

# Tidyverse - aula 1 - Introdução

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# Chapter 1



## Chapter 2

# Introdução - Pacotes

Para começar precisamos instalar os seguintes pacotes:

Ou então, um único pacote **tidyverse**. Que engloba todos os pacotes acima.

Após instalados precisamos carregá-los. Podemos fazer isso chamando cada um dos pacotes separadamente.

```
library(tibble)
library(dplyr)
```

```
##
## Attaching package: 'dplyr'

## The following objects are masked from 'package:stats':
##
##   filter, lag

## The following objects are masked from 'package:base':
##
##   intersect, setdiff, setequal, union
```

```
library(tidyr)
library(magrittr) # não faz parte do pacote tidyverse, mas é carregado por ele, dada a importância
```

```
##
## Attaching package: 'magrittr'

## The following object is masked from 'package:tidyr':
##
##   extract
```

Ou então podemos chamar apenas o pacote *tidyverse*.

```
library(tidyverse)
```

```
## -- Attaching packages ----- tidyverse 1.3.0 --

## v ggplot2 3.3.3      v stringr 1.4.0
## v readr   1.4.0      v forcats 0.5.1
## v purrr   0.3.4

## -- Conflicts ----- tidyverse_conflicts() --
## x magrittr::extract() masks tidyr::extract()
## x dplyr::filter()      masks stats::filter()
## x dplyr::lag()          masks stats::lag()
## x purrr::set_names()    masks magrittr::set_names()
```

Vamos trabalhar **algumas** funções destes pacotes.

### 2.0.1 Do pacote *tibble* iremos trabalhar as seguintes funções:

- `add_column()`
- `add_row()`
- `as_tibble()`
- `column_to_rownames()`
- `remove_rownames()`
- `rownames_to_column()`
- `subsetting`

### 2.0.2 Do pacote *dplyr* iremos trabalhar as seguintes funções:

- `add_count()`
- `arrange()`
- `bind_cols()`
- `bind_rows()`
- `count()`
- `desc()`
- `distinct()`
- `filter()`
- `group_by()`
- `mutate()`



- `na_if()`
- `recode_factor()`
- `relocate()`
- `rename()`
- `select()`
- `slice()`
- `summarise()`
- `transmute()`

### 2.0.3 Do pacote *tidyr* iremos trabalhar as seguintes funções:

- `drop_na()`
- `fill()`
- `pivot_longer()`
- `pivot_wider()`
- `replace_na()`
- `separate()`
- `unite()`

### 2.0.4 Do pacote *magrittr* iremos trabalhar com o operador chamado pipe:

- `%>%`<sup>1</sup>

## 2.1 Importando os dados

Caso não souberem importar os dados de um arquivo \*.csv ou \*.excel presente no seu PC ao fim da aula eu explico. Os exemplos de como as funções trabalham seguem do mesmo jeito.

Vamos trabalhar com conjuntos de dados presentes no R.

```
data(mtcars)
carros <- as_tibble(mtcars, rownames = NA)

data(iris)
flores <- as_tibble(iris)

data(starwars)
starwars <- as_tibble(starwars)
```

---

<sup>1</sup>Vamos utilizar este operador em todos os exemplos



## Chapter 3

### *tibble*

#### 3.1 `as_tibble()` - converte um objeto do tipo matriz ou data frame para `tbl_df`

```
obj1 <- carros
obj2 <- carros %>%
  data.frame()

# ["linhas", "colunas"]
obj1[, 1]
```

```
## # A tibble: 32 x 1
##       mpg
##   <dbl>
## 1    21
## 2    21
## 3   22.8
## 4   21.4
## 5   18.7
## 6   18.1
## 7   14.3
## 8   24.4
## 9   22.8
## 10  19.2
## # ... with 22 more rows
```

```
obj2[, 1]
```

```
## [1] 21.0 21.0 22.8 21.4 18.7 18.1 14.3 24.4 22.8 19.2 17.8 16.4 17.3 15.2 10.4
## [16] 10.4 14.7 32.4 30.4 33.9 21.5 15.5 15.2 13.3 19.2 27.3 26.0 30.4 15.8 19.7
## [31] 15.0 21.4
```

## 3.2 add\_column() - adiciona uma coluna nova a planilha

```
carros %>%
  add_column(teste = 0)
```

```
## # A tibble: 32 x 12
##   mpg   cyl  disp    hp  drat    wt   qsec    vs  am  gear  carb  teste
##   <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl>
## 1  21     6  160   110  3.9   2.62  16.5    0    1    4     4     0
## 2  21     6  160   110  3.9   2.88  17.0    0    1    4     4     0
## 3  22.8   4  108    93  3.85   2.32  18.6    1    1    4     1     0
## 4  21.4   6  258   110  3.08   3.22  19.4    1    0    3     1     0
## 5  18.7   8  360   175  3.15   3.44  17.0    0    0    3     2     0
## 6  18.1   6  225   105  2.76   3.46  20.2    1    0    3     1     0
## 7  14.3   8  360   245  3.21   3.57  15.8    0    0    3     4     0
## 8  24.4   4  147.    62  3.69   3.19   20     1    0    4     2     0
## 9  22.8   4  141.    95  3.92   3.15  22.9    1    0    4     2     0
## 10 19.2   6  168.   123  3.92   3.44  18.3    1    0    4     4     0
## # ... with 22 more rows
```

```
carros
```

```
## # A tibble: 32 x 11
##   mpg   cyl  disp    hp  drat    wt   qsec    vs  am  gear  carb
## * <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl>
## 1  21     6  160   110  3.9   2.62  16.5    0    1    4     4
## 2  21     6  160   110  3.9   2.88  17.0    0    1    4     4
## 3  22.8   4  108    93  3.85   2.32  18.6    1    1    4     1
## 4  21.4   6  258   110  3.08   3.22  19.4    1    0    3     1
## 5  18.7   8  360   175  3.15   3.44  17.0    0    0    3     2
## 6  18.1   6  225   105  2.76   3.46  20.2    1    0    3     1
## 7  14.3   8  360   245  3.21   3.57  15.8    0    0    3     4
## 8  24.4   4  147.    62  3.69   3.19   20     1    0    4     2
## 9  22.8   4  141.    95  3.92   3.15  22.9    1    0    4     2
```

### 3.3. ADD\_ROW() - ADICIONA UMA NOVA LINHA A PLANILHA 13

```
## 10 19.2      6 168.   123 3.92 3.44 18.3      1      0      4      4
## # ... with 22 more rows
```

```
carros %>%
  add_column(teste = 0, .before = "mpg")
```

```
## # A tibble: 32 x 12
##   teste mpg   cyl disp   hp drat   wt  qsec    vs  am gear carb
##   <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl>
## 1     0  21     6  160   110 3.9   2.62 16.5    0     1   4     4
## 2     0  21     6  160   110 3.9   2.88 17.0    0     1   4     4
## 3     0 22.8     4  108    93 3.85  2.32 18.6    1     1   4     1
## 4     0 21.4     6  258   110 3.08  3.22 19.4    1     0   3     1
## 5     0 18.7     8  360   175 3.15  3.44 17.0    0     0   3     2
## 6     0 18.1     6  225   105 2.76  3.46 20.2    1     0   3     1
## 7     0 14.3     8  360   245 3.21  3.57 15.8    0     0   3     4
## 8     0 24.4     4  147.    62 3.69  3.19 20      1     0   4     2
## 9     0 22.8     4  141.    95 3.92  3.15 22.9    1     0   4     2
## 10    0 19.2     6  168.   123 3.92  3.44 18.3    1     0   4     4
## # ... with 22 more rows
```

