("Gráfico de Barras")+  
  xlab("Año")+  
  ylab("Frecuencias")+  
  theme_minimal()
```

3.- Visualización del gráfico

GB1

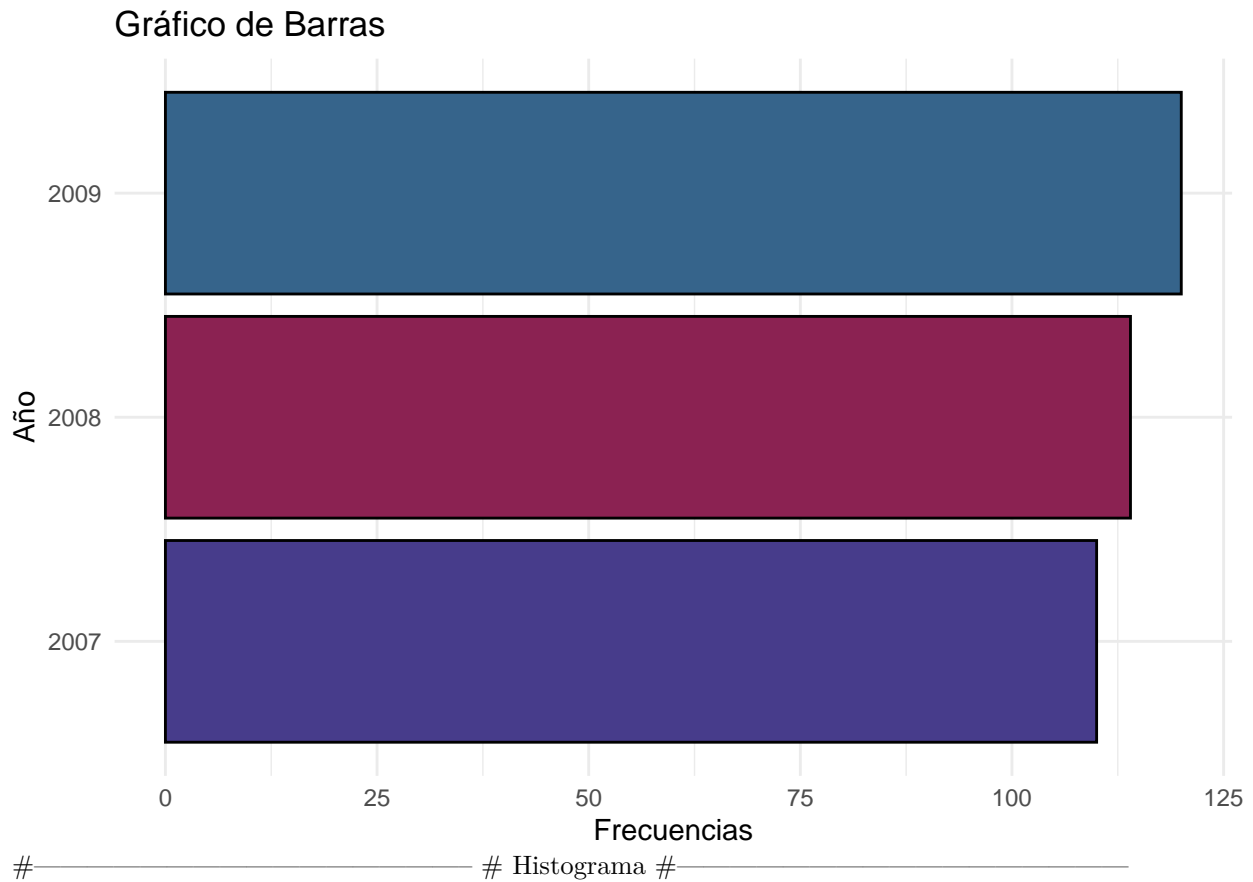


4.- Barras horizontales

