HW3 Key

07_apis.qmd

On Your Own 2-3

```
# Two ways to get my hidden key

myapikey <- readLines("~/264_fall_2024/DS2_preview_work/census_api_key.txt")

# I used the first line to store my CENSUS API key in .Renviron
#   after uncommenting - should only need to run one time
# Sys.setenv("CENSUS_KEY" = "my census api key pasted here")
my_census_api_key <- Sys.getenv("CENSUS_KEY")
```

2. Write a function to give choices about year, county, and variables

```
# function to allow user inputs

MN_tract_data <- function(year, county, variables) {
  tidycensus::get_acs(
    Sys.sleep(0.5),
    year = year,
    state = "MN",
    geography = "tract",
    variables = variables,
    output = "wide",
    geometry = TRUE,
    county = county
  ) |>
    mutate(year = year)
}
```

```r
# Should really build in checks so that county is in MN, year is in
#   proper range, and variables are part of ACS1 data set

my_data <- MN_tract_data(year = 2021,
              county = "Hennepin",
              variables = c("B01003_001", "B19013_001"))
```

```
Getting data from the 2017-2021 5-year ACS
```

```
Downloading feature geometry from the Census website.  To cache shapefiles for use in future
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```
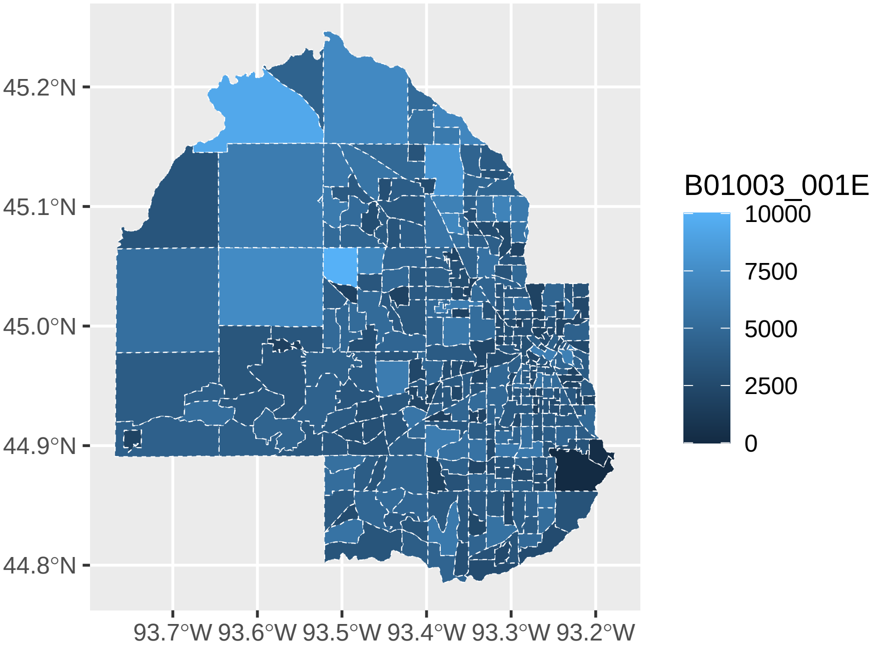

```r
ggplot(data = my_data) +
  geom_sf(aes(fill = B01003_001E), colour = "white", linetype = 2)
```



```r
my_data <- MN_tract_data(year = 2022,
                county = "Rice",
                variables = c("B01003_001", "B19013_001"))
```

```
Getting data from the 2018-2022 5-year ACS
Downloading feature geometry from the Census website.  To cache shapefiles for use in future



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```r
ggplot(data = my_data) +
  geom_sf(aes(fill = B01003_001E), colour = "white", linetype = 2)
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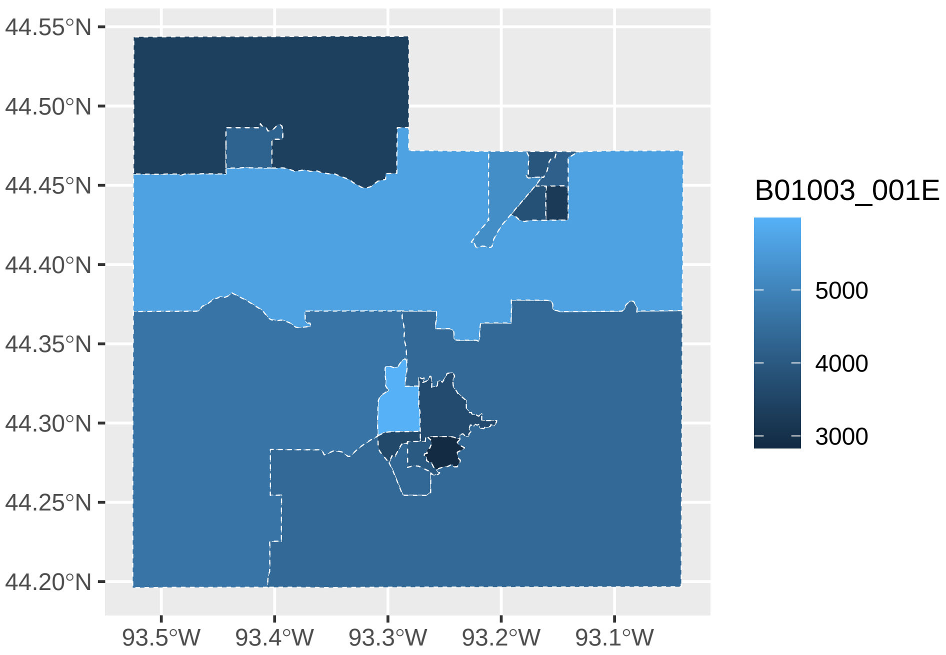

```
# Try other variables:
#  - B25077_001 is median home price
#  - B02001_002 is number of white residents
#  - etc.
# although the census codebook is admittedly quite daunting!
```