### 3.3 add\_row() - adiciona uma nova linha a planilha

```
carros %>%
  add_row()
```

```
## # A tibble: 33 x 11
##   mpg   cyl disp   hp drat   wt  qsec    vs  am gear carb
## * <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl>
## 1  21     6  160   110 3.9   2.62 16.5    0     1   4     4
## 2  21     6  160   110 3.9   2.88 17.0    0     1   4     4
## 3 22.8     4  108    93 3.85  2.32 18.6    1     1   4     1
## 4 21.4     6  258   110 3.08  3.22 19.4    1     0   3     1
## 5 18.7     8  360   175 3.15  3.44 17.0    0     0   3     2
## 6 18.1     6  225   105 2.76  3.46 20.2    1     0   3     1
## 7 14.3     8  360   245 3.21  3.57 15.8    0     0   3     4
## 8 24.4     4  147.    62 3.69  3.19 20      1     0   4     2
## 9 22.8     4  141.    95 3.92  3.15 22.9    1     0   4     2
## 10 19.2     6  168.   123 3.92  3.44 18.3    1     0   4     4
## # ... with 23 more rows
```

```
carros
```

```
## # A tibble: 32 x 11
##   mpg   cyl  disp    hp  drat    wt   qsec    vs  am  gear  carb
## * <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl>
## 1  21     6  160   110  3.9   2.62  16.5    0   1    4     4
## 2  21     6  160   110  3.9   2.88  17.0    0   1    4     4
## 3  22.8   4  108    93  3.85   2.32  18.6    1   1    4     1
## 4  21.4   6  258   110  3.08   3.22  19.4    1   0    3     1
## 5  18.7   8  360   175  3.15   3.44  17.0    0   0    3     2
## 6  18.1   6  225   105  2.76   3.46  20.2    1   0    3     1
## 7  14.3   8  360   245  3.21   3.57  15.8    0   0    3     4
## 8  24.4   4  147.    62  3.69   3.19   20     1   0    4     2
## 9  22.8   4  141.    95  3.92   3.15  22.9    1   0    4     2
## 10 19.2   6  168.   123  3.92   3.44  18.3    1   0    4     4
## # ... with 22 more rows
```

```
carros %>%
  add_row(.before = 1)
```

```
## # A tibble: 33 x 11
##   mpg   cyl  disp    hp  drat    wt   qsec    vs  am  gear  carb
## * <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl>
## 1  NA     NA   NA     NA  NA     NA     NA     NA   NA   NA     NA
## 2  21     6  160   110  3.9   2.62  16.5    0   1    4     4
## 3  21     6  160   110  3.9   2.88  17.0    0   1    4     4
## 4  22.8   4  108    93  3.85   2.32  18.6    1   1    4     1
## 5  21.4   6  258   110  3.08   3.22  19.4    1   0    3     1
## 6  18.7   8  360   175  3.15   3.44  17.0    0   0    3     2
## 7  18.1   6  225   105  2.76   3.46  20.2    1   0    3     1
## 8  14.3   8  360   245  3.21   3.57  15.8    0   0    3     4
## 9  24.4   4  147.    62  3.69   3.19   20     1   0    4     2
## 10 22.8   4  141.    95  3.92   3.15  22.9    1   0    4     2
## # ... with 23 more rows
```

### 3.4 remove\_rownames() e column\_to\_rownames()

- Remove os nomes das colunas e adiciona um nome as colunas

```
carros %>%
  add_column(teste = c("a", "b", "c", "d", "e", "f", "g", "h", "i", "j", "k", "l", "m", "n", "o", "p"))
```

### 3.5. ROWNAMES\_TO\_COLUMN() - ADICIONA O NOME DAS LINHAS COMO UMA COLUNA15

```
remove_rownames() %>%  
column_to_rownames("teste")
```

	mpg	cyl	disp	hp	drat	wt	qsec	vs	am	gear	carb
## a	21.0	6	160.0	110	3.90	2.620	16.46	0	1	4	4
## b	21.0	6	160.0	110	3.90	2.875	17.02	0	1	4	4
## c	22.8	4	108.0	93	3.85	2.320	18.61	1	1	4	1
## d	21.4	6	258.0	110	3.08	3.215	19.44	1	0	3	1
## e	18.7	8	360.0	175	3.15	3.440	17.02	0	0	3	2
## f	18.1	6	225.0	105	2.76	3.460	20.22	1	0	3	1
## g	14.3	8	360.0	245	3.21	3.570	15.84	0	0	3	4
## h	24.4	4	146.7	62	3.69	3.190	20.00	1	0	4	2
## i	22.8	4	140.8	95	3.92	3.150	22.90	1	0	4	2
## j	19.2	6	167.6	123	3.92	3.440	18.30	1	0	4	4
## k	17.8	6	167.6	123	3.92	3.440	18.90	1	0	4	4
## l	16.4	8	275.8	180	3.07	4.070	17.40	0	0	3	3
## m	17.3	8	275.8	180	3.07	3.730	17.60	0	0	3	3
## n	15.2	8	275.8	180	3.07	3.780	18.00	0	0	3	3
## o	10.4	8	472.0	205	2.93	5.250	17.98	0	0	3	4
## p	10.4	8	460.0	215	3.00	5.424	17.82	0	0	3	4
## q	14.7	8	440.0	230	3.23	5.345	17.42	0	0	3	4
## r	32.4	4	78.7	66	4.08	2.200	19.47	1	1	4	1
## s	30.4	4	75.7	52	4.93	1.615	18.52	1	1	4	2
## t	33.9	4	71.1	65	4.22	1.835	19.90	1	1	4	1
## u	21.5	4	120.1	97	3.70	2.465	20.01	1	0	3	1
## v	15.5	8	318.0	150	2.76	3.520	16.87	0	0	3	2
## w	15.2	8	304.0	150	3.15	3.435	17.30	0	0	3	2
## x	13.3	8	350.0	245	3.73	3.840	15.41	0	0	3	4
## y	19.2	8	400.0	175	3.08	3.845	17.05	0	0	3	2
## z	27.3	4	79.0	66	4.08	1.935	18.90	1	1	4	1
## aa	26.0	4	120.3	91	4.43	2.140	16.70	0	1	5	2
## bb	30.4	4	95.1	113	3.77	1.513	16.90	1	1	5	2
## cc	15.8	8	351.0	264	4.22	3.170	14.50	0	1	5	4
## dd	19.7	6	145.0	175	3.62	2.770	15.50	0	1	5	6
## ee	15.0	8	301.0	335	3.54	3.570	14.60	0	1	5	8
## ff	21.4	4	121.0	109	4.11	2.780	18.60	1	1	4	2

### 3.5 rownames\_to\_column() - adiciona o nome das linhas como uma coluna

```
carros %>%  
rownames_to_column(var = "teste")
```

```
## # A tibble: 32 x 12
##   teste      mpg   cyl  disp    hp  drat    wt  qsec    vs  am  gear  carb
##   <chr>    <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl>
## 1 Mazda RX4      21     6  160   110  3.9   2.62  16.5     0     1     4     4
## 2 Mazda RX4 ~    21     6  160   110  3.9   2.88  17.0     0     1     4     4
## 3 Datsun 710    22.8     4  108    93  3.85   2.32  18.6     1     1     4     1
## 4 Hornet 4 D~   21.4     6  258   110  3.08   3.22  19.4     1     0     3     1
## 5 Hornet Spo~  18.7     8  360   175  3.15   3.44  17.0     0     0     3     2
## 6 Valiant      18.1     6  225   105  2.76   3.46  20.2     1     0     3     1
## 7 Duster 360    14.3     8  360   245  3.21   3.57  15.8     0     0     3     4
## 8 Merc 240D     24.4     4  147.    62  3.69   3.19   20      1     0     4     2
## 9 Merc 230      22.8     4  141.    95  3.92   3.15  22.9     1     0     4     2
## 10 Merc 280     19.2     6  168.   123  3.92   3.44  18.3     1     0     4     4
## # ... with 22 more rows
```

