The inner_join verb

JOINING DATA WITH DPLYR

Chris Cardillo
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LEGO dataset

The sets table

```
sets
```

```
# A tibble: 4,977 x 4
   set_num   name                                                year theme_id
   <chr>     <chr>                                              <dbl>    <dbl>
 1 700.3-1   Medium Gift Set (ABB)                               1949      365
 2 700.1.1-1 Single 2 x 4 Brick (ABB)                            1950      371
 3 700.B.2-1 Single 1 x 2 x 3 Window without Glass (ABB)         1950      371
 4 700.1-2   Extra-Large Gift Set (Mursten)                      1953      366
 5 700.F-1   Automatic Binding Bricks - Small Brick Set (Lego Mursten)  1953      371
 6 700.24-1  Individual 2 x 12 Bricks                           1954      371
 7 700.C.1-1 Individual 1 x 6 x 4 Panorama Window (with glass)   1954      371
 8 700.C.4-1 Individual 1 x 4 x 3 Window (with glass)            1954      371
 9 700.H-1   Individual 4 x 4 Corner Bricks                      1954      371
10 1200-1    LEGO Town Plan Board, Large Plastic                 1955      372
# … with 4,967 more rows
```

Linking two tables

```
sets
```

```
# A tibble: 4,977 x 4
   set_num   name
   <chr>     <chr>
 1 700.3-1   Medium Gift Set (ABB)
 2 700.1.1-1 Single 2 x 4 Brick (ABB)
 3 700.B.2-1 Single 1 x 2 x 3 Window without Glass (ABB)
 4 700.1-2   Extra-Large Gift Set (Mursten)
 5 700.F-1   Automatic Binding Bricks - Small Brick Set
 6 700.24-1  Individual 2 x 12 Bricks
 7 700.C.1-1 Individual 1 x 6 x 4 Panorama Window (with
 8 700.C.4-1 Individual 1 x 4 x 3 Window (with glass)
 9 700.H-1   Individual 4 x 4 Corner Bricks
10 1200-1    LEGO Town Plan Board, Large Plastic
# … with 4,967 more rows
```

```
themes
```

```
# A tibble: 665 x 3
      id name            parent_id
   <dbl> <chr>               <dbl>
 1     1 Technic                NA
 2     2 Arctic Technic          1
 3     3 Competition             1
 4     4 Expert Builder          1
 5     5 Model                   1
 6     6 Airport                 5
 7     7 Construction            5
 8     8 Farm                    5
 9     9 Fire                    5
10    10 Harbor                  5
# … with 655 more rows
```

Inner join

```
sets %>%
  inner_join(themes, by = c("theme_id" = "id"))
```

```
# A tibble: 4,977 x 6
   set_num   name.x                                                year theme_id name.y       parent_id
   <chr>     <chr>                                                <dbl>    <dbl> <chr>            <dbl>
 1 700.3-1   Medium Gift Set (ABB)                                 1949      365 System              NA
 2 700.1.1-1 Single 2 x 4 Brick (ABB)                              1950      371 Supplemental       365
 3 700.B.2-1 Single 1 x 2 x 3 Window without Glass (ABB)           1950      371 Supplemental       365
 4 700.1-2   Extra-Large Gift Set (Mursten)                        1953      366 Basic Set          365
 5 700.F-1   Automatic Binding Bricks - Small Brick Set (Lego Mursten)  1953      371 Supplemental       365
 6 700.24-1  Individual 2 x 12 Bricks                              1954      371 Supplemental       365
 7 700.C.1-1 Individual 1 x 6 x 4 Panorama Window (with glass)     1954      371 Supplemental       365
 8 700.C.4-1 Individual 1 x 4 x 3 Window (with glass)              1954      371 Supplemental       365
 9 700.H-1   Individual 4 x 4 Corner Bricks                        1954      371 Supplemental       365
10 1200-1    LEGO Town Plan Board, Large Plastic                   1955      372 Town Plan          365
# … with 4,967 more rows
```

