

A quick introduction to R programming language

Data

the data source for all exercises is in Annex1: - A demographic pyramid for each year. total M and F is reported in the subtitle - And a few csv files with the raw data.

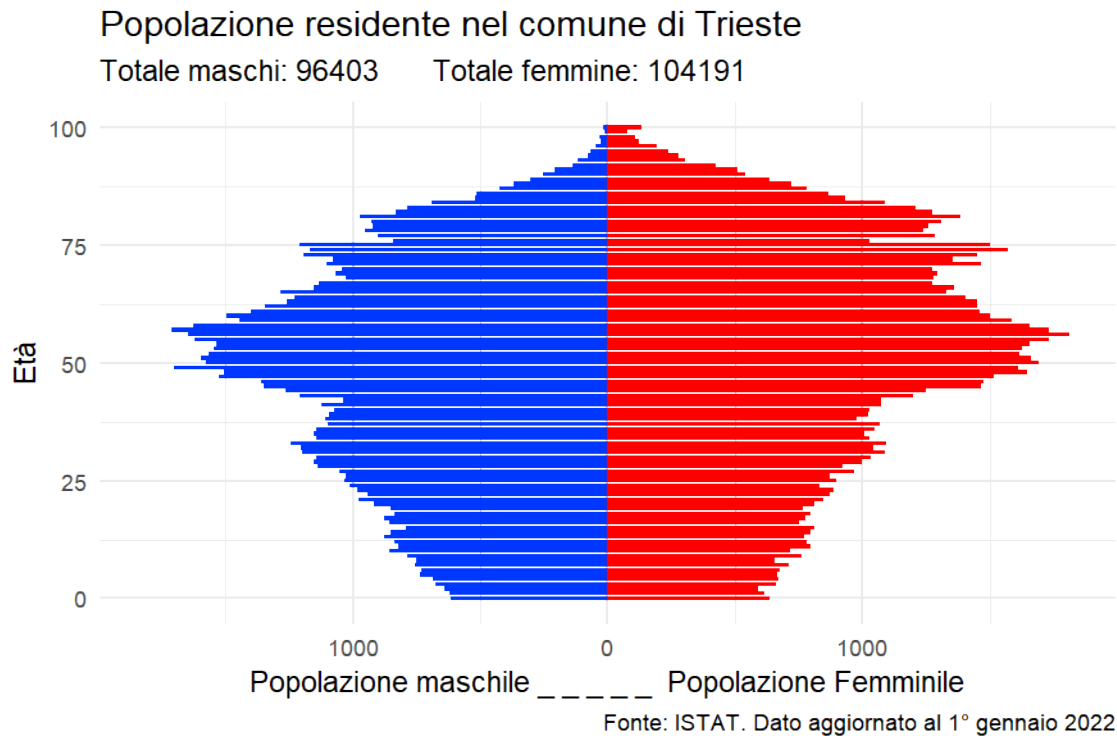


Figure 1: Population pyramid

Lesson 1: getting started with R

The objective of the first lesson is

Numerical variables and formulas

The solution is trivial, just sum the two numbers, but it gives us a chance to write our first script and execute it.

1. Assign each value to a variable, with a clear name
2. Calculate the solution using a simple formula

$$population = male + female$$

```
m <- 96403
f <- 104191
pop <- m + f
print(pop)
```

```
## [1] 200594
```

strings

Variables can contain text, too.

```
t <- "hello world!"
print(t)
```

```
## [1] "hello world!"
```

We can combine variables using `paste()`

```
text1 <- "La popolazione di Trieste al 1 gennaio 2022 è"
text2 <- "abitanti"
print(paste(text1, pop, text2))
```

```
## [1] "La popolazione di Trieste al 1 gennaio 2022 è 200594 abitanti"
```

read data from a csv file

if you have a table - and possibly a long table of data - you can read it from a .csv file and store into a variable (a vector or a matrix)

ex.1: a single column of numbers popolazione m then load another single column of numbers popolazione f calculate the total `pop_tot <- pop_m + pop_f`

```
dati_2002_2019 <- read.csv("com_triESTE_2002-2019_tot.csv")
print(dati_2002_2019)
```

```
##      anno      p
## 1  2002 211042
## 2  2003 209366
## 3  2004 207696
## 4  2005 206778
## 5  2006 205332
## 6  2007 204190
## 7  2008 204090
## 8  2009 203900
## 9  2010 203817
## 10 2011 203474
## 11 2012 202778
## 12 2013 202547
## 13 2014 202625
## 14 2015 202244
```

```
## 15 2016 201554
## 16 2017 201636
## 17 2018 202150
## 18 2019 202351
```