### 3.6 subsetting - forma de escrita que permite cortar/selecionar a planilha em função das linhas e colunas

```
carros[1, ]
```

```
## # A tibble: 1 x 11
##   mpg   cyl  disp    hp  drat    wt  qsec    vs  am  gear  carb
##   <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl>
## 1    21     6  160   110  3.9   2.62  16.5     0     1     4     4
```

```
carros[2, ]
```

```
## # A tibble: 1 x 11
##   mpg   cyl  disp    hp  drat    wt  qsec    vs  am  gear  carb
##   <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl>
## 1    21     6  160   110  3.9   2.88  17.0     0     1     4     4
```

```
carros[1:2, ]
```

```
## # A tibble: 2 x 11
##   mpg   cyl  disp    hp  drat    wt  qsec    vs  am  gear  carb
##   <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl>
## 1    21     6  160   110  3.9   2.62  16.5     0     1     4     4
## 2    21     6  160   110  3.9   2.88  17.0     0     1     4     4
```



### 3.6. SUBSETTING - FORMA DE ESCRITA QUE PERMITE CORTAR/SELECIONAR A PLANILHA EM FUNÇÃO

```
carros[, 1]
```

```
## # A tibble: 32 x 1
##   mpg
##   <dbl>
## 1  21
## 2  21
## 3 22.8
## 4 21.4
## 5 18.7
## 6 18.1
## 7 14.3
## 8 24.4
## 9 22.8
## 10 19.2
## # ... with 22 more rows
```

```
carros[, "mpg"]
```

```
## # A tibble: 32 x 1
##   mpg
##   <dbl>
## 1  21
## 2  21
## 3 22.8
## 4 21.4
## 5 18.7
## 6 18.1
## 7 14.3
## 8 24.4
## 9 22.8
## 10 19.2
## # ... with 22 more rows
```

```
carros[[1]]
```

```
## [1] 21.0 21.0 22.8 21.4 18.7 18.1 14.3 24.4 22.8 19.2 17.8 16.4 17.3 15.2 10.4
## [16] 10.4 14.7 32.4 30.4 33.9 21.5 15.5 15.2 13.3 19.2 27.3 26.0 30.4 15.8 19.7
## [31] 15.0 21.4
```

```
carros[["mpg"]]
```

```
## [1] 21.0 21.0 22.8 21.4 18.7 18.1 14.3 24.4 22.8 19.2 17.8 16.4 17.3 15.2 10.4
```

```
## [16] 10.4 14.7 32.4 30.4 33.9 21.5 15.5 15.2 13.3 19.2 27.3 26.0 30.4 15.8 19.7
## [31] 15.0 21.4
```

```
carros[["mpg"]]
```

```
## [1] 21.0 21.0 22.8 21.4 18.7 18.1 14.3 24.4 22.8 19.2 17.8 16.4 17.3 15.2 10.4
## [16] 10.4 14.7 32.4 30.4 33.9 21.5 15.5 15.2 13.3 19.2 27.3 26.0 30.4 15.8 19.7
## [31] 15.0 21.4
```

```
carros$mpg
```

```
## [1] 21.0 21.0 22.8 21.4 18.7 18.1 14.3 24.4 22.8 19.2 17.8 16.4 17.3 15.2 10.4
## [16] 10.4 14.7 32.4 30.4 33.9 21.5 15.5 15.2 13.3 19.2 27.3 26.0 30.4 15.8 19.7
## [31] 15.0 21.4
```

```
carros[, c("mpg", "cyl")]
```

```
## # A tibble: 32 x 2
##   mpg   cyl
##   <dbl> <dbl>
## 1  21     6
## 2  21     6
## 3 22.8     4
## 4 21.4     6
## 5 18.7     8
## 6 18.1     6
## 7 14.3     8
## 8 24.4     4
## 9 22.8     4
## 10 19.2     6
## # ... with 22 more rows
```

## Chapter 4

### *dplyr*

4.1 `count()` e `add_count()` - conta o número de linhas em função da variável especificada; adiciona uma nova coluna com a contagem do número de linhas em função da variável especificada

```
flores %>%  
  count(Species)
```

```
## # A tibble: 3 x 2  
##   Species      n  
##   <fct>    <int>  
## 1 setosa      50  
## 2 versicolor  50  
## 3 virginica   50
```

```
flores %>%  
  add_count(Species)
```

```
## # A tibble: 150 x 6  
##   Sepal.Length Sepal.Width Petal.Length Petal.Width Species      n  
##           <dbl>      <dbl>      <dbl>      <dbl> <fct>    <int>  
## 1         5.1        3.5        1.4        0.2 setosa      50  
## 2         4.9         3         1.4        0.2 setosa      50
```

```
## 3      4.7      3.2      1.3      0.2 setosa  50
## 4      4.6      3.1      1.5      0.2 setosa  50
## 5      5      3.6      1.4      0.2 setosa  50
## 6      5.4      3.9      1.7      0.4 setosa  50
## 7      4.6      3.4      1.4      0.3 setosa  50
## 8      5      3.4      1.5      0.2 setosa  50
## 9      4.4      2.9      1.4      0.2 setosa  50
## 10     4.9      3.1      1.5      0.1 setosa  50
## # ... with 140 more rows
```

## 4.2 arrange() - rearranja as linhas em função da variável especificada

```
flores %>%
  arrange(Species)
```

```
## # A tibble: 150 x 5
##   Sepal.Length Sepal.Width Petal.Length Petal.Width Species
##   <dbl>         <dbl>         <dbl>         <dbl> <fct>
## 1      5.1      3.5      1.4      0.2 setosa
## 2      4.9      3      1.4      0.2 setosa
## 3      4.7      3.2      1.3      0.2 setosa
## 4      4.6      3.1      1.5      0.2 setosa
## 5      5      3.6      1.4      0.2 setosa
## 6      5.4      3.9      1.7      0.4 setosa
## 7      4.6      3.4      1.4      0.3 setosa
## 8      5      3.4      1.5      0.2 setosa
## 9      4.4      2.9      1.4      0.2 setosa
## 10     4.9      3.1      1.5      0.1 setosa
## # ... with 140 more rows
```

```
flores %>%
  arrange(desc(Species))
```

```
## # A tibble: 150 x 5
##   Sepal.Length Sepal.Width Petal.Length Petal.Width Species
##   <dbl>         <dbl>         <dbl>         <dbl> <fct>
## 1      6.3      3.3      6      2.5 virginica
## 2      5.8      2.7      5.1      1.9 virginica
## 3      7.1      3      5.9      2.1 virginica
## 4      6.3      2.9      5.6      1.8 virginica
```

```
## 5      6.5      3      5.8      2.2 virginica
## 6      7.6      3      6.6      2.1 virginica
## 7      4.9      2.5      4.5      1.7 virginica
## 8      7.3      2.9      6.3      1.8 virginica
## 9      6.7      2.5      5.8      1.8 virginica
## 10     7.2      3.6      6.1      2.5 virginica
## # ... with 140 more rows
```

```
flores %>%
  arrange(factor(Species, levels = c("versicolor", "setosa", "virginica")))
```

```
## # A tibble: 150 x 5
##   Sepal.Length Sepal.Width Petal.Length Petal.Width Species
##   <dbl>         <dbl>         <dbl>         <dbl> <fct>
## 1           7         3.2         4.7         1.4 versicolor
## 2          6.4         3.2         4.5         1.5 versicolor
## 3          6.9         3.1         4.9         1.5 versicolor
## 4          5.5         2.3         4          1.3 versicolor
## 5          6.5         2.8         4.6         1.5 versicolor
## 6          5.7         2.8         4.5         1.3 versicolor
## 7          6.3         3.3         4.7         1.6 versicolor
## 8          4.9         2.4         3.3         1   versicolor
## 9          6.6         2.9         4.6         1.3 versicolor
## 10         5.2         2.7         3.9         1.4 versicolor
## # ... with 140 more rows
```