```
GB2<-ggplot(penguins, aes(x=año))+  
  geom_bar(colour= "black", fill=color)+  
  ggtitle("Gráfico de Barras")+  
  xlab("Año")+  
  ylab("Frecuencias")+  
  coord_flip()+  
  theme_minimal()
```


5. Visualizacion del objeto

GB2



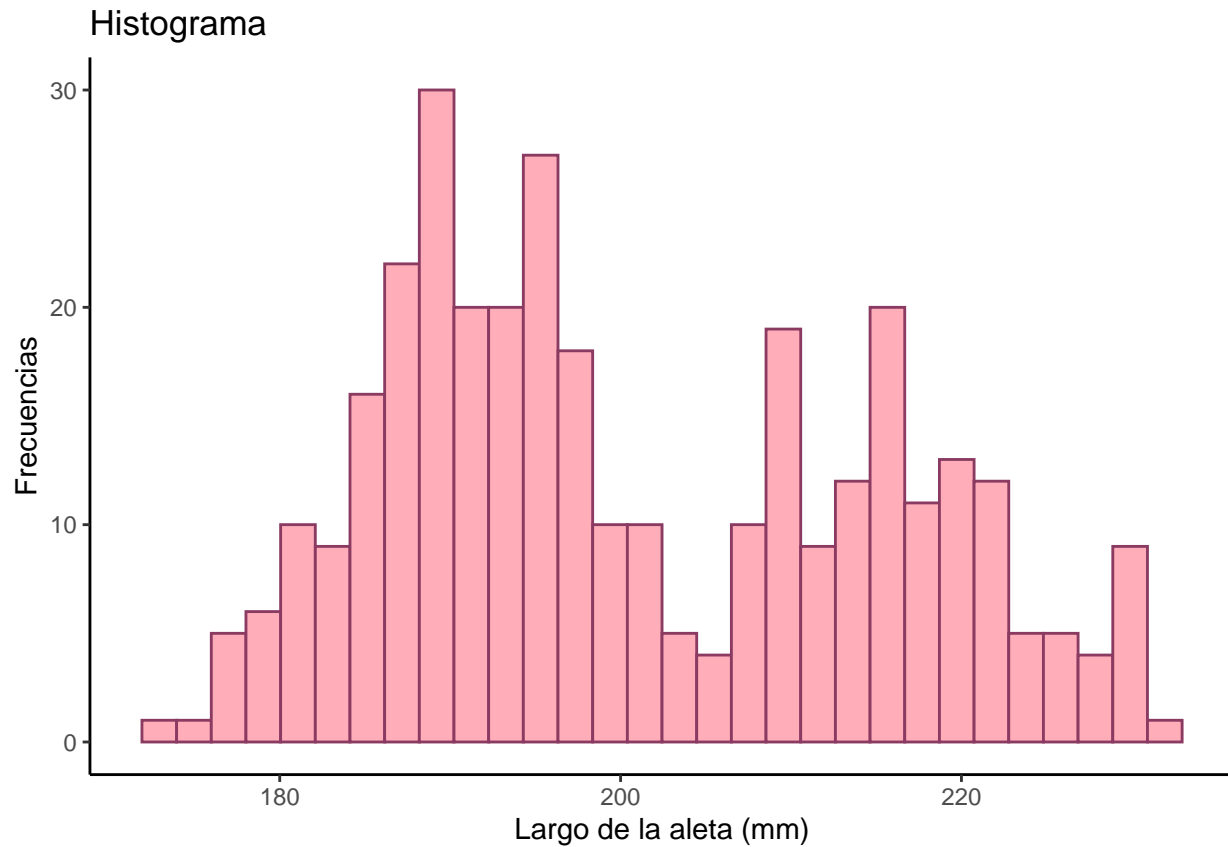
1.- Construcción del gráfico

```
HG<-ggplot(penguins, aes(x=largo_aleta_mm))+  
  geom_histogram(col="hotpink4", fill="lightpink1")+  
  ggtitle("Histograma")+  
  xlab("Largo de la aleta (mm)")+  
  ylab("Frecuencias")+  
  theme_classic()
```

2.- Visualización del gráfico

HG

