week 9 code along and challenge

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1. tidy the data
2. any grouping/new columns, separate [new: reshaping and reverse]
3. summary statistics, frequency etc.
4. plotting graph from reshaped data
5. scraping data from website’s (?)
6. API: Application Program Interface (?)

#1. tidy the data [slide 8]

```
library(tidyverse)
```

```
## ── Attaching core tidyverse packages ──────────────────────── tidyverse 2.0.0 ──
## ✔ dplyr     1.1.2     ✔ readr     2.1.4
## ✔ forcats   1.0.0     ✔ stringr   1.5.0
## ✔ ggplot2   3.4.3     ✔ tibble    3.2.1
## ✔ lubridate 1.9.2     ✔ tidyr     1.3.0
## ✔ purrr     1.0.2
## ── Conflicts ────────────────────────────────────────── tidyverse_conflicts() ──
## ✖ dplyr::filter() masks stats::filter()
## ✖ dplyr::lag()    masks stats::lag()
## ℹ Use the conflicted package (<http://conflicted.r-lib.org/>) to force all conflicts to become errors
```

```
tidydata <- tribble(
  ~country,      ~year,  ~cases, ~population,
"Afghanistan",  1999,    745,   19987071,
"Afghanistan",  2000,   2666,   20595360,
"Brazil",       1999,  37737,  172006362,
"Brazil",       2000,  80488,  174504898,
"China",        1999, 212258, 1272915272,
"China",        2000, 213766, 1280428583)
tidydata
```

```
## # A tibble: 6 × 4
##   country      year  cases population
##   <chr>       <dbl>  <dbl>      <dbl>
## 1 Afghanistan  1999    745   19987071
## 2 Afghanistan  2000   2666   20595360
## 3 Brazil       1999  37737  172006362
## 4 Brazil       2000  80488  174504898
## 5 China        1999 212258 1272915272
## 6 China        2000 213766 1280428583
```

```
nontidydata <- tribble(
  ~country, ~year, ~rate,
  "Afghanistan", 1999, "745/19987071",
  "Afghanistan", 2000, "2666/20595360",
  "Brazil", 1999, "37737/172006362",
  "Brazil", 2000, "80488/174504898",
  "China", 1999, "212258/1272915272",
  "China", 2000, "213766/1280428583"
)

nontidydata
```

```
## # A tibble: 6 × 3
##   country      year rate
##   <chr>       <dbl> <chr>
## 1 Afghanistan  1999 745/19987071
## 2 Afghanistan  2000 2666/20595360
## 3 Brazil       1999 37737/172006362
## 4 Brazil       2000 80488/174504898
## 5 China        1999 212258/1272915272
## 6 China        2000 213766/1280428583
```

```
tidydata %>%
  group_by(year) %>%
  summarize(total_cases = sum(cases))
```

```
## # A tibble: 2 × 2
##    year total_cases
##   <dbl>       <dbl>
## 1  1999      250740
## 2  2000      296920
```

#separate the data into different columns [slide 11]

```
tidieddata <- nontidydata %>%
  separate(rate, into = c("cases", "population"),
           sep = "/")
tidieddata
```

```
## # A tibble: 6 × 4
##   country      year cases  population
##   <chr>       <dbl> <chr>  <chr>
## 1 Afghanistan  1999 745    19987071
## 2 Afghanistan  2000 2666   20595360
## 3 Brazil       1999 37737  172006362
## 4 Brazil       2000 80488  174504898
## 5 China        1999 212258 1272915272
## 6 China        2000 213766 1280428583
```