### 4.3 bind\_cols() - une planilhas em colunas

```
parte1 <- flores[,1:2]
parte2 <- flores[,3:5]

bind_cols(parte1, parte2)
```

```
## # A tibble: 150 x 5
##   Sepal.Length Sepal.Width Petal.Length Petal.Width Species
##   <dbl>         <dbl>         <dbl>         <dbl> <fct>
## 1          5.1         3.5         1.4         0.2 setosa
## 2          4.9         3         1.4         0.2 setosa
## 3          4.7         3.2         1.3         0.2 setosa
## 4          4.6         3.1         1.5         0.2 setosa
## 5          5         3.6         1.4         0.2 setosa
## 6          5.4         3.9         1.7         0.4 setosa
```

```
## 7      4.6      3.4      1.4      0.3 setosa
## 8      5      3.4      1.5      0.2 setosa
## 9      4.4      2.9      1.4      0.2 setosa
## 10     4.9      3.1      1.5      0.1 setosa
## # ... with 140 more rows
```

## 4.4 bind\_rows() - une planilhas em linhas

```
parte1 <- flores[1:10,]
parte2 <- flores[11:150,]

bind_rows(parte1, parte2)
```

```
## # A tibble: 150 x 5
##   Sepal.Length Sepal.Width Petal.Length Petal.Width Species
##   <dbl>         <dbl>         <dbl>         <dbl> <fct>
## 1      5.1      3.5      1.4      0.2 setosa
## 2      4.9      3      1.4      0.2 setosa
## 3      4.7      3.2      1.3      0.2 setosa
## 4      4.6      3.1      1.5      0.2 setosa
## 5      5      3.6      1.4      0.2 setosa
## 6      5.4      3.9      1.7      0.4 setosa
## 7      4.6      3.4      1.4      0.3 setosa
## 8      5      3.4      1.5      0.2 setosa
## 9      4.4      2.9      1.4      0.2 setosa
## 10     4.9      3.1      1.5      0.1 setosa
## # ... with 140 more rows
```

## 4.5 distinct() - remove as linhas que são exatamente iguais

```
flores
```

```
## # A tibble: 150 x 5
##   Sepal.Length Sepal.Width Petal.Length Petal.Width Species
##   <dbl>         <dbl>         <dbl>         <dbl> <fct>
## 1      5.1      3.5      1.4      0.2 setosa
## 2      4.9      3      1.4      0.2 setosa
## 3      4.7      3.2      1.3      0.2 setosa
```

#### 4.6. FILTER() - FILTRA AS LINHAS QUE SATISFAÇÃO ALGUMA CONDIÇÃO

```
## 4      4.6      3.1      1.5      0.2 setosa
## 5      5       3.6      1.4      0.2 setosa
## 6      5.4      3.9      1.7      0.4 setosa
## 7      4.6      3.4      1.4      0.3 setosa
## 8      5       3.4      1.5      0.2 setosa
## 9      4.4      2.9      1.4      0.2 setosa
## 10     4.9      3.1      1.5      0.1 setosa
## # ... with 140 more rows
```

```
flores %>%
  distinct()
```

```
## # A tibble: 149 x 5
##   Sepal.Length Sepal.Width Petal.Length Petal.Width Species
##   <dbl>        <dbl>        <dbl>        <dbl> <fct>
## 1      5.1      3.5          1.4          0.2 setosa
## 2      4.9      3           1.4          0.2 setosa
## 3      4.7      3.2          1.3          0.2 setosa
## 4      4.6      3.1          1.5          0.2 setosa
## 5      5       3.6          1.4          0.2 setosa
## 6      5.4      3.9          1.7          0.4 setosa
## 7      4.6      3.4          1.4          0.3 setosa
## 8      5       3.4          1.5          0.2 setosa
## 9      4.4      2.9          1.4          0.2 setosa
## 10     4.9      3.1          1.5          0.1 setosa
## # ... with 139 more rows
```

```
flores %>%
  distinct() %>%
  count(Species)
```

```
## # A tibble: 3 x 2
##   Species      n
##   <fct>    <int>
## 1 setosa     50
## 2 versicolor 50
## 3 virginica  49
```

#### 4.6 filter() - filtra as linhas que satisfação alguma condição

```
flores %>%
  filter(Species == "setosa")
```

```
## # A tibble: 50 x 5
##   Sepal.Length Sepal.Width Petal.Length Petal.Width Species
##   <dbl>        <dbl>        <dbl>        <dbl> <fct>
## 1         5.1         3.5         1.4         0.2 setosa
## 2         4.9         3         1.4         0.2 setosa
## 3         4.7         3.2         1.3         0.2 setosa
## 4         4.6         3.1         1.5         0.2 setosa
## 5         5         3.6         1.4         0.2 setosa
## 6         5.4         3.9         1.7         0.4 setosa
## 7         4.6         3.4         1.4         0.3 setosa
## 8         5         3.4         1.5         0.2 setosa
## 9         4.4         2.9         1.4         0.2 setosa
## 10        4.9         3.1         1.5         0.1 setosa
## # ... with 40 more rows
```

```
flores %>%
  filter(Species %in% c("setosa", "virginica"))
```

```
## # A tibble: 100 x 5
##   Sepal.Length Sepal.Width Petal.Length Petal.Width Species
##   <dbl>        <dbl>        <dbl>        <dbl> <fct>
## 1         5.1         3.5         1.4         0.2 setosa
## 2         4.9         3         1.4         0.2 setosa
## 3         4.7         3.2         1.3         0.2 setosa
## 4         4.6         3.1         1.5         0.2 setosa
## 5         5         3.6         1.4         0.2 setosa
## 6         5.4         3.9         1.7         0.4 setosa
## 7         4.6         3.4         1.4         0.3 setosa
## 8         5         3.4         1.5         0.2 setosa
## 9         4.4         2.9         1.4         0.2 setosa
## 10        4.9         3.1         1.5         0.1 setosa
## # ... with 90 more rows
```

```
flores %>%
  filter(Sepal.Length >= mean(Sepal.Length))
```

```
## # A tibble: 70 x 5
##   Sepal.Length Sepal.Width Petal.Length Petal.Width Species
##   <dbl>        <dbl>        <dbl>        <dbl> <fct>
## 1         7         3.2         4.7         1.4 versicolor
```