```
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
```



————— - # Grafico de dispersion # —————

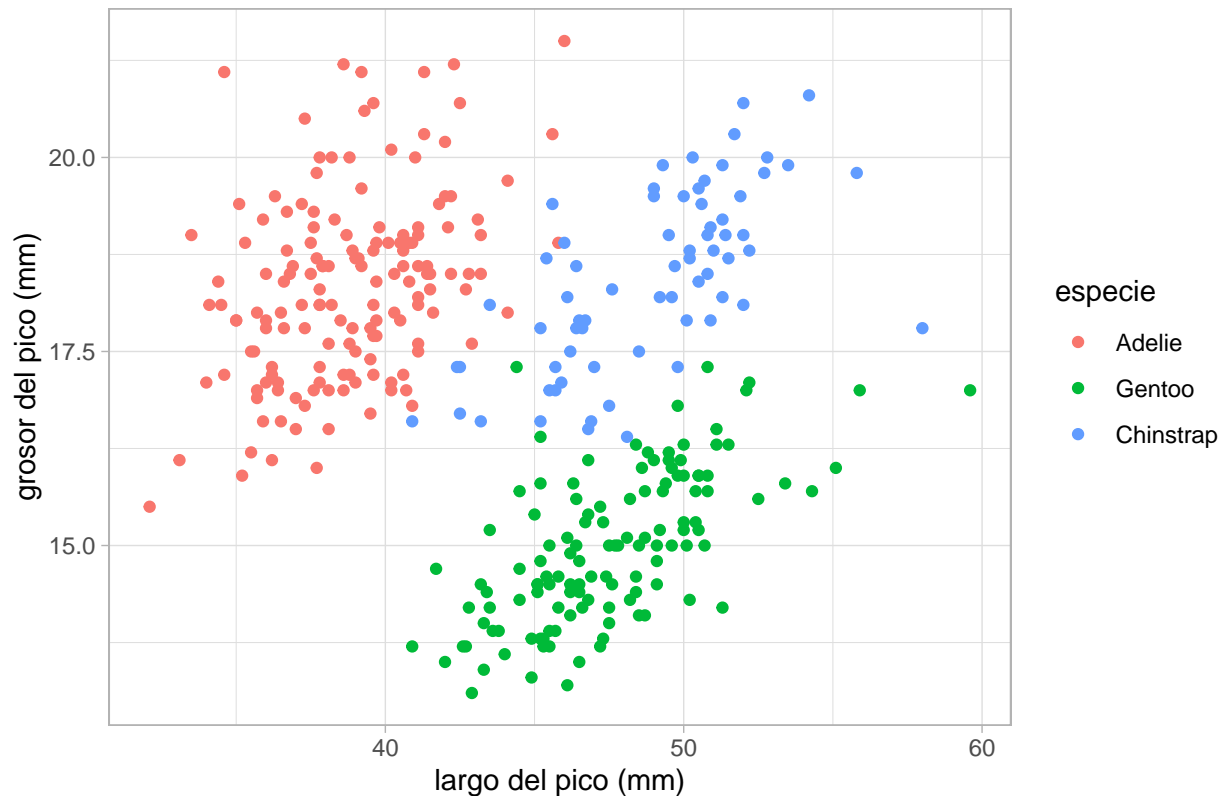
1.- Construcccion del grafico

```
GD<-ggplot(penguins, aes(x=largo_pico_mm, y=grosor_pico_mm))+
  geom_point(aes(color=especie))+
  ggtitle("Gráfico de dispersión")+
  xlab("largo del pico (mm)")+
  ylab("grosor del pico (mm)")+
  theme_light()
```

2.- Visualizacion del objeto

```
GD
```

Gráfico de dispersión



#-----# Organizacion de graficos #-----

1.- Descargar el paquete gridExtra

```
install.packages("gridExtra")
```

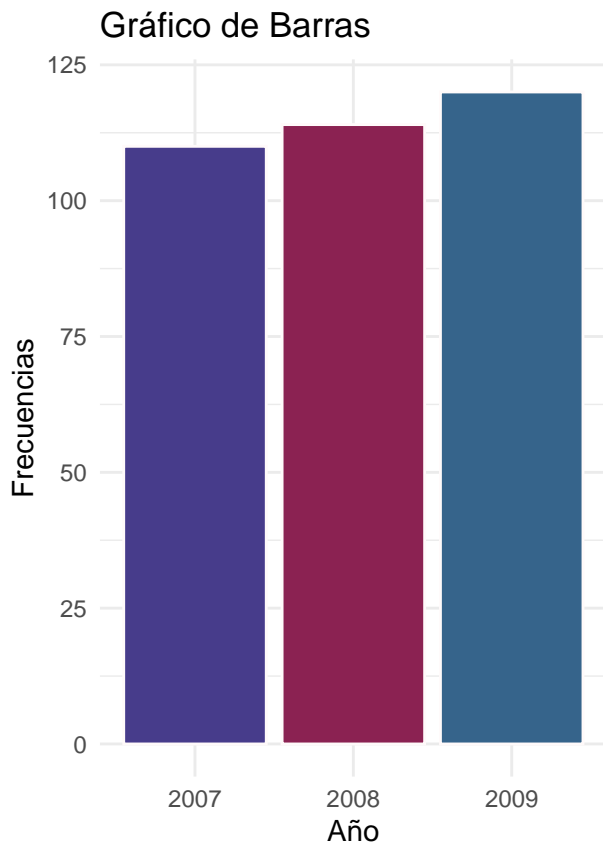
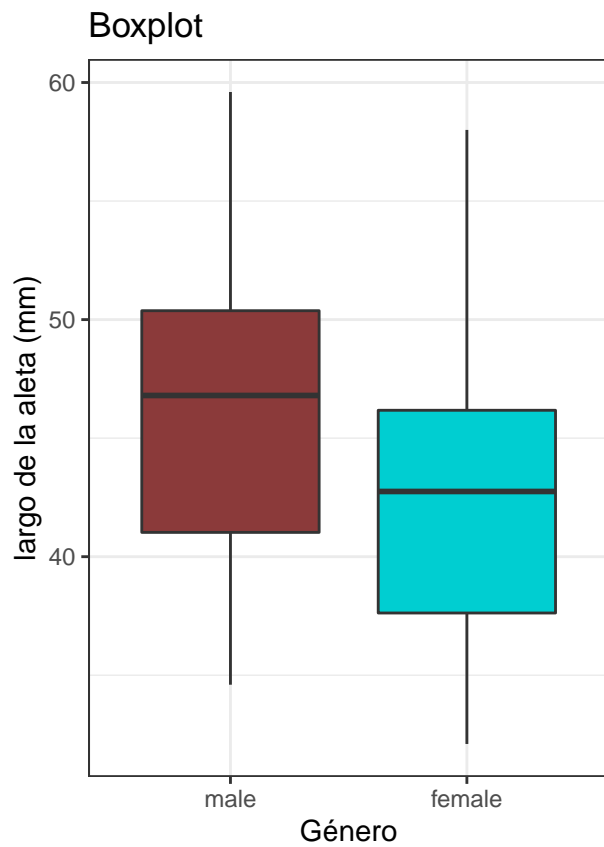
```
## Installing package into '/cloud/lib/x86_64-pc-linux-gnu-library/4.2'  
## (as 'lib' is unspecified)
```

2.- Abrir la libreria