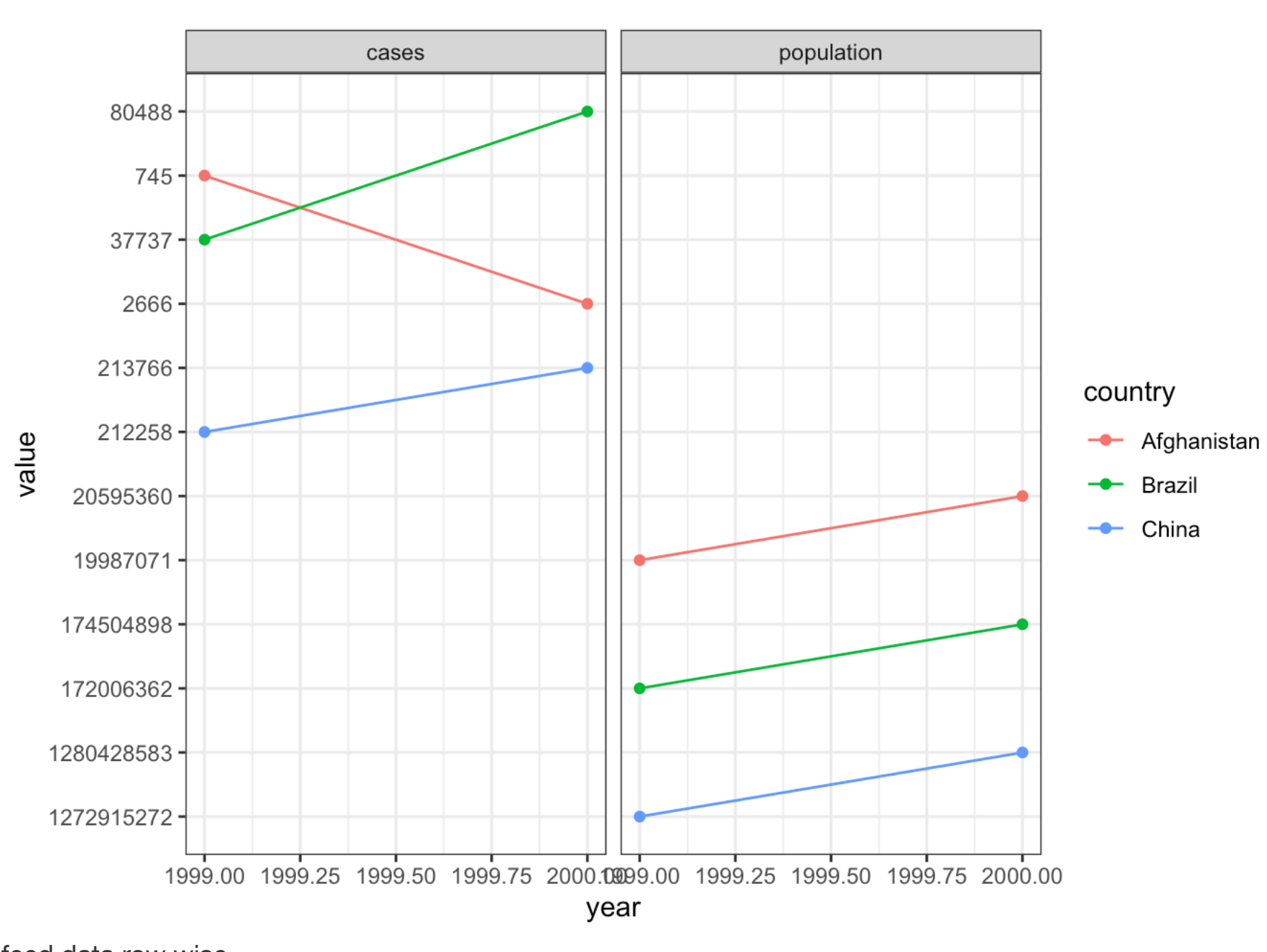
#reorganizing the variable [slide 12]

```
newtidieddata <- tidieddata %>%
  pivot_longer(
    cols = cases:population,
    names_to = "measurement",
    values_to = "value"
)
newtidieddata
```

```
## # A tibble: 12 × 4
##    country      year measurement value
##    <chr>       <dbl> <chr>       <chr>
##  1 Afghanistan  1999 cases       745
##  2 Afghanistan  1999 population  19987071
##  3 Afghanistan  2000 cases       2666
##  4 Afghanistan  2000 population  20595360
##  5 Brazil       1999 cases       37737
##  6 Brazil       1999 population  172006362
##  7 Brazil       2000 cases       80488
##  8 Brazil       2000 population  174504898
##  9 China        1999 cases       212258
## 10 China        1999 population  1272915272
## 11 China        2000 cases       213766
## 12 China        2000 population  1280428583
```