#### 4.6. FILTER() - FILTRA AS LINHAS QUE SATISFAÇÃO ALGUMA CONDIÇÃO

```
##      2      6.4      3.2      4.5      1.5 versicolor
##      3      6.9      3.1      4.9      1.5 versicolor
##      4      6.5      2.8      4.6      1.5 versicolor
##      5      6.3      3.3      4.7      1.6 versicolor
##      6      6.6      2.9      4.6      1.3 versicolor
##      7      5.9      3      4.2      1.5 versicolor
##      8      6      2.2      4      1 versicolor
##      9      6.1      2.9      4.7      1.4 versicolor
##     10      6.7      3.1      4.4      1.4 versicolor
## # ... with 60 more rows
```

```
flores %>%
  filter(Species == "setosa") %>%
  filter(Sepal.Length >= mean(Sepal.Length))
```

```
## # A tibble: 22 x 5
##   Sepal.Length Sepal.Width Petal.Length Petal.Width Species
##   <dbl>         <dbl>         <dbl>         <dbl> <fct>
## 1         5.1         3.5         1.4         0.2 setosa
## 2         5.4         3.9         1.7         0.4 setosa
## 3         5.4         3.7         1.5         0.2 setosa
## 4         5.8         4         1.2         0.2 setosa
## 5         5.7         4.4         1.5         0.4 setosa
## 6         5.4         3.9         1.3         0.4 setosa
## 7         5.1         3.5         1.4         0.3 setosa
## 8         5.7         3.8         1.7         0.3 setosa
## 9         5.1         3.8         1.5         0.3 setosa
## 10        5.4         3.4         1.7         0.2 setosa
## # ... with 12 more rows
```

```
flores %>%
  filter(Petal.Length >= mean(Petal.Length) & Petal.Width >= mean(Petal.Width))
```

```
## # A tibble: 89 x 5
##   Sepal.Length Sepal.Width Petal.Length Petal.Width Species
##   <dbl>         <dbl>         <dbl>         <dbl> <fct>
## 1         7         3.2         4.7         1.4 versicolor
## 2         6.4         3.2         4.5         1.5 versicolor
## 3         6.9         3.1         4.9         1.5 versicolor
## 4         5.5         2.3         4         1.3 versicolor
## 5         6.5         2.8         4.6         1.5 versicolor
## 6         5.7         2.8         4.5         1.3 versicolor
## 7         6.3         3.3         4.7         1.6 versicolor
## 8         6.6         2.9         4.6         1.3 versicolor
```

```
## 9          5.2          2.7          3.9          1.4 versicolor
## 10         5.9          3          4.2          1.5 versicolor
## # ... with 79 more rows
```

```
flores %>%
  filter(Petal.Length >= mean(Petal.Length) & Petal.Width >= mean(Petal.Width)) %>%
  count(Species)
```

```
## # A tibble: 2 x 2
##   Species      n
##   <fct>    <int>
## 1 versicolor    39
## 2 virginica     50
```

## 4.7 group\_by() - agrupa as linhas em função dos valores de alguma variável

*#Ver esta função juntamente com mutate(), transmute() e summarise()*

```
flores %>%
  group_by(Species)
```

```
## # A tibble: 150 x 5
## # Groups:   Species [3]
##   Sepal.Length Sepal.Width Petal.Length Petal.Width Species
##   <dbl>         <dbl>         <dbl>         <dbl> <fct>
## 1          5.1          3.5          1.4          0.2 setosa
## 2          4.9          3          1.4          0.2 setosa
## 3          4.7          3.2          1.3          0.2 setosa
## 4          4.6          3.1          1.5          0.2 setosa
## 5          5          3.6          1.4          0.2 setosa
## 6          5.4          3.9          1.7          0.4 setosa
## 7          4.6          3.4          1.4          0.3 setosa
## 8          5          3.4          1.5          0.2 setosa
## 9          4.4          2.9          1.4          0.2 setosa
## 10         4.9          3.1          1.5          0.1 setosa
## # ... with 140 more rows
```

#### 4.8. `MUTATE()` E `TRANSMUTE()` - ADICIONA NOVAS VARIÁVEIS E PRESERVA AS EXISTENTES; ADICIONA NOVAS VARIÁVEIS E NÃO PRESERVA AS EXISTENTES

### 4.8 `mutate()` e `transmute()` - adiciona novas variáveis e preserva as existentes; adiciona novas variáveis e não preserva as existentes

```
flores %>%  
  mutate(teste = Petal.Length + Sepal.Length)
```

```
## # A tibble: 150 x 6  
##   Sepal.Length Sepal.Width Petal.Length Petal.Width Species teste  
##   <dbl>         <dbl>         <dbl>         <dbl> <fct>    <dbl>  
## 1         5.1         3.5         1.4         0.2 setosa    6.5  
## 2         4.9         3         1.4         0.2 setosa    6.3  
## 3         4.7         3.2         1.3         0.2 setosa    6  
## 4         4.6         3.1         1.5         0.2 setosa    6.1  
## 5         5         3.6         1.4         0.2 setosa    6.4  
## 6         5.4         3.9         1.7         0.4 setosa    7.1  
## 7         4.6         3.4         1.4         0.3 setosa    6  
## 8         5         3.4         1.5         0.2 setosa    6.5  
## 9         4.4         2.9         1.4         0.2 setosa    5.8  
## 10        4.9         3.1         1.5         0.1 setosa    6.4  
## # ... with 140 more rows
```

```
flores %>%  
  group_by(Species) %>%  
  mutate(PL_media = mean(Petal.Length))
```

```
## # A tibble: 150 x 6  
## # Groups:   Species [3]  
##   Sepal.Length Sepal.Width Petal.Length Petal.Width Species PL_media  
##   <dbl>         <dbl>         <dbl>         <dbl> <fct>    <dbl>  
## 1         5.1         3.5         1.4         0.2 setosa    1.46  
## 2         4.9         3         1.4         0.2 setosa    1.46  
## 3         4.7         3.2         1.3         0.2 setosa    1.46  
## 4         4.6         3.1         1.5         0.2 setosa    1.46  
## 5         5         3.6         1.4         0.2 setosa    1.46  
## 6         5.4         3.9         1.7         0.4 setosa    1.46  
## 7         4.6         3.4         1.4         0.3 setosa    1.46  
## 8         5         3.4         1.5         0.2 setosa    1.46  
## 9         4.4         2.9         1.4         0.2 setosa    1.46  
## 10        4.9         3.1         1.5         0.1 setosa    1.46  
## # ... with 140 more rows
```

```
flores %>%
  group_by(Species) %>%
  transmute(PL.média = mean(Petal.Length))
```

```
## # A tibble: 150 x 2
## # Groups:   Species [3]
##   Species PL.média
##   <fct>     <dbl>
## 1 setosa     1.46
## 2 setosa     1.46
## 3 setosa     1.46
## 4 setosa     1.46
## 5 setosa     1.46
## 6 setosa     1.46
## 7 setosa     1.46
## 8 setosa     1.46
## 9 setosa     1.46
## 10 setosa    1.46
## # ... with 140 more rows
```

```
flores %>%
  group_by(Species) %>%
  transmute(PL.média = mean(Petal.Length),
            SL.média = mean(Sepal.Length))
```

```
## # A tibble: 150 x 3
## # Groups:   Species [3]
##   Species PL.média SL.média
##   <fct>     <dbl>     <dbl>
## 1 setosa     1.46       5.01
## 2 setosa     1.46       5.01
## 3 setosa     1.46       5.01
## 4 setosa     1.46       5.01
## 5 setosa     1.46       5.01
## 6 setosa     1.46       5.01
## 7 setosa     1.46       5.01
## 8 setosa     1.46       5.01
## 9 setosa     1.46       5.01
## 10 setosa    1.46       5.01
## # ... with 140 more rows
```

