Rbasics

PhD toolbox - 41th PhD cycle

Part V - Base graphics in R (some tips)

Part V - Base graphics in R (some tips)

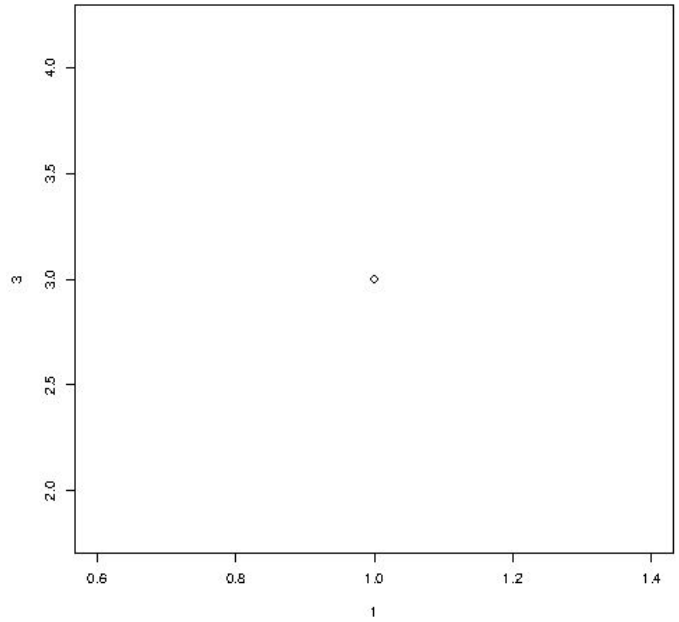
the base function to create graphics is plot() it simply creates a Cartesian plane where you can plot your data.

```
>plot(1,3)

or

>plot(x,y)
```

EXERCISE:

Substitute x and y with colname_2 and colname_3 vectors

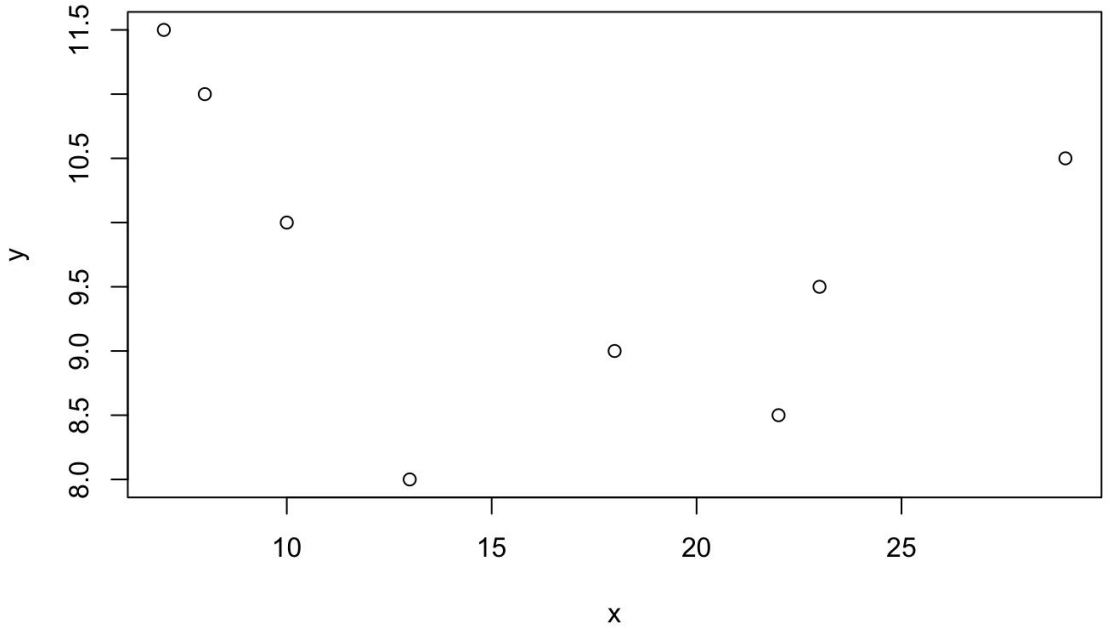
from the *df* object.