#ploting graphs from data facet_wrap: 1 dimensional grid regrouping data can help to plot specific graphs

```
ggplot(newtidieddata) +
  aes(x=year,y=value, colour=country) +
  geom_point() +
  geom_line(aes(group = country))+
  facet_wrap(~measurement) +
  theme_bw()
```



#tribble vs. tibble [slide 14] tribble:

feed data row wise

```
df <- tribble(
~id, ~bp1, ~bp2,
"A", 100, 120,
"B", 140, 115,
"C", 120, 125
)
df
```

```
## # A tibble: 3 × 3
##   id      bp1   bp2
##   <chr> <dbl> <dbl>
## 1 A       100   120
## 2 B       140   115
## 3 C       120   125
```

#[slide 18]

```
newtidieddata
```

```
## # A tibble: 12 × 4
##    country      year measurement value
##    <chr>       <dbl> <chr>       <chr>
##  1 Afghanistan  1999 cases       745
##  2 Afghanistan  1999 population  19987071
##  3 Afghanistan  2000 cases       2666
##  4 Afghanistan  2000 population  20595360
##  5 Brazil       1999 cases       37737
##  6 Brazil       1999 population  172006362
##  7 Brazil       2000 cases       80488
##  8 Brazil       2000 population  174504898
##  9 China        1999 cases       212258
## 10 China        1999 population  1272915272
## 11 China        2000 cases       213766
## 12 China        2000 population  1280428583
```

```
newtidieddata %>%
pivot_wider(names_from = "measurement",
              values_from ="value")
```

```
## # A tibble: 6 × 4
##   country      year cases  population
##   <chr>       <dbl> <chr>  <chr>
## 1 Afghanistan  1999 745    19987071
## 2 Afghanistan  2000 2666   20595360
## 3 Brazil       1999 37737  172006362
## 4 Brazil       2000 80488  174504898
## 5 China        1999 212258 1272915272
## 6 China        2000 213766 1280428583
```

another example of reshaping data

```
df %>%
pivot_longer(
  cols = bp1:bp2,
  names_to = "measurement",
  values_to = "value"
)
```

```
## # A tibble: 6 × 3
##   id    measurement value
##   <chr> <chr>       <dbl>
## 1 A     bp1           100
## 2 A     bp2           120
## 3 B     bp1           140
## 4 B     bp2           115
## 5 C     bp1           120
## 6 C     bp2           125
```

#reverse the reshaping [slide 19]

```
df <- tribble(
~id, ~measurement, ~value,
"A", "bp1", 100,
"B", "bp1", 140,
"B", "bp2", 115,
"A", "bp2", 120,
"A", "bp3", 105
)
df
```

```
## # A tibble: 5 × 3
##   id    measurement value
##   <chr> <chr>       <dbl>
## 1 A     bp1           100
## 2 B     bp1           140
## 3 B     bp2           115
## 4 A     bp2           120
## 5 A     bp3           105
```

```
df %>%
pivot_wider(
  names_from = measurement,
  values_from = value
)
```

```
## # A tibble: 2 × 4
##   id      bp1   bp2   bp3
##   <chr> <dbl> <dbl> <dbl>
## 1 A       100   120   105
## 2 B       140   115    NA
```

#scraping data from website

```
library(rvest)
```

```
##
## Attaching package: 'rvest'
```

```
## The following object is masked from 'package:readr':
##
##     guess_encoding
```

```
webpage <- read_html("https://books.toscrape.com/")
table <-html_elements(webpage,"body")
```

#API: Application Program Interface

```
library(httr)
library(jsonlite)

# current data
current_county_data_url <- "https://api.covidactnow.org/v2/counties.csv?apiKey=33382de96fd8441fb6c1eca82b3bd4ec"
# historic data
historic_county_data_url <-
"https://api.covidactnow.org/v2/counties.timeseries.csv?apiKey=33382de96fd8441fb6c1eca82b3bd4ec"
# individual location data
individual_loc_data_url <-
"https://api.covidactnow.org/v2/county/{state}.csv?apiKey=33382de96fd8441fb6c1eca82b3bd4ec"
```

