The count verb

DATA MANIPULATION WITH DPLYR

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datacamp

Count

```
counties %>%
  count()
```

```
# A tibble: 1 x 1
      n
  <int>
1  3138
```

Count variable

```
counties %>%
  count(state)
```

```
# A tibble: 50 x 2
   state           n
   <chr>       <int>
 1 Alabama        67
 2 Alaska         28
 3 Arizona        15
 4 Arkansas       75
 5 California     58
 6 Colorado       64
 7 Connecticut     8
 8 Delaware        3
 9 Florida        67
10 Georgia       159
# … with 40 more rows
```

Count and sort

```
counties %>%
  count(state, sort = TRUE)
```

```
# A tibble: 50 x 2
   state              n
   <chr>          <int>
 1 Texas            253
 2 Georgia          159
 3 Virginia         133
 4 Kentucky         120
 5 Missouri         115
 6 Kansas           105
 7 Illinois         102
 8 North Carolina   100
 9 Iowa              99
10 Tennessee         95
# … with 40 more rows
```

Count population

```
counties %>%
  select(state, county, population)
```

```
# A tibble: 3,138 x 3
   state   county   population
   <chr>   <chr>         <dbl>
 1 Alabama Autauga       55221
 2 Alabama Baldwin      195121
 3 Alabama Barbour       26932
 4 Alabama Bibb          22604
 5 Alabama Blount        57710
 6 Alabama Bullock       10678
 7 Alabama Butler        20354
 8 Alabama Calhoun      116648
 9 Alabama Chambers      34079
10 Alabama Cherokee      26008
# … with 3,128 more rows
```

Add weight

```
counties %>%
  count(state, wt = population, sort = TRUE)
```

```
# A tibble: 50 x 2
   state                n
   <chr>            <dbl>
 1 California     38421464
 2 Texas          26538497
 3 New York       19673174
 4 Florida        19645772
 5 Illinois       12873761
 6 Pennsylvania   12779559
 7 Ohio           11575977
 8 Georgia        10006693
 9 Michigan        9900571
10 North Carolina  9845333
# … with 40 more rows
```

Let's practice!

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Group by and summarize

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Summarize

```
counties %>%
  summarize(total_population = sum(population))
```

```
# A tibble: 1 x 1
  total_population
             <dbl>
1        315845353
```

Aggregate and summarize

```
counties %>%
  summarize(total_population = sum(population),
            average_unemployment = mean(unemployment))
```

```
# A tibble: 1 x 2
  total_population average_unemployment
             <dbl>                <dbl>
1        315845353                 7.80
```

Summary functions

- `sum()`
- `mean()`
- `median()`
- `min()`
- `max()`
- `n()`

Aggregate within groups

```
counties %>%
  group_by(state) %>%
  summarize(total_pop = sum(population),
            average_unemployment = sum(unemployment))
```

```
# A tibble: 50 x 3
   state       total_pop average_unemployment
   <chr>           <dbl>                <dbl>
 1 Alabama       4830620                758.
 2 Alaska         725461                257.
 3 Arizona       6641928                180.
 4 Arkansas      2958208                674.
 5 California   38421464                626.
 6 Colorado      5278906                477.
 7 Connecticut   3593222                 65.3
 8 Delaware       926454                 23.8
 9 Florida      19645772                696.
10 Georgia      10006693               1586.
# … with 40 more rows
```

Arrange

```
counties %>%
  group_by(state) %>%
  summarize(total_pop = sum(population),
            average_unemployment = mean(unemployment)) %>%
  arrange(desc(average_unemployment))
```

```
# A tibble: 50 x 3
   state          total_pop average_unemployment
   <chr>              <dbl>                <dbl>
 1 Mississippi      2988081                12.0
 2 Arizona          6641928                12.0
 3 South Carolina   4777576                11.3
 4 Alabama          4830620                11.3
 5 California      38421464                10.8
 6 Nevada           2798636                10.5
 7 North Carolina   9845333                10.5
 8 Florida         19645772                10.4
 9 Georgia         10006693                 9.97
10 Michigan         9900571                 9.96
# … with 40 more rows
```

Metro column

```
counties %>%
  select(state, metro, county, population)
```

```
# A tibble: 3,138 x 4
   state   metro    county   population
   <chr>   <chr>    <chr>         <dbl>
 1 Alabama Metro    Autauga       55221
 2 Alabama Metro    Baldwin      195121
 3 Alabama Nonmetro Barbour       26932
 4 Alabama Metro    Bibb          22604
 5 Alabama Metro    Blount        57710
 6 Alabama Nonmetro Bullock       10678
 7 Alabama Nonmetro Butler        20354
 8 Alabama Metro    Calhoun      116648
 9 Alabama Nonmetro Chambers      34079
10 Alabama Nonmetro Cherokee      26008
# … with 3,128 more rows
```