Base graphics in R

Exercise Solution:

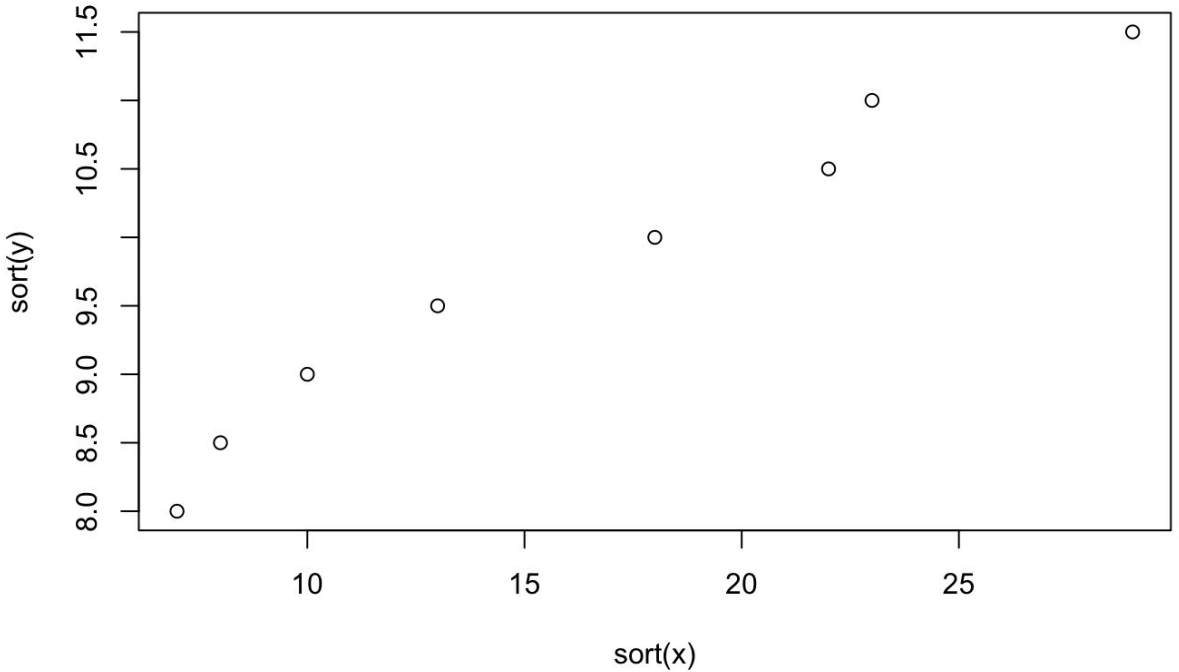
```
> x = df$colname_2

> y = df$colname_3

> plot(x,y)
```



Base graphics in R

you can modify vectors directly before plotting to ameliorate the graphical output