## 4.9 na\_if() - Substitui o valor especificado por NA

```
flores %>%
  mutate(Species = na_if(Species, "setosa"))
```

```
## # A tibble: 150 x 5
##   Sepal.Length Sepal.Width Petal.Length Petal.Width Species
##   <dbl>        <dbl>        <dbl>        <dbl> <fct>
## 1         5.1         3.5         1.4         0.2 <NA>
## 2         4.9         3          1.4         0.2 <NA>
## 3         4.7         3.2         1.3         0.2 <NA>
## 4         4.6         3.1         1.5         0.2 <NA>
## 5         5          3.6         1.4         0.2 <NA>
## 6         5.4         3.9         1.7         0.4 <NA>
## 7         4.6         3.4         1.4         0.3 <NA>
## 8         5          3.4         1.5         0.2 <NA>
## 9         4.4         2.9         1.4         0.2 <NA>
## 10        4.9         3.1         1.5         0.1 <NA>
## # ... with 140 more rows
```

```
flores %>%
  mutate(Petal.Length = na_if(Petal.Length, 1.4))
```

```
## # A tibble: 150 x 5
##   Sepal.Length Sepal.Width Petal.Length Petal.Width Species
##   <dbl>        <dbl>        <dbl>        <dbl> <fct>
## 1         5.1         3.5         NA          0.2 setosa
## 2         4.9         3          NA          0.2 setosa
## 3         4.7         3.2         1.3         0.2 setosa
## 4         4.6         3.1         1.5         0.2 setosa
## 5         5          3.6         NA          0.2 setosa
## 6         5.4         3.9         1.7         0.4 setosa
## 7         4.6         3.4         NA          0.3 setosa
## 8         5          3.4         1.5         0.2 setosa
## 9         4.4         2.9         NA          0.2 setosa
## 10        4.9         3.1         1.5         0.1 setosa
## # ... with 140 more rows
```

```
flores %>%
  mutate(Sepal.Length = na_if(Sepal.Length, 5.1))
```

```
## # A tibble: 150 x 5
##   Sepal.Length Sepal.Width Petal.Length Petal.Width Species
##         <dbl>         <dbl>         <dbl>         <dbl> <fct>
## 1           NA           3.5           1.4           0.2 setosa
## 2           4.9           3           1.4           0.2 setosa
## 3           4.7           3.2           1.3           0.2 setosa
## 4           4.6           3.1           1.5           0.2 setosa
## 5           5           3.6           1.4           0.2 setosa
## 6           5.4           3.9           1.7           0.4 setosa
## 7           4.6           3.4           1.4           0.3 setosa
## 8           5           3.4           1.5           0.2 setosa
## 9           4.4           2.9           1.4           0.2 setosa
## 10          4.9           3.1           1.5           0.1 setosa
## # ... with 140 more rows
```

#### 4.10 recode() e recode\_factor() - substitui um determinado valor por outro, se variável for numérica usar recode(), se for fator usar recode\_factor()

```
flores %>%
  mutate(Sepal.Length = recode(Sepal.Length, `5.1` = 0))
```

```
## # A tibble: 150 x 5
##   Sepal.Length Sepal.Width Petal.Length Petal.Width Species
##         <dbl>         <dbl>         <dbl>         <dbl> <fct>
## 1           0           3.5           1.4           0.2 setosa
## 2           4.9           3           1.4           0.2 setosa
## 3           4.7           3.2           1.3           0.2 setosa
## 4           4.6           3.1           1.5           0.2 setosa
## 5           5           3.6           1.4           0.2 setosa
## 6           5.4           3.9           1.7           0.4 setosa
## 7           4.6           3.4           1.4           0.3 setosa
## 8           5           3.4           1.5           0.2 setosa
## 9           4.4           2.9           1.4           0.2 setosa
## 10          4.9           3.1           1.5           0.1 setosa
## # ... with 140 more rows
```

```
flores %>%
  mutate(Species = recode_factor(Species, setosa = "sts"))
```

```
## # A tibble: 150 x 5
##   Sepal.Length Sepal.Width Petal.Length Petal.Width Species
##   <dbl>         <dbl>         <dbl>         <dbl> <fct>
## 1         5.1         3.5         1.4         0.2 sts
## 2         4.9         3         1.4         0.2 sts
## 3         4.7         3.2         1.3         0.2 sts
## 4         4.6         3.1         1.5         0.2 sts
## 5         5         3.6         1.4         0.2 sts
## 6         5.4         3.9         1.7         0.4 sts
## 7         4.6         3.4         1.4         0.3 sts
## 8         5         3.4         1.5         0.2 sts
## 9         4.4         2.9         1.4         0.2 sts
## 10        4.9         3.1         1.5         0.1 sts
## # ... with 140 more rows
```

## 4.11 relocate() - altera a ordem das variáveis

```
flores %>%
  relocate(Species, .before = Sepal.Length)
```

```
## # A tibble: 150 x 5
##   Species Sepal.Length Sepal.Width Petal.Length Petal.Width
##   <fct>         <dbl>         <dbl>         <dbl>         <dbl>
## 1 setosa         5.1         3.5         1.4         0.2
## 2 setosa         4.9         3         1.4         0.2
## 3 setosa         4.7         3.2         1.3         0.2
## 4 setosa         4.6         3.1         1.5         0.2
## 5 setosa         5         3.6         1.4         0.2
## 6 setosa         5.4         3.9         1.7         0.4
## 7 setosa         4.6         3.4         1.4         0.3
## 8 setosa         5         3.4         1.5         0.2
## 9 setosa         4.4         2.9         1.4         0.2
## 10 setosa        4.9         3.1         1.5         0.1
## # ... with 140 more rows
```

## 4.12 rename() - altera o nome das variáveis

```
flores %>%
  rename(sp = Species)
```

```
## # A tibble: 150 x 5
##   Sepal.Length Sepal.Width Petal.Length Petal.Width sp
##         <dbl>         <dbl>         <dbl>         <dbl> <fct>
## 1         5.1           3.5           1.4           0.2 setosa
## 2         4.9           3             1.4           0.2 setosa
## 3         4.7           3.2           1.3           0.2 setosa
## 4         4.6           3.1           1.5           0.2 setosa
## 5         5             3.6           1.4           0.2 setosa
## 6         5.4           3.9           1.7           0.4 setosa
## 7         4.6           3.4           1.4           0.3 setosa
## 8         5             3.4           1.5           0.2 setosa
## 9         4.4           2.9           1.4           0.2 setosa
## 10        4.9           3.1           1.5           0.1 setosa
## # ... with 140 more rows
```

### 4.13 select() - Seleciona variáveis

```
flores %>%
  select(Species)
```

```
## # A tibble: 150 x 1
##   Species
##   <fct>
## 1 setosa
## 2 setosa
## 3 setosa
## 4 setosa
## 5 setosa
## 6 setosa
## 7 setosa
## 8 setosa
## 9 setosa
## 10 setosa
## # ... with 140 more rows
```

```
flores %>%
  select(starts_with("Sepal"))
```

```
## # A tibble: 150 x 2
##   Sepal.Length Sepal.Width
##         <dbl>         <dbl>
## 1         5.1           3.5
```



```
## 2      4.9      3
## 3      4.7      3.2
## 4      4.6      3.1
## 5      5       3.6
## 6      5.4      3.9
## 7      4.6      3.4
## 8      5       3.4
## 9      4.4      2.9
## 10     4.9      3.1
## # ... with 140 more rows
```

```
flores %>%
  select(ends_with("Length"))
```

```
## # A tibble: 150 x 2
##   Sepal.Length Petal.Length
##   <dbl>         <dbl>
## 1      5.1      1.4
## 2      4.9      1.4
## 3      4.7      1.3
## 4      4.6      1.5
## 5      5       1.4
## 6      5.4      1.7
## 7      4.6      1.4
## 8      5       1.5
## 9      4.4      1.4
## 10     4.9      1.5
## # ... with 140 more rows
```

```
flores %>%
  select(Species, Sepal.Length)
```

```
## # A tibble: 150 x 2
##   Species Sepal.Length
##   <fct>         <dbl>
## 1 setosa      5.1
## 2 setosa      4.9
## 3 setosa      4.7
## 4 setosa      4.6
## 5 setosa      5
## 6 setosa      5.4
## 7 setosa      4.6
## 8 setosa      5
## 9 setosa      4.4
```

```
## 10 setosa          4.9
## # ... with 140 more rows
```