Customizing your join

```
sets %>%
  inner_join(themes, by = c("theme_id" = "id"), suffix = c("_set", "_theme"))
```

```
# A tibble: 4,977 x 6
   set_num   name_set                                                year theme_id name_theme   parent_id
   <chr>     <chr>                                                  <dbl>    <dbl> <chr>           <dbl>
 1 700.3-1   Medium Gift Set (ABB)                                   1949      365 System             NA
 2 700.1.1-1 Single 2 x 4 Brick (ABB)                                1950      371 Supplemental      365
 3 700.B.2-1 Single 1 x 2 x 3 Window without Glass (ABB)             1950      371 Supplemental      365
 4 700.1-2   Extra-Large Gift Set (Mursten)                          1953      366 Basic Set         365
 5 700.F-1   Automatic Binding Bricks - Small Brick Set (Lego Mursten) 1953     371 Supplemental      365
 6 700.24-1  Individual 2 x 12 Bricks                                1954      371 Supplemental      365
 7 700.C.1-1 Individual 1 x 6 x 4 Panorama Window (with glass)       1954      371 Supplemental      365
 8 700.C.4-1 Individual 1 x 4 x 3 Window (with glass)                1954      371 Supplemental      365
 9 700.H-1   Individual 4 x 4 Corner Bricks                          1954      371 Supplemental      365
10 1200-1    LEGO Town Plan Board, Large Plastic                     1955      372 Town Plan         365
# … with 4,967 more rows
```

Most common themes

```
sets %>%
  inner_join(themes, by = c("theme_id" = "id"), suffix = c("_set", "_theme")) %>%
  count(name_theme, sort = TRUE)
```

```
# A tibble: 419 x 2
   name_theme        n
   <chr>         <int>
 1 Supplemental    180
 2 Basic Set       171
 3 Technic         144
 4 Friends         133
 5 Gear            122
 6 City            120
 7 Town            117
 8 Ninjago          95
 9 Service Packs    94
10 Star Wars        94
# … with 409 more rows
```

