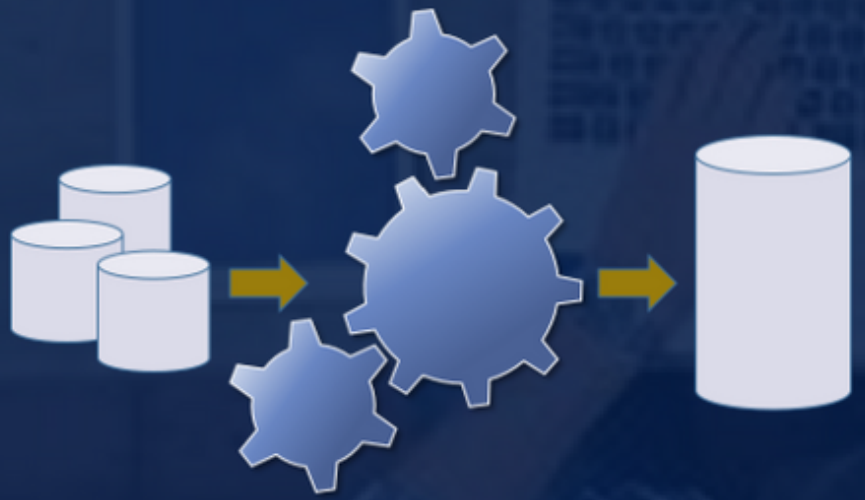
Rsquared Academy



Data Wrangling with dplyr

Agenda

- extract unique rows
- rename columns
- sample data
- extract columns
- slice rows

- arrange rows
- compare tables
- extract/mutate data using predicate functions
- count observations for different levels of a variable

Libraries

```
library(dplyr)
library(readr)
```

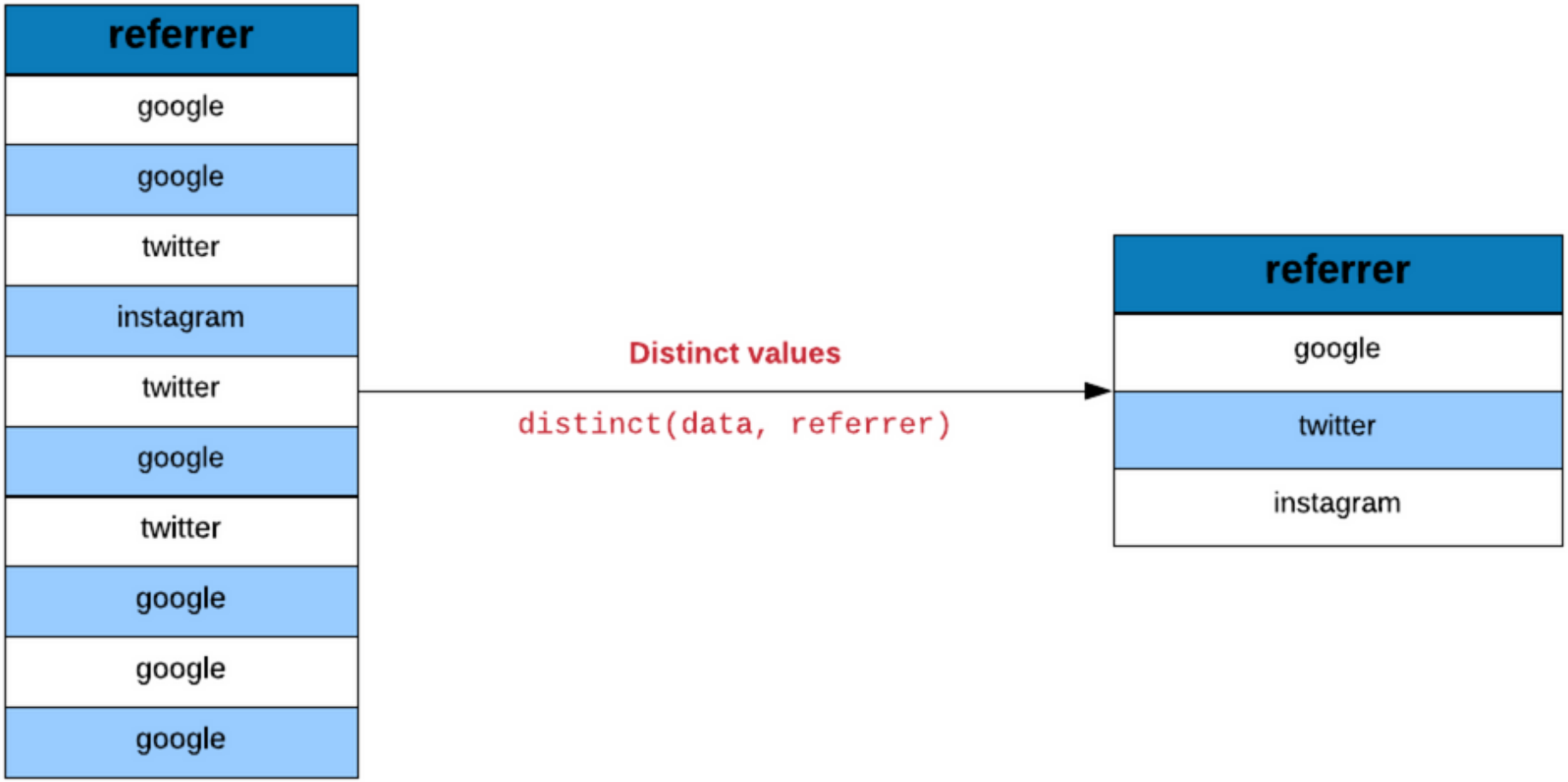
```
## # A tibble: 1,000 x 7
##    referrer device bouncers n_visit n_pages duration purchase
##    <fct>    <fct>  <lgl>      <dbl>   <dbl>    <dbl> <lgl>
##  1 google   laptop TRUE          10       1      693 FALSE
##  2 yahoo    tablet TRUE           9       1      459 FALSE
##  3 direct   laptop TRUE           0       1      996 FALSE
##  4 bing     tablet FALSE          3      18      468 TRUE
##  5 yahoo    mobile TRUE           9       1      955 FALSE
##  6 yahoo    laptop FALSE          5       5      135 FALSE
##  7 yahoo    mobile TRUE          10       1       75 FALSE
##  8 direct   mobile TRUE          10       1      908 FALSE
##  9 bing     mobile FALSE          3      19      209 FALSE
## 10 google   mobile TRUE           6       1      208 FALSE
## # ... with 990 more rows
```