```
library(gridExtra)
```

3.- Organizacion 2 graficos en una fila y dos columnas

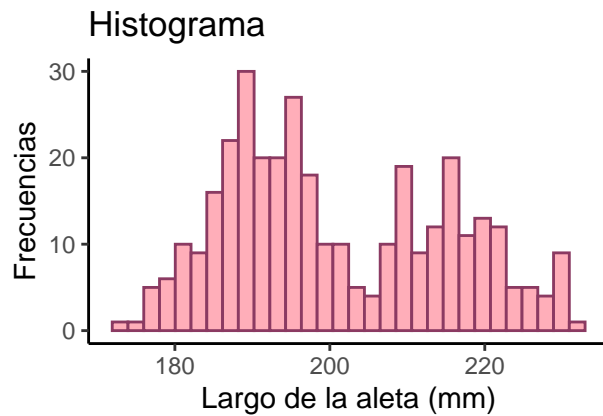
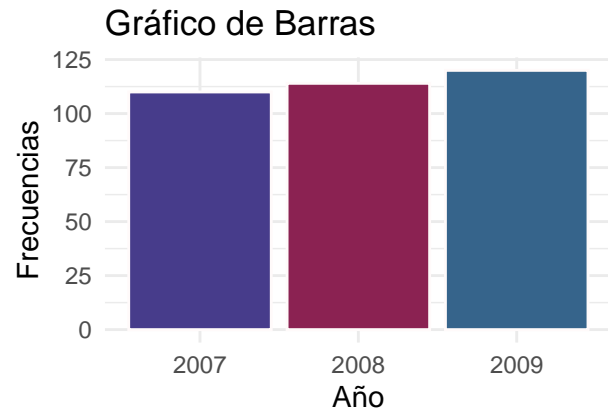
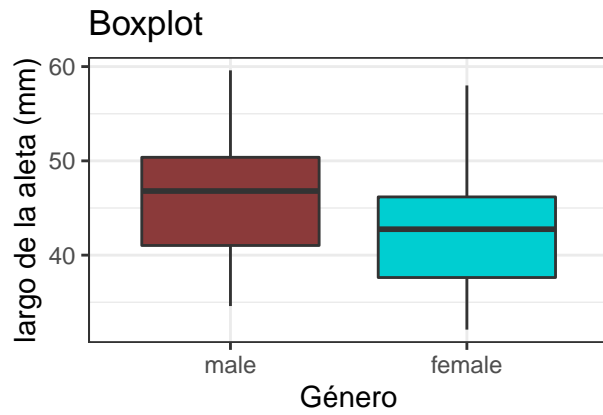
```
grid.arrange(BX,GB1, nrow=1, ncol=2)
```



4.- Organizacion 3 graficos en dos filas y dos columnas

```
grid.arrange(BX,GB1,HG, nrow=2, ncol=2)
```

```
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
```



5.- Organizacion 4 graficos en dos filas y dos columnas

```
grid.arrange(BX,GB1,HG,GD, nrow=2, ncol=2)
```

```
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
```