Other LEGO tables

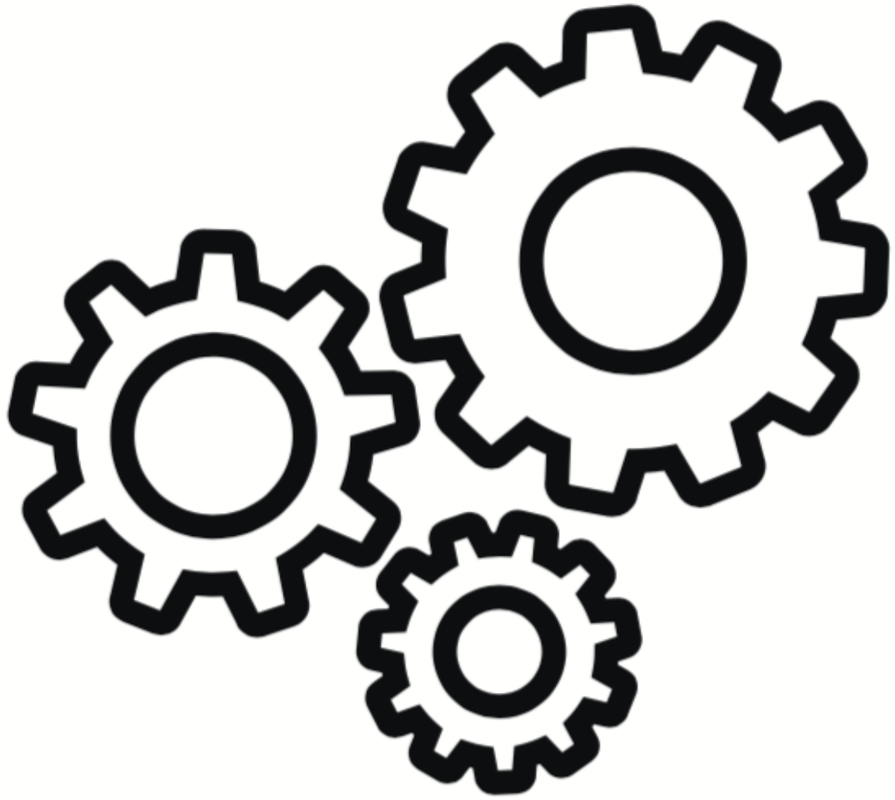
```
parts
```

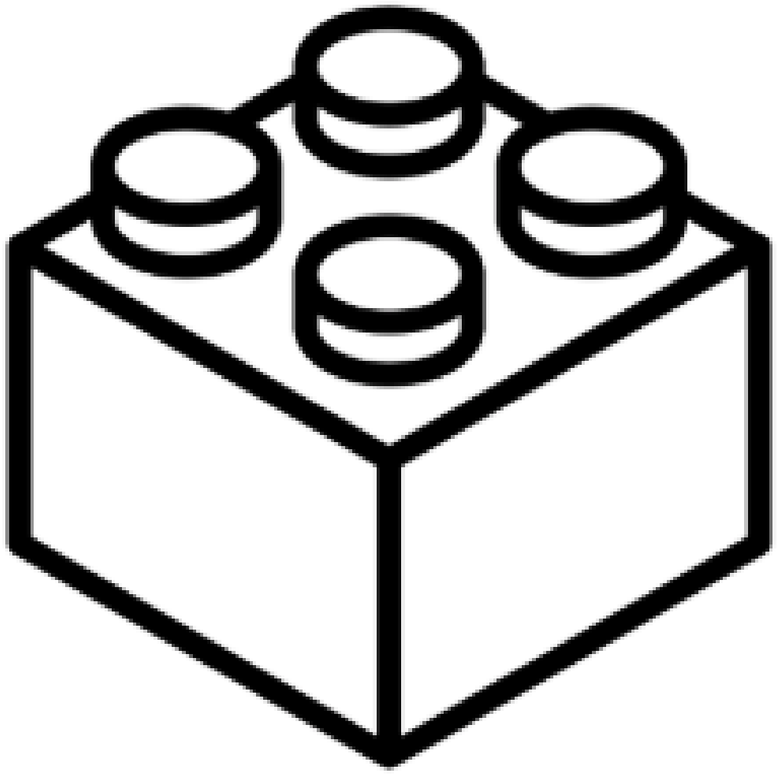
```
# A tibble: 17,501 x 3
   part_num   name
   <chr>      <chr>
 1 0901       Baseplate 16 x 30 with Set 080 Yellow Hous
 2 0902       Baseplate 16 x 24 with Set 080 Small White
 3 0903       Baseplate 16 x 24 with Set 080 Red House P
 4 0904       Baseplate 16 x 24 with Set 080 Large White
 5 1          Homemaker Bookcase 2 x 4 x 4
 6 10016414   Sticker Sheet #1 for 41055-1
 7 10026stk01 Sticker for Set 10026 - (44942/4184185)
 8 10039      Pullback Motor 8 x 4 x 2/3
 9 10048      Minifig Hair Tousled
10 10049      Minifig Shield Broad with Spiked Bottom an
# … with 17,491 more rows
```

```
part_categories
```

```
# A tibble: 64 x 2
      id name
   <dbl> <chr>
 1     1 Baseplates
 2     3 Bricks Sloped
 3     4 Duplo, Quatro and Primo
 4     5 Bricks Special
 5     6 Bricks Wedged
 6     7 Containers
 7     8 Technic Bricks
 8     9 Plates Special
 9    11 Bricks
10    12 Technic Connectors
# … with 54 more rows
```

Part





Let's practice!

JOINING DATA WITH DPLYR

Joining with a one-to-many relationship

JOINING DATA WITH DPLYR

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Joining sets and themes

```
sets %>%
  inner_join(themes, by = c("theme_id" = "id"), suffix = c("_set", "_theme"))
```

```
# A tibble: 4,977 x 6
   set_num   name_set                                                year theme_id name_theme   parent_id
   <chr>     <chr>                                                  <dbl>    <dbl> <chr>           <dbl>
 1 700.3-1   Medium Gift Set (ABB)                                   1949      365 System             NA
 2 700.1.1-1 Single 2 x 4 Brick (ABB)                                1950      371 Supplemental      365
 3 700.B.2-1 Single 1 x 2 x 3 Window without Glass (ABB)             1950      371 Supplemental      365
 4 700.1-2   Extra-Large Gift Set (Mursten)                          1953      366 Basic Set         365
 5 700.F-1   Automatic Binding Bricks - Small Brick Set (Lego Mursten) 1953     371 Supplemental      365
 6 700.24-1  Individual 2 x 12 Bricks                                1954      371 Supplemental      365
 7 700.C.1-1 Individual 1 x 6 x 4 Panorama Window (with glass)       1954      371 Supplemental      365
 8 700.C.4-1 Individual 1 x 4 x 3 Window (with glass)                1954      371 Supplemental      365
 9 700.H-1   Individual 4 x 4 Corner Bricks                          1954      371 Supplemental      365
10 1200-1    LEGO Town Plan Board, Large Plastic                     1955      372 Town Plan         365
# … with 4,967 more rows
```