## 4.14 slice() - Selecciona linhas

```
flores %>%
  slice(3:15)
```

```
## # A tibble: 13 x 5
##   Sepal.Length Sepal.Width Petal.Length Petal.Width Species
##   <dbl>         <dbl>         <dbl>         <dbl> <fct>
## 1         4.7         3.2         1.3         0.2 setosa
## 2         4.6         3.1         1.5         0.2 setosa
## 3         5         3.6         1.4         0.2 setosa
## 4         5.4         3.9         1.7         0.4 setosa
## 5         4.6         3.4         1.4         0.3 setosa
## 6         5         3.4         1.5         0.2 setosa
## 7         4.4         2.9         1.4         0.2 setosa
## 8         4.9         3.1         1.5         0.1 setosa
## 9         5.4         3.7         1.5         0.2 setosa
## 10        4.8         3.4         1.6         0.2 setosa
## 11        4.8         3         1.4         0.1 setosa
## 12        4.3         3         1.1         0.1 setosa
## 13        5.8         4         1.2         0.2 setosa
```

```
flores %>%
  slice_sample(n = 10)
```

```
## # A tibble: 10 x 5
##   Sepal.Length Sepal.Width Petal.Length Petal.Width Species
##   <dbl>         <dbl>         <dbl>         <dbl> <fct>
## 1         4.4         3.2         1.3         0.2 setosa
## 2         5.7         2.5         5         2 virginica
## 3         5.5         3.5         1.3         0.2 setosa
## 4         7.7         3.8         6.7         2.2 virginica
## 5         5.8         2.7         3.9         1.2 versicolor
## 6         5.5         2.4         3.7         1 versicolor
## 7         6.6         2.9         4.6         1.3 versicolor
## 8         6.1         2.8         4         1.3 versicolor
## 9         5.1         3.5         1.4         0.2 setosa
## 10        5.6         3         4.5         1.5 versicolor
```

```
flores %>%
  slice_min(Petal.Length, n = 10)
```

```
## # A tibble: 11 x 5
##   Sepal.Length Sepal.Width Petal.Length Petal.Width Species
##   <dbl>         <dbl>         <dbl>         <dbl> <fct>
## 1         4.6         3.6           1           0.2 setosa
## 2         4.3         3             1.1         0.1 setosa
## 3         5.8         4             1.2         0.2 setosa
## 4         5         3.2           1.2         0.2 setosa
## 5         4.7         3.2           1.3         0.2 setosa
## 6         5.4         3.9           1.3         0.4 setosa
## 7         5.5         3.5           1.3         0.2 setosa
## 8         4.4         3             1.3         0.2 setosa
## 9         5         3.5           1.3         0.3 setosa
## 10        4.5         2.3           1.3         0.3 setosa
## 11        4.4         3.2           1.3         0.2 setosa
```

```
flores %>%
  slice_max(Petal.Length, n = 10)
```

```
## # A tibble: 11 x 5
##   Sepal.Length Sepal.Width Petal.Length Petal.Width Species
##   <dbl>         <dbl>         <dbl>         <dbl> <fct>
## 1         7.7         2.6           6.9         2.3 virginica
## 2         7.7         3.8           6.7         2.2 virginica
## 3         7.7         2.8           6.7         2   virginica
## 4         7.6         3             6.6         2.1 virginica
## 5         7.9         3.8           6.4         2   virginica
## 6         7.3         2.9           6.3         1.8 virginica
## 7         7.2         3.6           6.1         2.5 virginica
## 8         7.4         2.8           6.1         1.9 virginica
## 9         7.7         3             6.1         2.3 virginica
## 10        6.3         3.3           6           2.5 virginica
## 11        7.2         3.2           6           1.8 virginica
```

## 4.15 summarise() - sumariza os dados

```
flores %>%
  group_by(Species) %>%
  summarise(N = n(),
```

```
PL.média = mean(Petal.Length),  
SL.média = mean(Sepal.Length),  
PW.média = mean(Petal.Width),  
SW.média = mean(Sepal.Width))
```

```
## # A tibble: 3 x 6  
##   Species      N PL.média SL.média PW.média SW.média  
##   <fct>    <int>   <dbl>   <dbl>   <dbl>   <dbl>  
## 1 setosa     50    1.46    5.01    0.246    3.43  
## 2 versicolor 50    4.26    5.94    1.33     2.77  
## 3 virginica  50    5.55    6.59    2.03     2.97
```

## Chapter 5

### *tidyr*

#### 5.1 `drop_na()` - remove as linhas com NA

```
starwars %>%  
  select(hair_color) %>%  
  drop_na()
```

```
## # A tibble: 82 x 1  
##   hair_color  
##   <chr>  
## 1 blond  
## 2 none  
## 3 brown  
## 4 brown, grey  
## 5 brown  
## 6 black  
## 7 auburn, white  
## 8 blond  
## 9 auburn, grey  
## 10 brown  
## # ... with 72 more rows
```

```
starwars %>%  
  drop_na()
```

```
## # A tibble: 6 x 14  
##   name      height  mass hair_color  skin_color eye_color birth_year sex  gender
```

```
##   <chr>      <int> <dbl> <chr>      <chr>      <chr>      <dbl> <chr> <chr>
## 1 Luke Sk~   172    77 blond      fair       blue       19   male  mascu~
## 2 Obi-Wan~   182    77 auburn, wh~ fair       blue-gray   57   male  mascu~
## 3 Anakin ~   188    84 blond      fair       blue       41.9 male  mascu~
## 4 Chewbac~   228   112 brown      unknown    blue       200   male  mascu~
## 5 Wedge A~   170    77 brown      fair       hazel      21   male  mascu~
## 6 Darth M~   175    80 none       red        yellow     54   male  mascu~
## # ... with 5 more variables: homeworld <chr>, species <chr>, films <list>,
## #   vehicles <list>, starships <list>
```

## 5.2 replace\_na() - Substitui os valores de NA por outro valor

```
starwars %>%
  replace_na(list(hair_color = "orange"))
```

```
## # A tibble: 87 x 14
##   name      height mass hair_color skin_color eye_color birth_year sex  gender
##   <chr>    <int> <dbl> <chr>      <chr>      <chr>      <dbl> <chr> <chr>
## 1 Luke S~   172    77 blond      fair       blue       19   male  mascu~
## 2 C-3P0    167    75 orange     gold       yellow     112   none  mascu~
## 3 R2-D2     96    32 orange     white, bl~ red       33   none  mascu~
## 4 Darth ~   202   136 none       white      yellow     41.9 male  mascu~
## 5 Leia O~   150    49 brown      light      brown      19   fema~ femin~
## 6 Owen L~   178   120 brown, grey light      blue       52   male  mascu~
## 7 Beru W~   165    75 brown      light      blue       47   fema~ femin~
## 8 R5-D4     97    32 orange     white, red red       NA   none  mascu~
## 9 Biggs ~   183    84 black      light      brown      24   male  mascu~
## 10 Obi-Wa~  182    77 auburn, wh~ fair       blue-gray   57   male  mascu~
## # ... with 77 more rows, and 5 more variables: homeworld <chr>, species <chr>,
## #   films <list>, vehicles <list>, starships <list>
```

## 5.3 pivot\_longer() e pivot\_wider() - Aumenta o número de linhas e diminui o número de colunas; aumenta o número de colunas e diminui o número de linhas

