Booleans

made with flipbookr and xaringan

Gina Reynolds, January 2020

```
library(gapminder)
library(tidyverse)
```

```
## ── Attaching packages ─────────────────────────────────────── tidyverse 1.3.0 ──

## ✓ ggplot2 3.3.2     ✓ purrr   0.3.3
## ✓ tibble  3.0.0     ✓ dplyr   0.8.5
## ✓ tidyr   1.0.2     ✓ stringr 1.4.0
## ✓ readr   1.3.1     ✓ forcats 0.5.0

## Warning: package 'ggplot2' was built under R version 3.6.2

## Warning: package 'tibble' was built under R version 3.6.2

## ── Conflicts ────────────────────────────────────────── tidyverse_conflicts() ──
## x dplyr::filter() masks stats::filter()
## x dplyr::lag()    masks stats::lag()
```

```
knitr::opts_chunk$set(cache = F, comment = "")
```

```
5 == 5
```

```
[1] TRUE
```

```r
5 == 5
5 != 5
```

```
[1] TRUE

[1] FALSE
```

```r
5 == 5
5 != 5
5 != 9
```

```
[1] TRUE

[1] FALSE

[1] TRUE
```

```r
5 == 5
5 != 5
5 != 9
"blue" == "blue"
```

```
[1] TRUE

[1] FALSE

[1] TRUE

[1] TRUE
```

```r
5 == 5
5 != 5
5 != 9
"blue" == "blue"
"red" == "blue"
```

```
[1] TRUE

[1] FALSE

[1] TRUE

[1] TRUE

[1] FALSE
```

```r
5 == 5
5 != 5
5 != 9
"blue" == "blue"
"red" == "blue"
"Blue" == "blue"
```

```
[1] TRUE

[1] FALSE

[1] TRUE

[1] TRUE

[1] FALSE

[1] FALSE
```

```r
5 == 5
5 != 5
5 != 9
"blue" == "blue"
"red" == "blue"
"Blue" == "blue"
"Blue" != "blue"
```

```
[1] TRUE

[1] FALSE

[1] TRUE

[1] TRUE

[1] FALSE

[1] FALSE

[1] TRUE
```

```r
5 == 5
5 != 5
5 != 9
"blue" == "blue"
"red" == "blue"
"Blue" == "blue"
"Blue" != "blue"
5 > 3
```

```
[1] TRUE

[1] FALSE

[1] TRUE

[1] TRUE

[1] FALSE

[1] FALSE

[1] TRUE

[1] TRUE
```

```r
5 == 5
5 != 5
5 != 9
"blue" == "blue"
"red" == "blue"
"Blue" == "blue"
"Blue" != "blue"
5 > 3
5 >= 5
```

```
[1] TRUE

[1] FALSE

[1] TRUE

[1] TRUE

[1] FALSE

[1] FALSE

[1] TRUE

[1] TRUE

[1] TRUE
```

```r
5 == 5
5 != 5
5 != 9
"blue" == "blue"
"red" == "blue"
"Blue" == "blue"
"Blue" != "blue"
5 > 3
5 >= 5
5 < 3
```

```
[1] TRUE

[1] FALSE

[1] TRUE

[1] TRUE

[1] FALSE

[1] FALSE

[1] TRUE

[1] TRUE

[1] TRUE

[1] FALSE
```

```r
5 == 5
5 != 5
5 != 9
"blue" == "blue"
"red" == "blue"
"Blue" == "blue"
"Blue" != "blue"
5 > 3
5 >= 5
5 < 3
5 <= 3
```

```
[1] TRUE

[1] FALSE

[1] TRUE

[1] TRUE

[1] FALSE

[1] FALSE

[1] TRUE

[1] TRUE

[1] TRUE

[1] FALSE

[1] FALSE
```

```r
TRUE & TRUE
```

```
[1] TRUE
```

```r
TRUE & TRUE
FALSE & TRUE
```

```
[1] TRUE

[1] FALSE
```

```r
TRUE & TRUE
FALSE & TRUE
TRUE | FALSE
```

```
[1] TRUE

[1] FALSE

[1] TRUE
```

```r
TRUE & TRUE
FALSE & TRUE
TRUE | FALSE
FALSE | FALSE
```

```
[1] TRUE

[1] FALSE

[1] TRUE

[1] FALSE
```

```r
TRUE & TRUE
FALSE & TRUE
TRUE | FALSE
FALSE | FALSE
5 %in% c(1, 5, 8, 9)
```

```
[1] TRUE

[1] FALSE

[1] TRUE

[1] FALSE

[1] TRUE
```

```r
TRUE & TRUE
FALSE & TRUE
TRUE | FALSE
FALSE | FALSE
5 %in% c(1, 5, 8, 9)
2 %in% c(1, 5, 8, 9)
```

```
[1] TRUE

[1] FALSE

[1] TRUE

[1] FALSE

[1] TRUE

[1] FALSE
```

```r
TRUE & TRUE
FALSE & TRUE
TRUE | FALSE
FALSE | FALSE
5 %in% c(1, 5, 8, 9)
2 %in% c(1, 5, 8, 9)
c(2, 5) %in% c(1, 5, 8, 9)
```

```
[1] TRUE

[1] FALSE

[1] TRUE

[1] FALSE

[1] TRUE

[1] FALSE

[1] FALSE  TRUE
```

```r
TRUE & TRUE
FALSE & TRUE
TRUE | FALSE
FALSE | FALSE
5 %in% c(1, 5, 8, 9)
2 %in% c(1, 5, 8, 9)
c(2, 5) %in% c(1, 5, 8, 9)
c(1, 5, 8, 9) %in% 5
```

```
[1] TRUE

[1] FALSE

[1] TRUE

[1] FALSE

[1] TRUE

[1] FALSE

[1] FALSE  TRUE

[1] FALSE  TRUE FALSE FALSE
```

```
gapminder
```