The inventories table

```
inventories
```

```
# A tibble: 15,174 x 3
      id version set_num
   <dbl>   <dbl> <chr>
 1     1       1 7922-1
 2     3       1 3931-1
 3     4       1 6942-1
 4    15       1 5158-1
 5    16       1 903-1
 6    17       1 850950-1
 7    19       1 4444-1
 8    21       1 3474-1
 9    22       1 30277-1
10    25       1 71012-11
# … with 15,164 more rows
```

Joining sets and inventories

```
sets %>%
  inner_join(inventories, by = "set_num")
```

```
# A tibble: 5,056 x 6
   set_num   name                                          year theme_id    id version
   <chr>     <chr>                                        <dbl>    <dbl> <dbl>   <dbl>
 1 700.3-1   Medium Gift Set (ABB)                         1949      365 24197       1
 2 700.3-1   Medium Gift Set (ABB)                         1949      365 24214       2
 3 700.3-1   Medium Gift Set (ABB)                         1949      365 24215       3
 4 700.1.1-1 Single 2 x 4 Brick (ABB)                      1950      371 11831       1
 5 700.1.1-1 Single 2 x 4 Brick (ABB)                      1950      371 24230       2
 6 700.1.1-1 Single 2 x 4 Brick (ABB)                      1950      371 24231       3
 7 700.1.1-1 Single 2 x 4 Brick (ABB)                      1950      371 24232       4
 8 700.1.1-1 Single 2 x 4 Brick (ABB)                      1950      371 24233       5
 9 700.B.2-1 Single 1 x 2 x 3 Window without Glass (ABB)   1950      371   537       1
10 700.B.2-1 Single 1 x 2 x 3 Window without Glass (ABB)   1950      371 24240       2
# … with 5,046 more rows
```

Filtering the joined table

```
sets %>%
  inner_join(inventories, by = "set_num") %>%
  filter(version == 1)
```

```
# A tibble: 4,976 x 6
   set_num   name                                                year theme_id    id version
   <chr>     <chr>                                              <dbl>    <dbl> <dbl>   <dbl>
 1 700.3-1   Medium Gift Set (ABB)                               1949      365 24197       1
 2 700.1.1-1 Single 2 x 4 Brick (ABB)                            1950      371 11831       1
 3 700.B.2-1 Single 1 x 2 x 3 Window without Glass (ABB)         1950      371   537       1
 4 700.1-2   Extra-Large Gift Set (Mursten)                      1953      366 12985       1
 5 700.F-1   Automatic Binding Bricks - Small Brick Set (Lego Mursten)  1953      371 11265       1
 6 700.24-1  Individual 2 x 12 Bricks                            1954      371  7645       1
 7 700.C.1-1 Individual 1 x 6 x 4 Panorama Window (with glass)   1954      371  3896       1
 8 700.C.4-1 Individual 1 x 4 x 3 Window (with glass)            1954      371  3663       1
 9 700.H-1   Individual 4 x 4 Corner Bricks                      1954      371 15503       1
10 1200-1    LEGO Town Plan Board, Large Plastic                 1955      372 10761       1
# … with 4,966 more rows
```

Parts and pieces

part + color = piece

The inventory parts

```
inventory_parts
```

```
# A tibble: 258,958 x 4
   inventory_id part_num              color_id quantity
          <dbl> <chr>                    <dbl>    <dbl>
 1           21 3009                         7       50
 2           25 21019c00pat004pr1033        15        1
 3           25 24629pr0002                 78        1
 4           25 24634pr0001                  5        1
 5           25 24782pr0001                  5        1
 6           25 88646                        0        1
 7           25 973pr3314c01                 5        1
 8           26 14226c11                     0        3
 9           26 2340px2                     15        1
10           26 2340px3                     15        1
# … with 258,948 more rows
```

Let's practice!