Data Dictionary

- referrer: referrer website/search engine
- device: device used to visit the website
- bouncers: whether a visit bounced (exited from landing page)
- duration: time spent on the website (in seconds)
- purchase: whether visitor purchased

- n_visit: number of visits
- n_pages: number of pages visited/browsed

Distinct


referrer
google
google
twitter
instagram
twitter
google
twitter
google
google
google
Distinct values
distinct(data, referrer)
referrer
google
twitter
instagram

Traffic Sources

```
distinct(ecom, referrer)
```

```
## # A tibble: 5 x 1
##   referrer
##   <fct>
## 1 google
## 2 yahoo
## 3 direct

## 4 bing
## 5 social
```

Device Types

```
distinct(ecom, device)
```

```
## # A tibble: 3 x 1
##   device
##   <fct>
## 1 laptop
## 2 tablet
## 3 mobile
```

Rename

device	order items	order value
mobile	3	267
tablet	3	297
laptop	4	378

Rename order items as items

```
rename(data, items = `order items`)
```

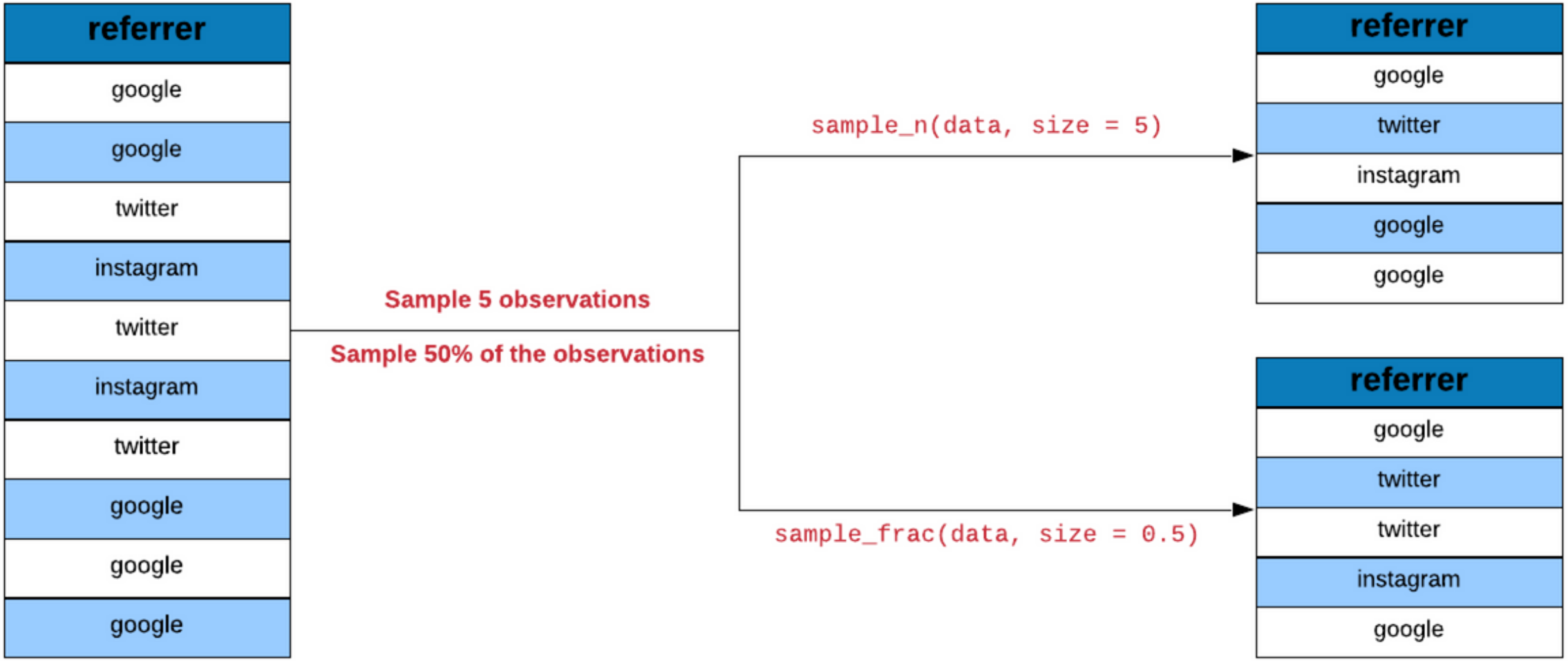
device	items	order value
mobile	3	267
tablet	3	297
laptop	4	378

Rename Columns

```
rename(ecom, time_on_site = duration)
```

```
## # A tibble: 1,000 x 7
##    referrer device bouncers n_visit n_pages time_on_site purchase
##    <fct>    <fct>  <lgl>      <dbl>   <dbl>        <dbl> <lgl>
##  1 google   laptop TRUE          10       1          693 FALSE
##  2 yahoo    tablet TRUE           9       1          459 FALSE
##  3 direct   laptop TRUE           0       1          996 FALSE
##  4 bing     tablet FALSE          3      18          468 TRUE
##  5 yahoo    mobile TRUE           9       1          955 FALSE
##  6 yahoo    laptop FALSE          5       5          135 FALSE
##  7 yahoo    mobile TRUE          10       1           75 FALSE
##  8 direct   mobile TRUE          10       1          908 FALSE
##  9 bing     mobile FALSE          3      19          209 FALSE
## 10 google   mobile TRUE           6       1          208 FALSE
## # ... with 990 more rows
```