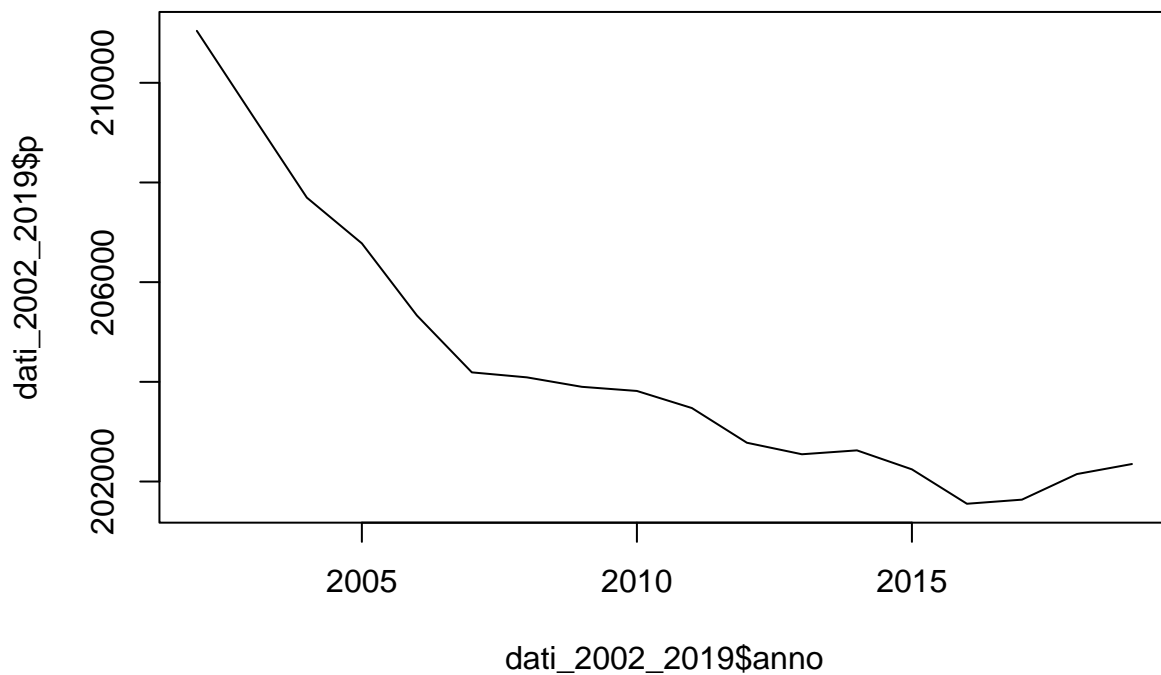
you can explore the structure of your variable

```
str(dati_2002_2019)
```

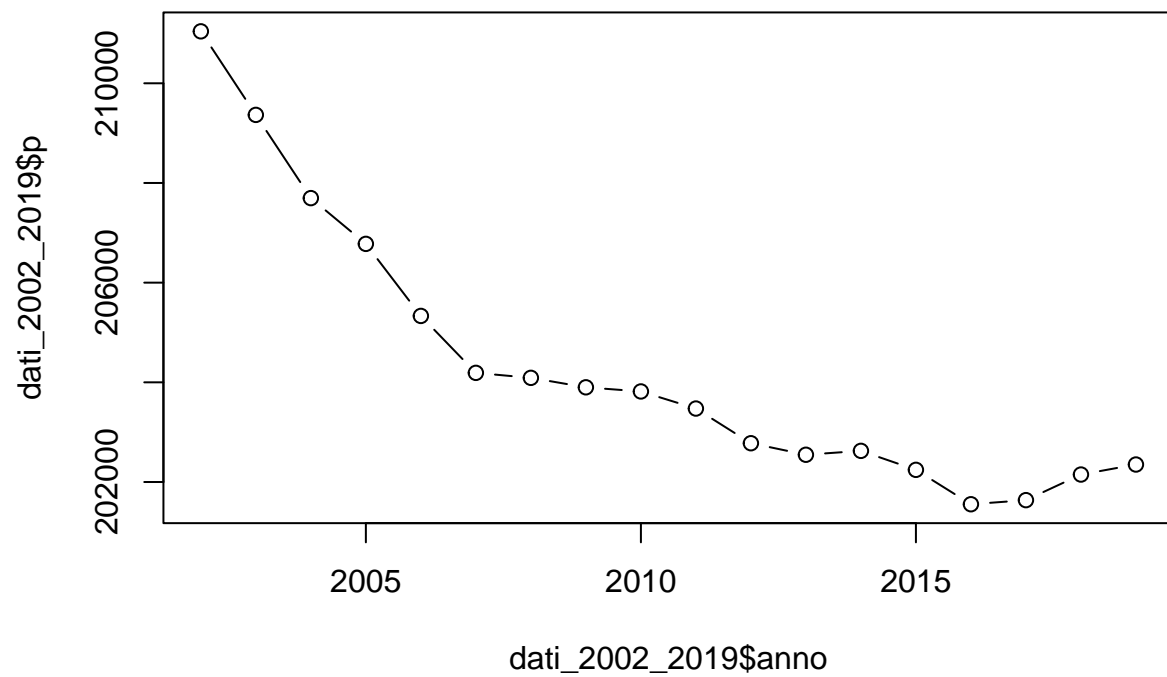
```
## 'data.frame':  18 obs. of  2 variables:
## $ anno: int  2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 ...
## $ p : int  211042 209366 207696 206778 205332 204190 204090 203900 203817 203474 ...
```

plot a graph

```
plot(x = dati_2002_2019$anno, y = dati_2002_2019$p, type = "l")
```



```
plot(x = dati_2002_2019$anno, y = dati_2002_2019$p, type = "b")
```



finally... knit to PDF to knit to PDF press Shift+Ctrl+P and use the command Knit to PDF

Lesson 2

Lesson 3

Lesson 4