JOINING DATA WITH DPLYR

Joining three or more tables

JOINING DATA WITH DPLYR

Chris Cardillo
Data Scientist

Joining sets and inventories

```
sets %>%
  inner_join(inventories, by = "set_num")
```

```
# A tibble: 5,056 x 6
   set_num   name                                          year theme_id    id version
   <chr>     <chr>                                        <dbl>    <dbl> <dbl>   <dbl>
 1 700.3-1   Medium Gift Set (ABB)                         1949      365 24197       1
 2 700.3-1   Medium Gift Set (ABB)                         1949      365 24214       2
 3 700.3-1   Medium Gift Set (ABB)                         1949      365 24215       3
 4 700.1.1-1 Single 2 x 4 Brick (ABB)                      1950      371 11831       1
 5 700.1.1-1 Single 2 x 4 Brick (ABB)                      1950      371 24230       2
 6 700.1.1-1 Single 2 x 4 Brick (ABB)                      1950      371 24231       3
 7 700.1.1-1 Single 2 x 4 Brick (ABB)                      1950      371 24232       4
 8 700.1.1-1 Single 2 x 4 Brick (ABB)                      1950      371 24233       5
 9 700.B.2-1 Single 1 x 2 x 3 Window without Glass (ABB)   1950      371   537       1
10 700.B.2-1 Single 1 x 2 x 3 Window without Glass (ABB)   1950      371 24240       2
# … with 5,046 more rows
```

The themes table

```
themes
```

```
# A tibble: 665 x 3
      id name            parent_id
   <dbl> <chr>               <dbl>
 1     1 Technic                NA
 2     2 Arctic Technic          1
 3     3 Competition             1
 4     4 Expert Builder          1
 5     5 Model                   1
 6     6 Airport                 5
 7     7 Construction            5
 8     8 Farm                    5
 9     9 Fire                    5
10    10 Harbor                  5
# … with 655 more rows
```

Adding another join

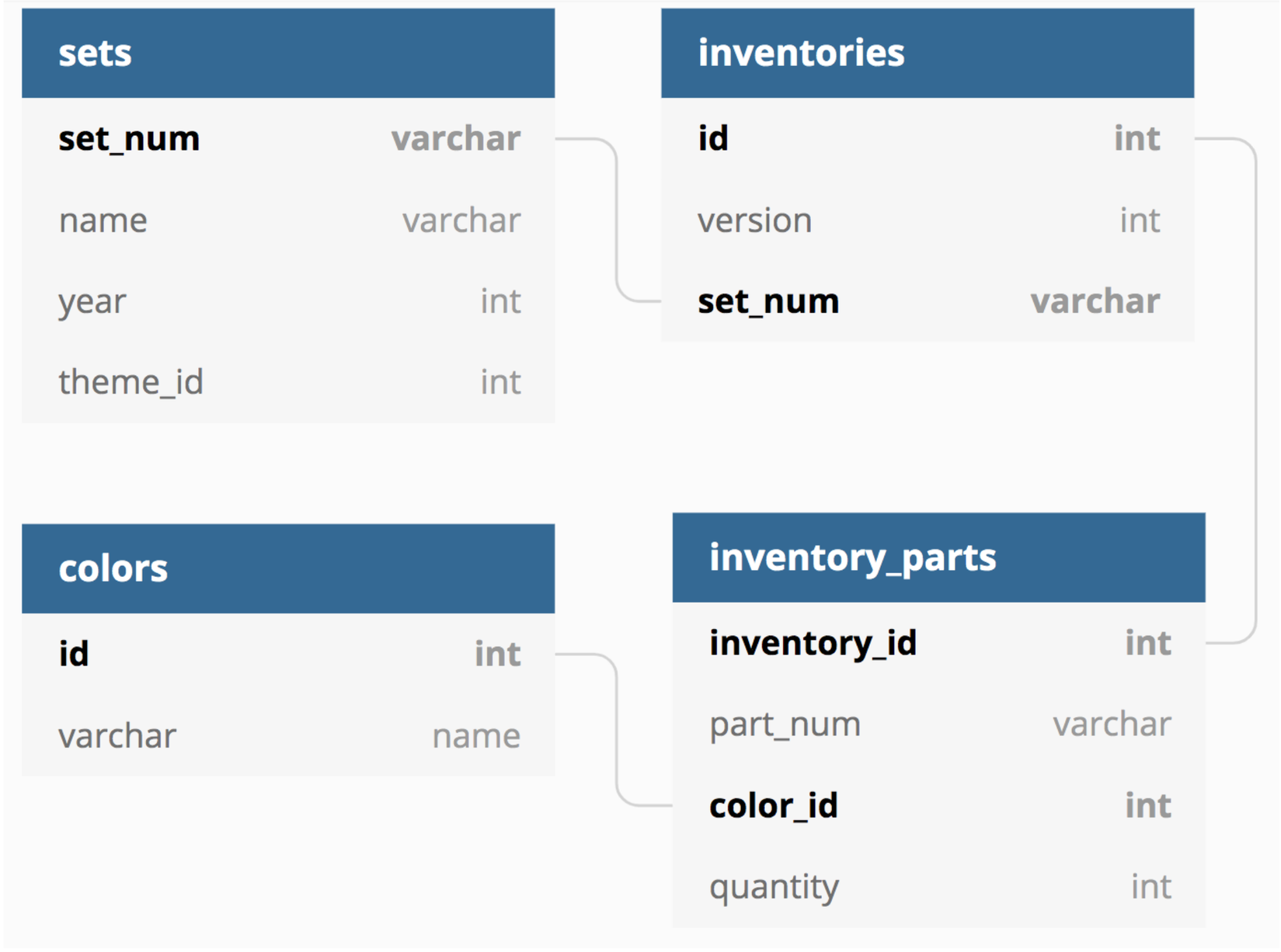
```
sets %>%
  inner_join(inventories, by = "set_num") %>%
  inner_join(themes, by = c("theme_id" = "id"))
```

```
# A tibble: 5,056 x 8
   set_num   name.x                                year theme_id    id version name.y     parent_id
   <chr>     <chr>                                <dbl>    <dbl> <dbl>   <dbl> <chr>           <dbl>
 1 700.3-1   Medium Gift Set (ABB)                 1949      365 24197       1 System             NA
 2 700.3-1   Medium Gift Set (ABB)                 1949      365 24214       2 System             NA
 3 700.3-1   Medium Gift Set (ABB)                 1949      365 24215       3 System             NA
 4 700.1.1-1 Single 2 x 4 Brick (ABB)              1950      371 11831       1 Supplemen…        365
 5 700.1.1-1 Single 2 x 4 Brick (ABB)              1950      371 24230       2 Supplemen…        365
 6 700.1.1-1 Single 2 x 4 Brick (ABB)              1950      371 24231       3 Supplemen…        365
 7 700.1.1-1 Single 2 x 4 Brick (ABB)              1950      371 24232       4 Supplemen…        365
 8 700.1.1-1 Single 2 x 4 Brick (ABB)              1950      371 24233       5 Supplemen…        365
 9 700.B.2-1 Single 1 x 2 x 3 Window without …     1950      371   537       1 Supplemen…        365
10 700.B.2-1 Single 1 x 2 x 3 Window without …     1950      371 24240       2 Supplemen…        365
# … with 5,046 more rows
```