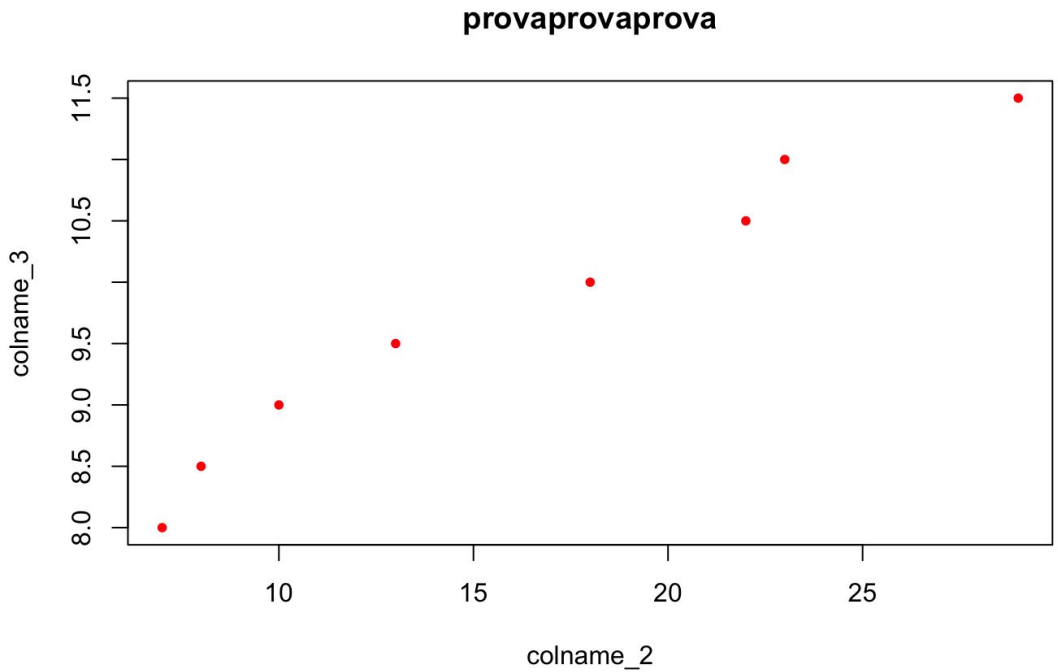
```
> plot(sort(y)~sort(x))
```



Base graphics in R

Plots can be modified in many different ways (most of Radvance program)

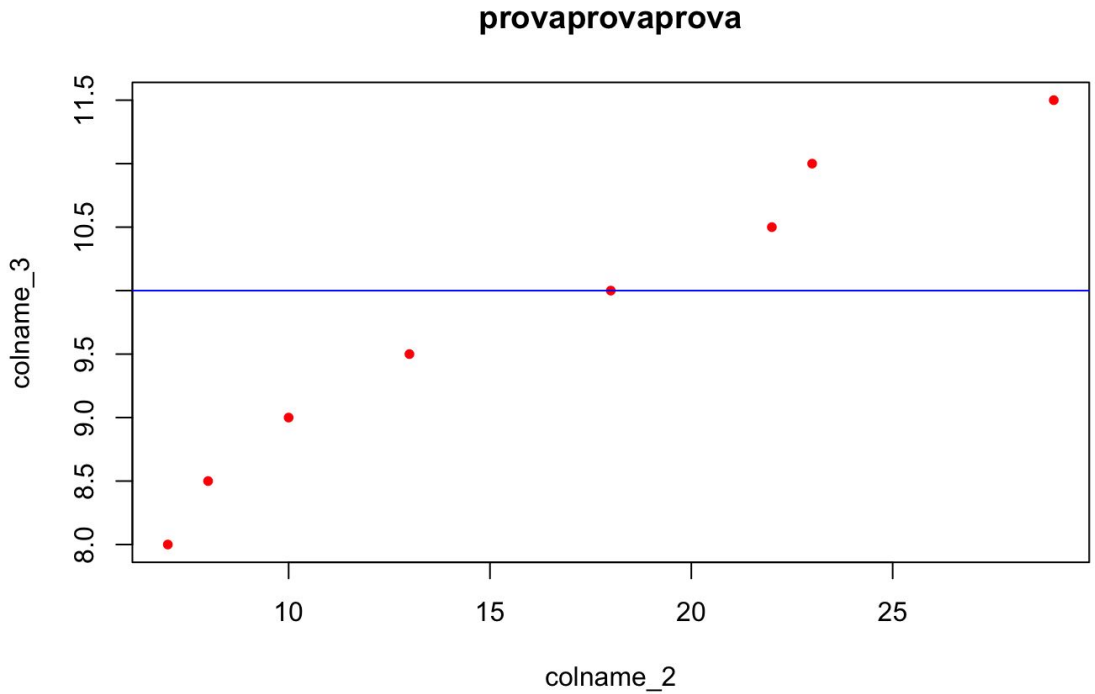
```
> plot(sort(y)~sort(x),
      col = "red",
      pch = 20,
      main = "provaprovaprova",
      ylab = "colname_3",
      xlab = "colname_2")
```