Sampling


referrer
google
google
twitter
instagram
twitter
instagram
twitter
google
google
google
Sample 5 observations
Sample 50% of the observations
sample_n(data, size = 5)
sample_frac(data, size = 0.5)
referrer
google
twitter
instagram
google
google
referrer
google
twitter
twitter
instagram
google

```
sample_n(ecom, size = 700)
```

```
## # A tibble: 700 x 7
##    referrer device bouncers n_visit n_pages duration purchase
##    <fct>    <fct>  <lgl>      <dbl>   <dbl>    <dbl> <lgl>
##  1 bing     laptop FALSE          0       1       21 FALSE
##  2 social   tablet FALSE         10      13      247 FALSE
##  3 yahoo    tablet FALSE          5       8       80 FALSE
##  4 social   tablet TRUE           3       1      111 FALSE
##  5 google   mobile FALSE          4      20      420 FALSE
##  6 google   laptop TRUE           1       1      958 FALSE
##  7 yahoo    tablet TRUE           9       1      459 FALSE
##  8 yahoo    mobile FALSE          5       5      150 FALSE
##  9 google   mobile FALSE          5       3       66 FALSE
## 10 google   tablet TRUE           6       1      551 FALSE
## # ... with 690 more rows
```

```
sample_frac(ecom, size = 0.7)
```

```
## # A tibble: 700 x 7
##    referrer device bouncers n_visit n_pages duration purchase
##    <fct>    <fct>  <lgl>      <dbl>   <dbl>    <dbl> <lgl>
##  1 google   laptop FALSE          4       9      117 FALSE
##  2 social   mobile FALSE          1      16      336 TRUE
##  3 google   tablet FALSE         10       8      200 FALSE
##  4 bing     tablet FALSE          5      18      216 FALSE
##  5 social   tablet FALSE          9      15      405 FALSE
##  6 direct   mobile TRUE           1       1      180 FALSE
##  7 social   mobile FALSE         10      14      350 TRUE
##  8 social   tablet TRUE           4       1      392 FALSE
##  9 bing     mobile FALSE          6      18      342 TRUE
## 10 yahoo    tablet TRUE           5       1       10 FALSE
## # ... with 690 more rows
```

Extract Columns

device	order items	order value
mobile	3	267
tablet	3	297
laptop	4	378

Extract device column

```
pull(data, device)
```

mobile	tablet	laptop

Extract first column

```
pull(data, 1)
```

mobile	tablet	laptop

Extract last column

```
pull(data, -1)
```

267	297	378

Sample Data

```
ecom_mini <- sample_n(ecom, size = 10)
```

Extract Device Column

```
pull(ecom_mini, device)
```

```
##  [1] tablet tablet laptop tablet laptop mobile laptop laptop mobile m
## Levels: laptop tablet mobile
```