```
# A tibble: 1,704 x 6
   country     continent  year lifeExp      pop gdpPercap
   <fct>       <fct>     <int>   <dbl>    <int>     <dbl>
 1 Afghanistan Asia       1952    28.8  8425333      779.
 2 Afghanistan Asia       1957    30.3  9240934      821.
 3 Afghanistan Asia       1962    32.0 10267083      853.
 4 Afghanistan Asia       1967    34.0 11537966      836.
 5 Afghanistan Asia       1972    36.1 13079460      740.
 6 Afghanistan Asia       1977    38.4 14880372      786.
 7 Afghanistan Asia       1982    39.9 12881816      978.
 8 Afghanistan Asia       1987    40.8 13867957      852.
 9 Afghanistan Asia       1992    41.7 16317921      649.
10 Afghanistan Asia       1997    41.8 22227415      635.
# … with 1,694 more rows
```

```
gapminder %>%
  filter(pop > 100000000 &
         gdpPercap > 5000)
```

```
# A tibble: 30 x 6
   country continent  year lifeExp       pop gdpPercap
   <fct>   <fct>     <int>   <dbl>     <int>     <dbl>
 1 Brazil  Americas   1977    61.5 114313951     6660.
 2 Brazil  Americas   1982    63.3 128962939     7031.
 3 Brazil  Americas   1987    65.2 142938076     7807.
 4 Brazil  Americas   1992    67.1 155975974     6950.
 5 Brazil  Americas   1997    69.4 168546719     7958.
 6 Brazil  Americas   2002    71.0 179914212     8131.
 7 Brazil  Americas   2007    72.4 190010647     9066.
 8 Japan   Asia       1967    71.4 100825279     9848.
 9 Japan   Asia       1972    73.4 107188273    14779.
10 Japan   Asia       1977    75.4 113872473    16610.
# … with 20 more rows
```

```r
gapminder %>%
  filter(pop > 100000000 &
         gdpPercap > 5000) %>%
  filter(year > 1995)
```

```
# A tibble: 11 x 6
   country       continent  year lifeExp       pop gdpPercap
   <fct>         <fct>     <int>   <dbl>     <int>     <dbl>
 1 Brazil        Americas   1997    69.4 168546719     7958.
 2 Brazil        Americas   2002    71.0 179914212     8131.
 3 Brazil        Americas   2007    72.4 190010647     9066.
 4 Japan         Asia       1997    80.7 125956499    28817.
 5 Japan         Asia       2002    82   127065841    28605.
 6 Japan         Asia       2007    82.6 127467972    31656.
 7 Mexico        Americas   2002    74.9 102479927    10742.
 8 Mexico        Americas   2007    76.2 108700891    11978.
 9 United States Americas   1997    76.8 272911760    35767.
10 United States Americas   2002    77.3 287675526    39097.
11 United States Americas   2007    78.2 301139947    42952.
```

```r
gapminder %>%
  filter(pop > 100000000 &
         gdpPercap > 5000) %>%
  filter(year > 1995) %>%
  filter(country == "Brazil" |
         country == "Mexico" |
         country == "United States")
```

```
# A tibble: 8 x 6
  country       continent  year lifeExp       pop gdpPercap
  <fct>         <fct>     <int>   <dbl>     <int>     <dbl>
1 Brazil        Americas   1997    69.4 168546719     7958.
2 Brazil        Americas   2002    71.0 179914212     8131.
3 Brazil        Americas   2007    72.4 190010647     9066.
4 Mexico        Americas   2002    74.9 102479927    10742.
5 Mexico        Americas   2007    76.2 108700891    11978.
6 United States Americas   1997    76.8 272911760    35767.
7 United States Americas   2002    77.3 287675526    39097.
8 United States Americas   2007    78.2 301139947    42952.
```

```r
gapminder %>%
  filter(pop > 100000000 &
         gdpPercap > 5000) %>%
  filter(year > 1995) %>%
  filter(country == "Brazil" |
         country == "Mexico" |
         country == "United States") %>%
  filter(country %in% c("United States", "Mexico"))
```

```
# A tibble: 5 x 6
  country       continent  year lifeExp       pop gdpPercap
  <fct>         <fct>     <int>   <dbl>     <int>     <dbl>
1 Mexico        Americas   2002    74.9 102479927    10742.
2 Mexico        Americas   2007    76.2 108700891    11978.
3 United States Americas   1997    76.8 272911760    35767.
4 United States Americas   2002    77.3 287675526    39097.
5 United States Americas   2007    78.2 301139947    42952.
```