### 5.3. PIVOT\_LONGER() E PIVOT\_WIDER() - AUMENTA O NÚMERO DE LINHAS E DIMINUI O NÚMERO DE COLUNAS

```
starwars[1:10,] %>%  
  select(homeworld, skin_color, mass) %>%  
  pivot_wider(names_from = homeworld, values_from = mass, values_fn = list)
```

```
## # A tibble: 6 x 5  
##   skin_color Tatooine Naboo Alderaan Stewjon  
##   <chr>         <list> <list> <list> <list>  
## 1 fair         <dbl [1]> <NULL> <NULL> <dbl [1]>  
## 2 gold         <dbl [1]> <NULL> <NULL> <NULL>  
## 3 white, blue  <NULL> <dbl [1]> <NULL> <NULL>  
## 4 white        <dbl [1]> <NULL> <NULL> <NULL>  
## 5 light        <dbl [3]> <NULL> <dbl [1]> <NULL>  
## 6 white, red   <dbl [1]> <NULL> <NULL> <NULL>
```

```
starwars[1:10,] %>%  
  select(homeworld, skin_color, mass) %>%  
  pivot_wider(names_from = homeworld, values_from = mass, values_fn = list) %>%  
  view()
```

```
starwars[1:10,] %>%  
  select(homeworld, skin_color, mass) %>%  
  pivot_wider(names_from = homeworld, values_from = mass) %>%  
  unchop(c(2:5))
```

```
## Warning: Values are not uniquely identified; output will contain list-cols.  
## * Use `values_fn = list` to suppress this warning.  
## * Use `values_fn = length` to identify where the duplicates arise  
## * Use `values_fn = {summary_fun}` to summarise duplicates
```

```
## # A tibble: 8 x 5  
##   skin_color Tatooine Naboo Alderaan Stewjon  
##   <chr>         <dbl> <dbl> <dbl> <dbl>  
## 1 fair         77    NA    NA    77  
## 2 gold         75    NA    NA    NA  
## 3 white, blue   NA    32    NA    NA  
## 4 white        136   NA    NA    NA  
## 5 light        120   NA    49    NA  
## 6 light         75   NA    49    NA  
## 7 light         84   NA    49    NA  
## 8 white, red    32    NA    NA    NA
```

```
starwars[1:10,] %>%
  select(skin_color, homeworld, mass) %>%
  pivot_wider(names_from = homeworld, values_from = mass) %>%
  pivot_longer(cols = 2:5, names_to = "homeworld", values_to = "mass")
```

```
## Warning: Values are not uniquely identified; output will contain list-cols.
## * Use `values_fn = list` to suppress this warning.
## * Use `values_fn = length` to identify where the duplicates arise
## * Use `values_fn = {summary_fun}` to summarise duplicates
```

```
## # A tibble: 24 x 3
##   skin_color homeworld mass
##   <chr>      <chr>    <list>
## 1 fair      Tatooine  <dbl [1]>
## 2 fair      Naboo    <NULL>
## 3 fair      Alderaan <NULL>
## 4 fair      Stewjon  <dbl [1]>
## 5 gold      Tatooine  <dbl [1]>
## 6 gold      Naboo    <NULL>
## 7 gold      Alderaan <NULL>
## 8 gold      Stewjon  <NULL>
## 9 white, blue Tatooine <NULL>
## 10 white, blue Naboo   <dbl [1]>
## # ... with 14 more rows
```

```
starwars[1:10,] %>%
  select(homeworld, skin_color, mass) %>%
  pivot_wider(names_from = homeworld, values_from = mass) %>%
  pivot_longer(cols = 2:5, names_to = "homeworld", values_to = "mass") %>%
  unchop(everything()) %>%
  drop_na()
```

```
## Warning: Values are not uniquely identified; output will contain list-cols.
## * Use `values_fn = list` to suppress this warning.
## * Use `values_fn = length` to identify where the duplicates arise
## * Use `values_fn = {summary_fun}` to summarise duplicates
```

```
## # A tibble: 10 x 3
##   skin_color homeworld mass
##   <chr>      <chr>    <dbl>
## 1 fair      Tatooine    77
## 2 fair      Stewjon    77
## 3 gold      Tatooine    75
```



#### 5.4. *SEPARATE()* E *UNITE()* - SEPARA UMA COLUNA EM MÚLTIPLAS COLUNAS; UNE MÚLTIPLAS COLUNAS

```
## 4 white, blue Naboo      32
## 5 white      Tatooine   136
## 6 light      Tatooine   120
## 7 light      Tatooine    75
## 8 light      Tatooine    84
## 9 light      Alderaan    49
## 10 white, red Tatooine   32
```

#### 5.4 separate() e unite() - Separa uma coluna em múltiplas colunas; Une múltiplas colunas

```
starwars[1:10,] %>%
  select(sex, gender, homeworld) %>%
  unite("sexgender", sex:gender, sep = "-")
```

```
## # A tibble: 10 x 2
##   sexgender      homeworld
##   <chr>          <chr>
## 1 male-masculine Tatooine
## 2 none-masculine Tatooine
## 3 none-masculine Naboo
## 4 male-masculine Tatooine
## 5 female-feminine Alderaan
## 6 male-masculine Tatooine
## 7 female-feminine Tatooine
## 8 none-masculine Tatooine
## 9 male-masculine Tatooine
## 10 male-masculine Stewjon
```

```
starwars[1:10,] %>%
  select(sex, gender, homeworld) %>%
  unite("sexgender", sex:gender, sep = "-") %>%
  separate(sexgender, c("sex", "gender"), sep = "-")
```

```
## # A tibble: 10 x 3
##   sex  gender homeworld
##   <chr> <chr>    <chr>
## 1 male  masculine Tatooine
## 2 none  masculine Tatooine
## 3 none  masculine Naboo
## 4 male  masculine Tatooine
```

```
## 5 female feminine Alderaan
## 6 male   masculine Tatooine
## 7 female feminine Tatooine
## 8 none   masculine Tatooine
## 9 male   masculine Tatooine
## 10 male   masculine Stewjon
```

## 5.5 fill() - Preenche as células com NA com o valor posterior ou anterior da mesma coluna

```
starwars %>%
  select(hair_color) %>%
  fill(hair_color)
```

```
## # A tibble: 87 x 1
##   hair_color
##   <chr>
## 1 blond
## 2 blond
## 3 blond
## 4 none
## 5 brown
## 6 brown, grey
## 7 brown
## 8 brown
## 9 black
## 10 auburn, white
## # ... with 77 more rows
```

## Chapter 6

# Integrando os pacotes *tibble*, *dplyr*, *tidyr* e *magrittr*

Importar o arquivo excel de nome “dados” presente na página para resolução desta tarefa.

```
#dados <- tibble(dados)

#dados %>%
#  distinct()

#dados %>%
#  count(especie, experimento)

#dados %>%
#  select(1:4) %>%
#  distinct() %>%
#  filter(especie %in% c("sp1", "sp2", "sp3")) %>%
#  pivot_wider(id_cols = c(especie, experimento),
#              names_from = replica,
#              values_from = mortalidade) %>%
#  arrange(especie,
#          factor(experimento, levels = c("baixa", "media", "alta"))) %>%
#  select(1:5)
```



## Chapter 7

### Exercício

Importar o arquivo excel de nome “tarefa” presente na página para resolução destes exercícios.

1 - Faça a conversão da planilha para a tabela a seguir utilizando as funções acima. Tente executar com apenas um comando e o mínimo de funções possíveis.

**Utilize o operador pipe: %>%”. Se houver observações iguais remova-as**

2 - Converta as seguintes tabelas (salinidade, temperatura, pH e mortalidade) para a seguinte planilha. Tente executar com mínimo de funções possíveis.

**Dica: converta cada tabela em uma planilha e as uma como colunas. “Utilize o operador pipe: %>%”. Se houver observações iguais remova-as**



## Chapter 8

## Resposta exercício