#calling an API

```
# historic data
historic_county_data_url <-
"https://api.covidactnow.org/v2/counties.timeseries.csv?apiKey=33382de96fd8441fb6c1eca82b3bd4ec"
raw_data <- GET(historic_county_data_url)
raw_data$status
raw_data$content
```

```
# individual location data
individual_loc_data_url <-
"https://api.covidactnow.org/v2/county/{49}.csv?apiKey=33382de96fd8441fb6c1eca82b3bd4ec"
raw_data <- GET(individual_loc_data_url)
raw_data$status
raw_data$content
```

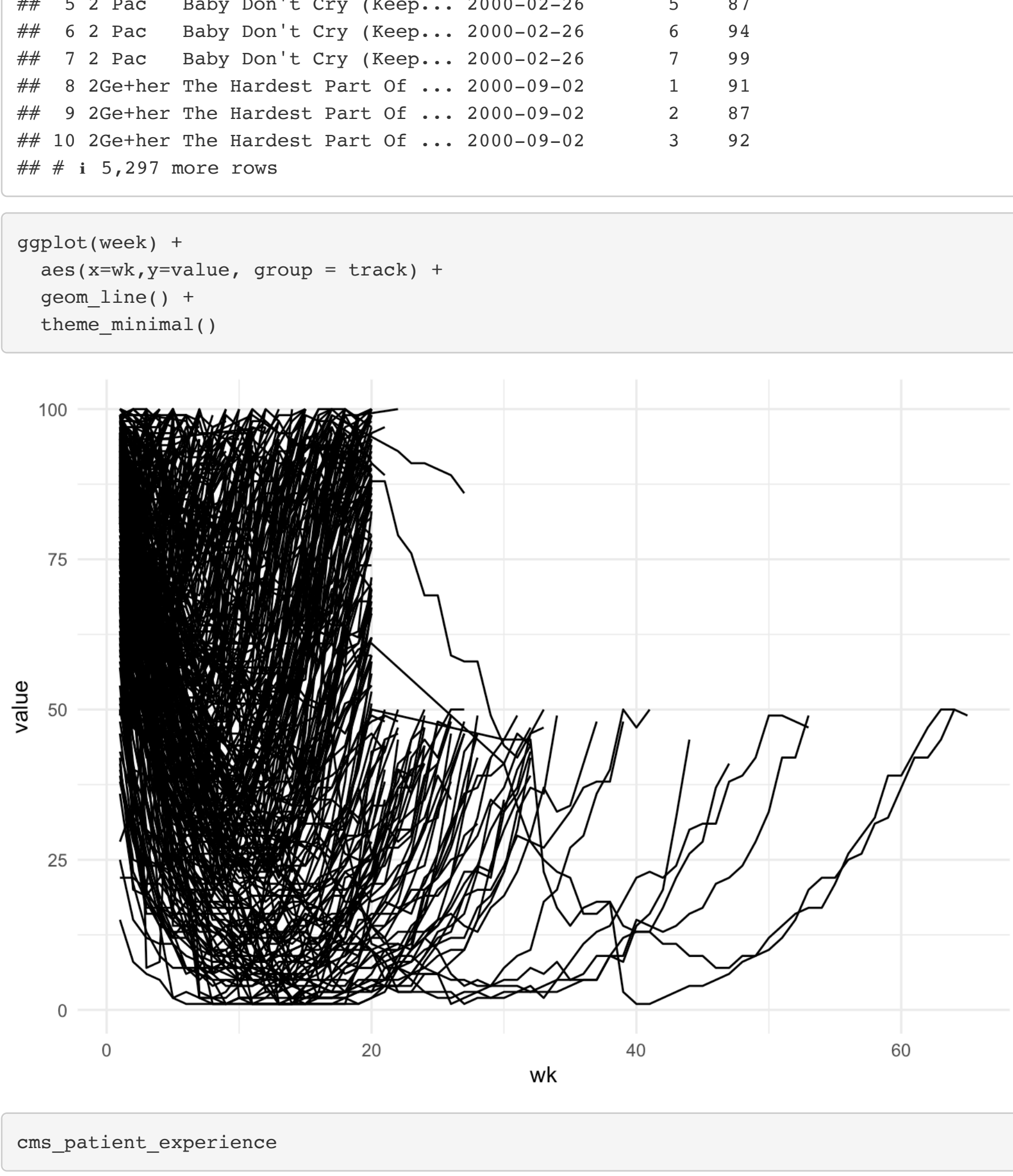
#challenge

```
week <- billboard %>%
  pivot_longer(
    cols = starts_with("wk"),
    names_to = "wk",
    values_to = "value",
    values_drop_na = TRUE) %>%
    mutate(wk = parse_number(wk))

week
```

```
## # A tibble: 5,307 × 5
##    artist  track                   date.entered    wk value
##    <chr>   <chr>                   <date>       <dbl> <dbl>
##  1 2 Pac   Baby Don't Cry (Keep... 2000-02-26       1    87
##  2 2 Pac   Baby Don't Cry (Keep... 2000-02-26       2    82
##  3 2 Pac   Baby Don't Cry (Keep... 2000-02-26       3    72
##  4 2 Pac   Baby Don't Cry (Keep... 2000-02-26       4    77
##  5 2 Pac   Baby Don't Cry (Keep... 2000-02-26       5    87
##  6 2 Pac   Baby Don't Cry (Keep... 2000-02-26       6    94
##  7 2 Pac   Baby Don't Cry (Keep... 2000-02-26       7    99
##  8 2Ge+her The Hardest Part Of ... 2000-09-02       1    91
##  9 2Ge+her The Hardest Part Of ... 2000-09-02       2    87
## 10 2Ge+her The Hardest Part Of ... 2000-09-02       3    92
## # ℹ 5,297 more rows
```

```
ggplot(week) +
  aes(x=wk,y=value, group = track) +
  geom_line() +
  theme_minimal()
```




```
cms_patient_experience
```

```
## # A tibble: 500 × 5
##    org_pac_id org_nm                               measure_cd measure_title prf_rate
##    <chr>      <chr>                                <chr>      <chr>            <dbl>
##  1 0446157747 USC CARE MEDICAL GROUP INC           CAHPS_GRP… CAHPS for MI…       63
##  2 0446157747 USC CARE MEDICAL GROUP INC           