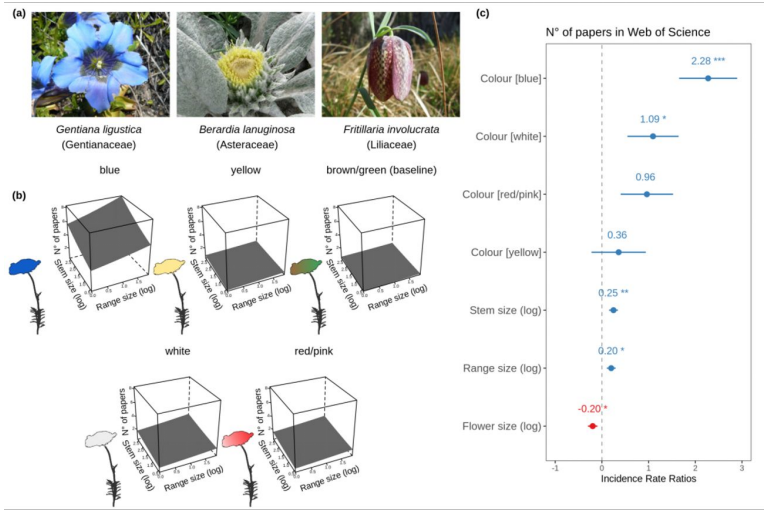
Base graphics in R

plots() is a canvas on which you can draw secondary elements, such as lines and legends

```
> plot(sort(y)~sort(x),
      col = "red",
      pch = 20,
      main = "provaprovaprova",
      ylab = "colname_3",
      xlab = "colname_2")
> abline(10,0, color = "blue")
```



benefits of scientific graphics in R



PROS

1. **Understanding**: steep learning curve
2. **Efficiency**: display different information in small space.
3. **Location**: it integrates mapping directly in graphs
4. **Cost**: R is free country to many other graphic tools

CONS

1. **Time**: especially first times could be time-consuming
2. **Distraction**: you can build complex and fancy graphics-rich reports and charts, focusing more on the form than the function.