Group by

```
counties %>%
  group_by(state, metro) %>%
  summarize(total_pop = sum(population))
```

```
# A tibble: 97 x 3
# Groups:   state [50]
   state      metro    total_pop
   <chr>      <chr>        <dbl>
 1 Alabama    Metro      3671377
 2 Alabama    Nonmetro   1159243
 3 Alaska     Metro       494990
 4 Alaska     Nonmetro    230471
 5 Arizona    Metro      6295145
 6 Arizona    Nonmetro    346783
 7 Arkansas   Metro      1806867
 8 Arkansas   Nonmetro   1151341
 9 California Metro     37587429
10 California Nonmetro    834035
# … with 87 more rows
```

Ungroup

```
counties %>%
  group_by(state, metro) %>%
  summarize(total_pop = sum(population)) %>%
  ungroup()
```

```
# A tibble: 97 x 3
   state      metro    total_pop
   <chr>      <chr>        <dbl>
 1 Alabama    Metro      3671377
 2 Alabama    Nonmetro   1159243
 3 Alaska     Metro       494990
 4 Alaska     Nonmetro    230471
 5 Arizona    Metro      6295145
 6 Arizona    Nonmetro    346783
 7 Arkansas   Metro      1806867
 8 Arkansas   Nonmetro   1151341
 9 California Metro     37587429
10 California Nonmetro    834035
# … with 87 more rows
```

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The top_n verb

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top_n

```
counties_selected <- counties %>%
  select(state, county, population, unemployment, income)

counties_selected %>%
  group_by(state) %>%
  top_n(1, population)
```

top_n

```
# A tibble: 50 x 5
# Groups:   state [50]
   state       county                  population unemployment income
   <chr>       <chr>                        <dbl>        <dbl>  <dbl>
 1 Alabama     Jefferson                   659026          9.1  45610
 2 Alaska      Anchorage Municipality      299107          6.7  78326
 3 Arizona     Maricopa                   4018143          7.7  54229
 4 Arkansas    Pulaski                     390463          7.5  46140
 5 California  Los Angeles               10038388         10    56196
 6 Colorado    El Paso                     655024          8.4  58206
 7 Connecticut Fairfield                   939983          9    84233
 8 Delaware    New Castle                  549643          7.4  65476
 9 Florida     Miami-Dade                 2639042         10    43129
10 Georgia     Fulton                      983903          9.9  57207
# … with 40 more rows
```

Highest unemployment

```
counties_selected %>%
  group_by(state) %>%
  top_n(1, unemployment)
```

```
# A tibble: 51 x 5
# Groups:   state [50]
   state       county                    population unemployment income
   <chr>       <chr>                          <dbl>        <dbl>  <dbl>
 1 Alabama     Conecuh                        12865         22.6  24900
 2 Alaska      Northwest Arctic Borough        7732         21.9  63648
 3 Arizona     Navajo                        107656         19.8  35921
 4 Arkansas    Phillips                       20391         18.1  26844
 5 California  Imperial                      178206         17.4  41079
 6 Colorado    Crowley                         5551         27    31151
 7 Connecticut New Haven                     862224          9.5  61640
 8 Delaware    Kent                          169509          8.4  54976
 9 Florida     Hamilton                       14395         15.8  35048
10 Georgia     Taylor                          8401         20.6  28143
# … with 41 more rows
```

Number of observations

```
counties_selected %>%
  group_by(state) %>%
  top_n(3, unemployment)
```

```
# A tibble: 153 x 5
# Groups:   state [50]
   state    county                    population unemployment income
   <chr>    <chr>                          <dbl>        <dbl>  <dbl>
 1 Alabama  Conecuh                        12865         22.6  24900
 2 Alabama  Monroe                         22217         20.7  27257
 3 Alabama  Wilcox                         11235         20.8  23750
 4 Alaska   Bethel Census Area             17776         17.6  51012
 5 Alaska   Northwest Arctic Borough        7732         21.9  63648
 6 Alaska   Yukon-Koyukuk Census Area       5644         18.2  38491
 7 Arizona  Apache                         72124         18.2  31757
 8 Arizona  Graham                         37407         14.1  45964
 9 Arizona  Navajo                        107656         19.8  35921
10 Arkansas Desha                         12379         17.7  27197
# … with 143 more rows
```

Let's practice!

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