Extract First Column

```
pull(ecom_mini, 1)
```

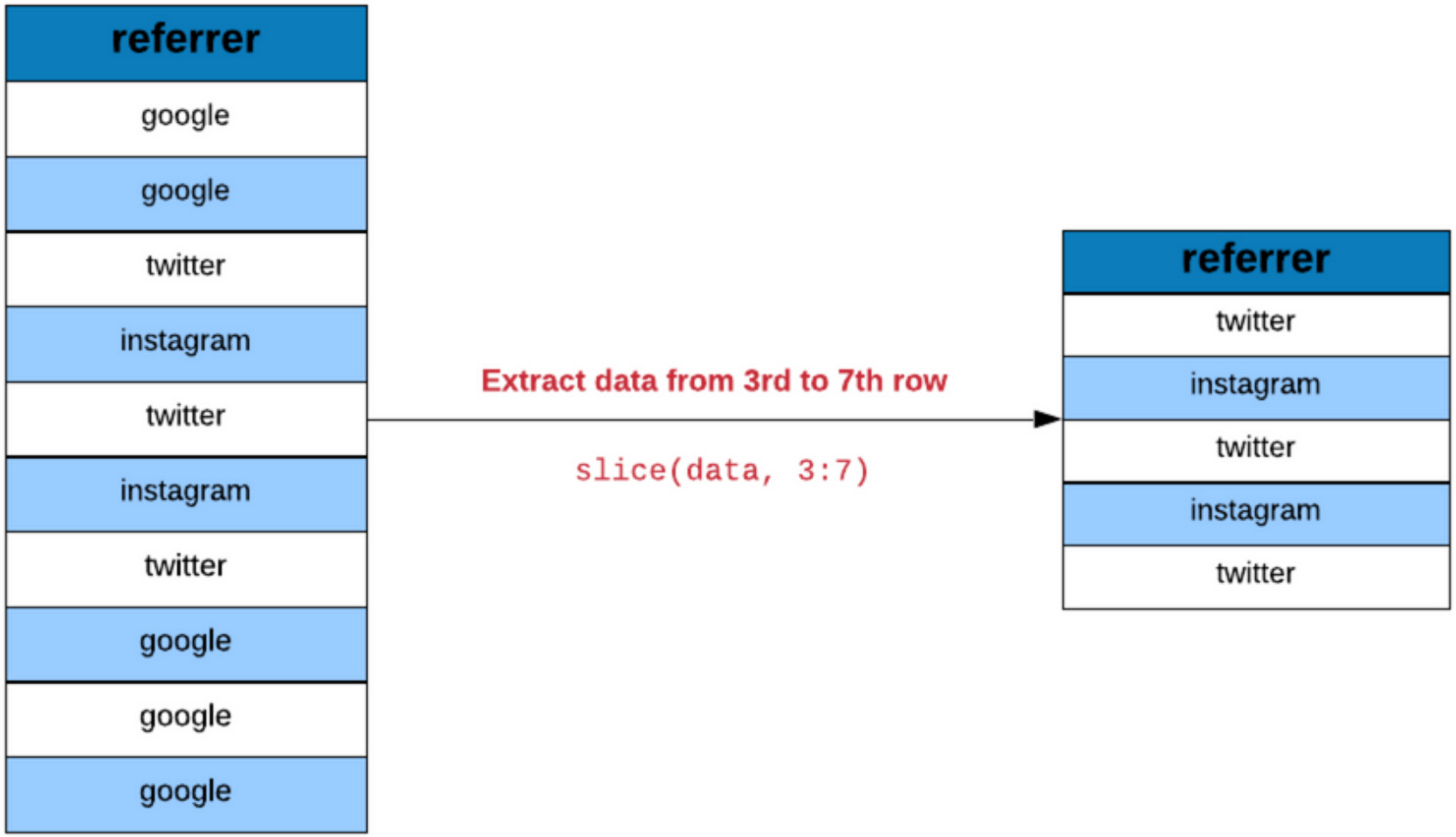
```
##  [1] direct social direct bing   bing   social bing   direct google s
## Levels: bing direct social yahoo google
```

Extract Last Column

```
pull(ecom_mini, -1)
```

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

Slice Rows


referrer
google
google
twitter
instagram
twitter
instagram
twitter
google
google
google
Extract data from 3rd to 7th row
slice(data, 3:7)
referrer
twitter
instagram
twitter
instagram
twitter