graphical notes for scientific data plotting

Easy/natural color associations

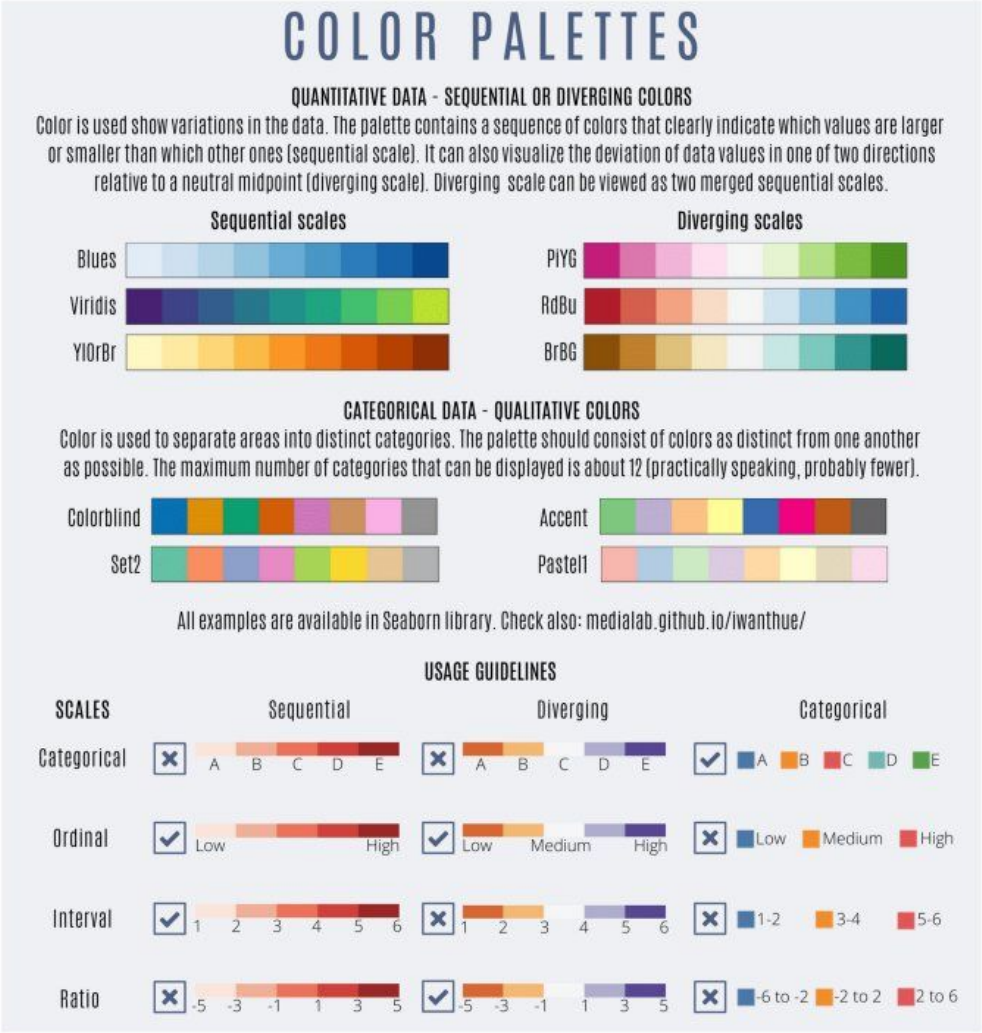
Use as few colors as you can

Use the same color for the same object through the whole report

Each part should be easy readable

No gradients for categories

Legends are gold as well as measure units



Colors are useful make your graphs readable, but they must be used in a proper way

Journals are increasingly asking for **color-blind** friendly figures:
~8% of the global population is affected by colorblindness (mainly males)

there are many packages to create palettes in R:

the most famous = RColorBrewer

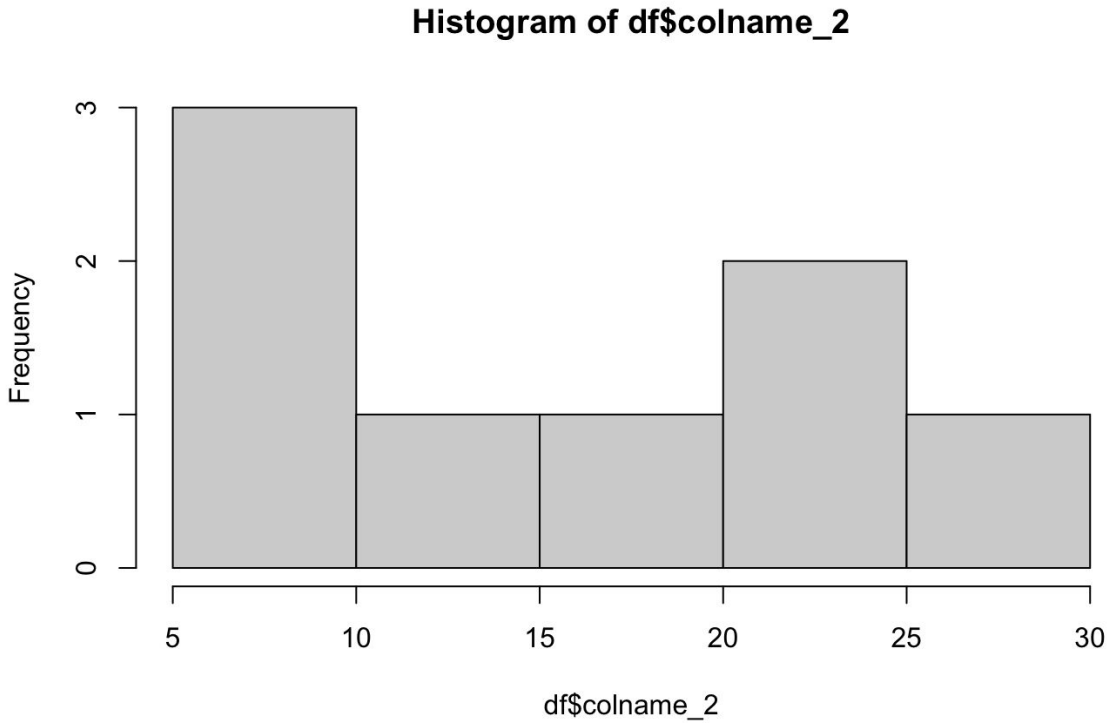
the most complete = paletteer

Additionally to colors there are shadings, line styles, point styles

main base graph functions - histograms

hist() is useful for visualize frequencies

```
> hist(df$colname_2)
```



main base graph functions - boxplots

```
> str(df)
'data.frame':  8 obs. of  3 variables:
 $ colname_1: chr  "A" "A" "B" "B" ...
 $ colname_2: int  13 22 18 23 10 29 8 7
 $ colname_3: num  8 8.5 9 9.5 10 10.5 11 11.5
```

Boxplots are useful to see a variable response to a specific factor … than you need to verify that you actually have a factor!

main base graph functions - boxplots

```
> boxplot(df$colname_2 ~ as.factor(df$colname_1), main = "box1")
```