CAHPS_GRP… CAHPS for MI…       87
##  3 0446157747 USC CARE MEDICAL GROUP INC           CAHPS_GRP… CAHPS for MI…       86
##  4 0446157747 USC CARE MEDICAL GROUP INC           CAHPS_GRP… CAHPS for MI…       57
##  5 0446157747 USC CARE MEDICAL GROUP INC           CAHPS_GRP… CAHPS for MI…       85
##  6 0446157747 USC CARE MEDICAL GROUP INC           CAHPS_GRP… CAHPS for MI…       24
##  7 0446162697 ASSOCIATION OF UNIVERSITY PHYSI… CAHPS_GRP… CAHPS for MI…       59
##  8 0446162697 ASSOCIATION OF UNIVERSITY PHYSI… CAHPS_GRP… CAHPS for MI…       85
##  9 0446162697 ASSOCIATION OF UNIVERSITY PHYSI… CAHPS_GRP… CAHPS for MI…       83
## 10 0446162697 ASSOCIATION OF UNIVERSITY PHYSI… CAHPS_GRP… CAHPS for MI…       63
## # ℹ 490 more rows
```

```
cms_patient_experience %>%
pivot_wider(names_from = "measure_cd",
             values_from ="prf_rate",
           id_cols = starts_with("org"))
```

```
## # A tibble: 95 × 8
##    org_pac_id org_nm CAHPS_GRP_1 CAHPS_GRP_2 CAHPS_GRP_3 CAHPS_GRP_5 CAHPS_GRP_8
##    <chr>      <chr>        <dbl>       <dbl>       <dbl>       <dbl>       <dbl>
##  1 0446157747 USC C…          63          87          86          57          85
##  2 0446162697 ASSOC…          59          85          83          63          88
##  3 0547164295 BEAVE…          49          NA          75          44          73
##  4 0749333730 CAPE …          67          84          85          65          82
##  5 0840104360 ALLIA…          66          87          87          64          87
##  6 0840109864 REX H…          73          87          84          67          91
##  7 0840513552 SCL H…          58          83          76          58          78
##  8 0941545784 GRITM…          46          86          81          54          NA
##  9 1052612785 COMMU…          65          84          80          58          87
## 10 1254237779 OUR L…          61          NA          NA          65          NA
## # ℹ 85 more rows
## # ℹ 1 more variable: CAHPS_GRP_12 <dbl>
```