Recall: suffix

```
sets %>%
  inner_join(inventories, by = "set_num") %>%
  inner_join(themes, by = c("theme_id" = "id"), suffix = c("_set", "_theme"))
```

```
# A tibble: 5,056 x 8
   set_num   name_set                          year theme_id    id version name_theme  parent_id
   <chr>     <chr>                             <dbl>    <dbl> <dbl>   <dbl> <chr>            <dbl>
 1 700.3-1   Medium Gift Set (ABB)              1949      365 24197       1 System              NA
 2 700.3-1   Medium Gift Set (ABB)              1949      365 24214       2 System              NA
 3 700.3-1   Medium Gift Set (ABB)              1949      365 24215       3 System              NA
 4 700.1.1-1 Single 2 x 4 Brick (ABB)           1950      371 11831       1 Supplement…       365
 5 700.1.1-1 Single 2 x 4 Brick (ABB)           1950      371 24230       2 Supplement…       365
 6 700.1.1-1 Single 2 x 4 Brick (ABB)           1950      371 24231       3 Supplement…       365
 7 700.1.1-1 Single 2 x 4 Brick (ABB)           1950      371 24232       4 Supplement…       365
 8 700.1.1-1 Single 2 x 4 Brick (ABB)           1950      371 24233       5 Supplement…       365
 9 700.B.2-1 Single 1 x 2 x 3 Window without…   1950      371   537       1 Supplement…       365
10 700.B.2-1 Single 1 x 2 x 3 Window without…   1950      371 24240       2 Supplement…       365
# … with 5,046 more rows
```


sets
set_num varchar
name varchar
year int
theme_id int
inventories
id int
version int
set_num varchar
colors
id int
varchar name
inventory_parts
inventory_id int
part_num varchar
color_id int
quantity int

Let's practice!

JOINING DATA WITH DPLYR