Extract 10 rows starting from 15

```
slice(ecom, 5:14)
```

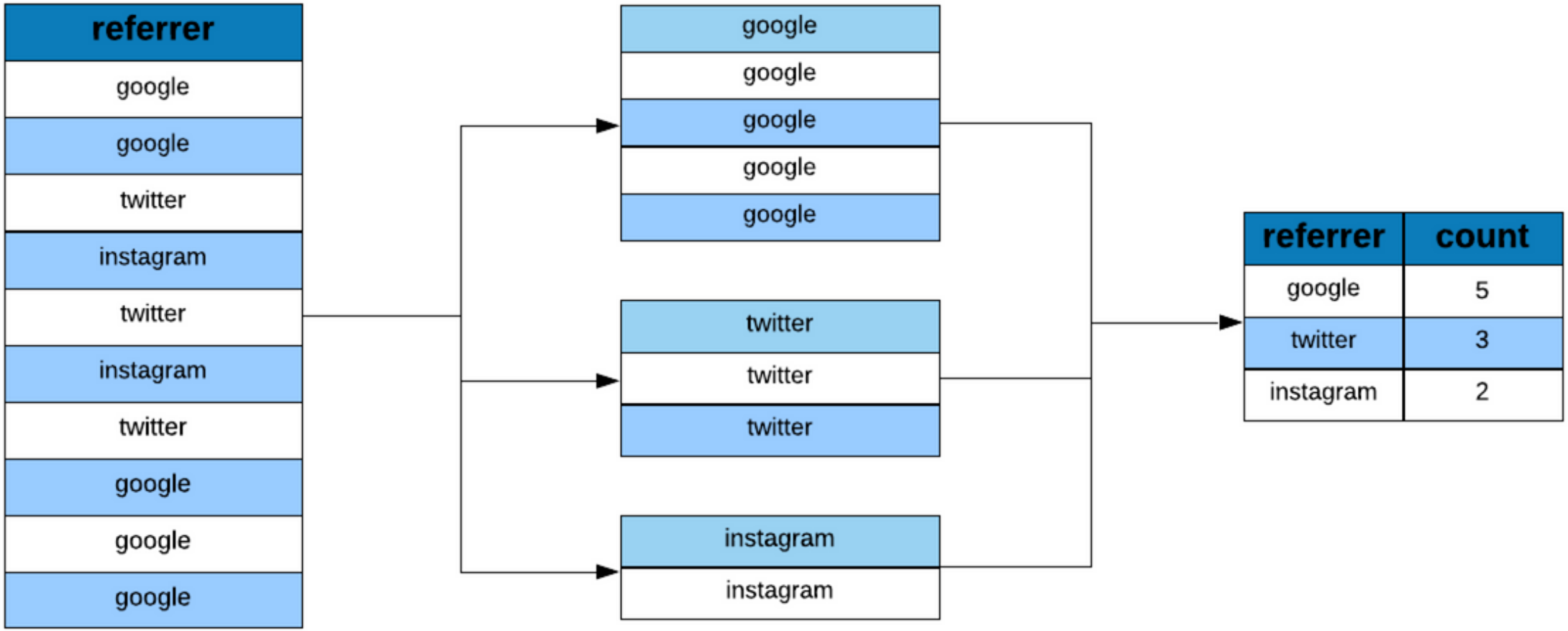
```
## # A tibble: 10 x 7
##    referrer device bouncers n_visit n_pages duration purchase
##    <fct>    <fct>  <lgl>      <dbl>   <dbl>    <dbl> <lgl>
##  1 yahoo    mobile TRUE           9       1      955 FALSE
##  2 yahoo    laptop FALSE          5       5      135 FALSE
##  3 yahoo    mobile TRUE          10       1       75 FALSE
##  4 direct   mobile TRUE          10       1      908 FALSE
##  5 bing     mobile FALSE          3      19      209 FALSE
##  6 google   mobile TRUE           6       1      208 FALSE
##  7 direct   laptop TRUE           9       1      738 FALSE
##  8 direct   tablet FALSE          6      12      132 FALSE
##  9 direct   mobile FALSE          9      14      406 TRUE
## 10 yahoo    tablet FALSE          5       8       80 FALSE
```

Extract Last Row

```
slice(ecom, n())
```

```
## # A tibble: 1 x 7
##   referrer device bouncers n_visit n_pages duration purchase
##   <fct>    <fct>  <lgl>      <dbl>   <dbl>    <dbl> <lgl>
## 1 google   mobile TRUE           9       1      269 FALSE
```

Tally


referrer
google
google
twitter
instagram
twitter
instagram
twitter
google
google
google
google
google
google
google
google
twitter
twitter
twitter
instagram
instagram
referrer
count
google
5
twitter
3
instagram
2

Tabulate Referrers

```
ecom %>%
  group_by(referrer) %>%
  tally()
```

```
## # A tibble: 5 x 2
##   referrer     n
##   <fct>    <int>
## 1 bing       194

## 2 direct     191
## 3 social     200
## 4 yahoo      207
## 5 google     208
```

Tabulate Referrers and Bouncers

```
ecom %>%
  group_by(referrer, bouncers) %>%
  tally()
```

```
## # A tibble: 10 x 3
## # Groups:   referrer [5]
##    referrer bouncers     n
##    <fct>    <lgl>    <int>
##  1 bing     FALSE      104
##  2 bing     TRUE        90
##  3 direct   FALSE       98
##  4 direct   TRUE        93
##  5 social   FALSE       93
##  6 social   TRUE       107
##  7 yahoo    FALSE      110
##  8 yahoo    TRUE        97
##  9 google   FALSE      101
## 10 google   TRUE       107
```