Factors must be in the second argument

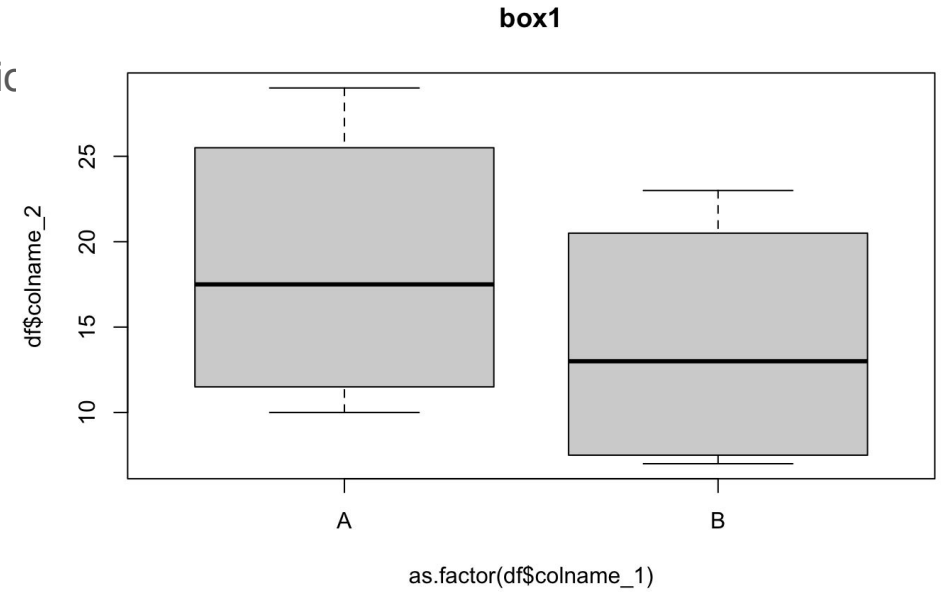
you can see multiple plots using the functic

```
> par(mfrow=c(plots x row,plots x col))
```

Exercise:

Visualize the two possible boxplot from df

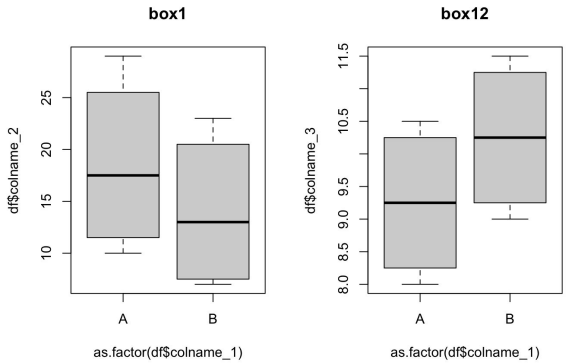
in a single image.



main base graph functions - boxplots

Solution:

```
> par(mfrow=c(1,2))

> boxplot(df$colname_2 ~ as.factor(df$colname_1), main =
"box1")

> boxplot(df$colname_3 ~ as.factor(df$colname_1), main =
"box2")
```



Saving figures

Find your-own way, but remember that:

- export tool from Rstudio dependents on the resolution of your screen.
- figure sizes will depend from the plot window size (by default in Rstudio)
- you can avoid this steps saving images by using the command line (specific functions)
- journals want high resolutions figures (usually 300 dpi or higher), exporting *.pdf figures you save vectorial figures corresponding to infinite dpi!
- post-edit figure as few as you can
- post-edit figures with appropriate softwares (NO POWERPOINT!)

More hints in Stream 2 lessons … don’t miss it!

PhD Toolbox - Get ready for Stream 2!

Working with **lists**

- More advanced stuff on graphics (**ggplot2**)
- composite graphs panels (**gridExtra**, …)
- Exporting figures
- **Plotting Maps using R**

Aula 1

Tuesday January 20	**h 10-13**	**(sede di Viale Mattioli 25 - Botanical Garden)**
Friday January 24	**h 10-13**	**(sede di Viale Mattioli 25 - Botanical Garden)**
Tuesday January 27	**h 10-13**	**(sede di Viale Mattioli 25 - Botanical Garden)**
Thursday January 29	**h 10-13**	**(sede di Viale Mattioli 25 - Botanical Garden)**
Monday February 2 (or 3)	**h 9-13**	**(sede di Viale Mattioli 25 - Botanical Garden)**