Tabulate Referrers and Purchasers

```
ecom %>%
  group_by(referrer, purchase) %>%
  tally()
```

```
## # A tibble: 10 x 3
## # Groups:   referrer [5]
##    referrer purchase     n
##    <fct>    <lgl>    <int>
##
##  1 bing     FALSE      177
##  2 bing     TRUE        17
##  3 direct   FALSE      166
##  4 direct   TRUE        25
##  5 social   FALSE      180
##  6 social   TRUE        20
##  7 yahoo    FALSE      185
##  8 yahoo    TRUE        22
##  9 google   FALSE      189
## 10 google   TRUE        19
```

Tabulate Referrers & Converts

```
ecom %>%
  group_by(referrer, purchase) %>%
  tally() %>%
  filter(purchase)
```

```
## # A tibble: 5 x 3
## # Groups:   referrer [5]
##   referrer purchase     n
##
##   <fct>    <lgl>    <int>
## 1 bing     TRUE        17
## 2 direct   TRUE        25
## 3 social   TRUE        20
## 4 yahoo    TRUE        22
## 5 google   TRUE        19
```

Count

```
count(ecom, referrer, purchase)
```

```
## # A tibble: 10 x 3
##    referrer purchase     n
##    <fct>    <lgl>    <int>
##  1 bing     FALSE      177
##  2 bing     TRUE        17
##  3 direct   FALSE      166
##  4 direct   TRUE        25
##  5 social   FALSE      180
##  6 social   TRUE        20
##  7 yahoo    FALSE      185
##  8 yahoo    TRUE        22
##  9 google   FALSE      189
## 10 google   TRUE        19
```

Arrange

channel	traffic (%)
Direct	14.75
Display	6.35
Social	11.82
Affiliates	2.02
Organic Search	49.44
Paid Search	3.07
Referral	12.54

Arrange traffic channels in ascending order

```
arrange(data, traffic)
```

channel	traffic (%)
Affiliates	2.02
Paid Search	3.07
Display	6.35
Social	11.82
Referral	12.54
Direct	14.75
Organic Search	49.44

Arrange traffic channels in descending order

```
arrange(data, desc(traffic))
```

channel	traffic (%)
Organic Search	49.44
Direct	14.75
Referral	12.54
Social	11.82
Display	6.35
Paid Search	3.07
Affiliates	2.02

Top 2 Referrers by Orders

```
ecom %>%
  count(referrer, purchase) %>%
  filter(purchase) %>%
  arrange(desc(n)) %>%
  top_n(n = 2)
```

```
## Selecting by n
```

```
## # A tibble: 2 x 3
##   referrer purchase     n
##   <fct>    <lgl>    <int>
## 1 direct   TRUE        25
## 2 yahoo    TRUE        22
```

Between

```
ecom_sample <- sample_n(ecom, 30)
ecom_sample %>%
  pull(n_pages) %>%
  between(5, 15)
```

```
##  [1]  TRUE FALSE FALSE FALSE FALSE  TRUE FALSE  TRUE FALSE FALSE  TRU
## [12]  TRUE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE  TRUE FALS
## [23]  TRUE  TRUE FALSE FALSE FALSE FALSE FALSE FALSE
```

Case When

```
ecom %>%
  mutate(
    repeat_visit = case_when(
      n_visit > 0 ~ TRUE,
      TRUE ~ FALSE
    )
  ) %>%
  select(n_visit, repeat_visit)
```

```
## # A tibble: 1,000 x 2
##    n_visit repeat_visit
##      <dbl> <lgl>
##  1      10 TRUE
##  2       9 TRUE
##  3       0 FALSE
##  4       3 TRUE
##  5       9 TRUE
##  6       5 TRUE
##  7      10 TRUE
##  8      10 TRUE
##  9       3 TRUE
## 10       6 TRUE
## # ... with 990 more rows
```

Select First Observation

```
ecom %>%
  pull(referrer) %>%
  nth(1)
```

```
## [1] google
## Levels: bing direct social yahoo google
```

```
ecom %>%
  pull(referrer) %>%
  first()
```

```
## [1] google
## Levels: bing direct social yahoo google
```

Select 1000th Observation

```
ecom %>%
  pull(referrer) %>%
  nth(1000)
```

```
## [1] google
## Levels: bing direct social yahoo google
```

Select Last Observation

```
ecom %>%
  pull(referrer) %>%
  last()
```

```
## [1] google
## Levels: bing direct social yahoo google
```

Thank You

For more information please visit our website
www.rsquaredacademy.com