3. Use your function from (2) along with `map` and `list_rbind` to build a data set for Rice county for the years 2019-2021

```
# To examine trends over time in Rice County
2019:2021 |>
  purrr::map(\(x)
    MN_tract_data(
      x,
      county = "Rice",
      variables = c("B01003_001", "B19013_001")
    )
  ) |>
  list_rbind()
```

```
Getting data from the 2015-2019 5-year ACS

Downloading feature geometry from the Census website.  To cache shapefiles for use in future
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Getting data from the 2016-2020 5-year ACS
Downloading feature geometry from the Census website.  To cache shapefiles for use in future
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Getting data from the 2017-2021 5-year ACS
Downloading feature geometry from the Census website.  To cache shapefiles for use in future

         GEOID                                        NAME B01003_001E
1  27131070504 Census Tract 705.04, Rice County, Minnesota        3933
2  27131070400    Census Tract 704, Rice County, Minnesota        4511
3  27131070300    Census Tract 703, Rice County, Minnesota        4551
4  27131070503 Census Tract 705.03, Rice County, Minnesota        3348
5  27131070601 Census Tract 706.01, Rice County, Minnesota        3526
6  27131070800    Census Tract 708, Rice County, Minnesota        8101
7  27131070901 Census Tract 709.01, Rice County, Minnesota        5509
8  27131070700    Census Tract 707, Rice County, Minnesota        7165
9  27131070100    Census Tract 701, Rice County, Minnesota        7333
10 27131070602 Census Tract 706.02, Rice County, Minnesota        5211
11 27131070200    Census Tract 702, Rice County, Minnesota        5463
12 27131070902 Census Tract 709.02, Rice County, Minnesota        3160
13 27131070501 Census Tract 705.01, Rice County, Minnesota        4374
14 27131070501 Census Tract 705.01, Rice County, Minnesota        4272
15 27131070504 Census Tract 705.04, Rice County, Minnesota        3941
16 27131070801 Census Tract 708.01, Rice County, Minnesota        4456
17 27131070200    Census Tract 702, Rice County, Minnesota        5508
18 27131070701 Census Tract 707.01, Rice County, Minnesota        3057
19 27131070400    Census Tract 704, Rice County, Minnesota        4686
20 27131070300    Census Tract 703, Rice County, Minnesota        4737
21 27131070601 Census Tract 706.01, Rice County, Minnesota        3669
22 27131070102 Census Tract 701.02, Rice County, Minnesota        3786
23 27131070802 Census Tract 708.02, Rice County, Minnesota        3873
24 27131070702 Census Tract 707.02, Rice County, Minnesota        3872
25 27131070901 Census Tract 709.01, Rice County, Minnesota        5681
26 27131070503 Census Tract 705.03, Rice County, Minnesota        3185
27 27131070902 Census Tract 709.02, Rice County, Minnesota        2992
28 27131070101 Census Tract 701.01, Rice County, Minnesota        3428
29 27131070602 Census Tract 706.02, Rice County, Minnesota        5406
30 27131070902 Census Tract 709.02, Rice County, Minnesota        3212
31 27131070601 Census Tract 706.01, Rice County, Minnesota        3775
32 27131070503 Census Tract 705.03, Rice County, Minnesota        3035
33 27131070702 Census Tract 707.02, Rice County, Minnesota        3738
34 27131070901 Census Tract 709.01, Rice County, Minnesota        5858
```

```
35 27131070801 Census Tract 708.01, Rice County, Minnesota        4618
36 27131070501 Census Tract 705.01, Rice County, Minnesota        4242
37 27131070300    Census Tract 703, Rice County, Minnesota        4657
38 27131070200    Census Tract 702, Rice County, Minnesota        5419
39 27131070400    Census Tract 704, Rice County, Minnesota        4380
40 27131070701 Census Tract 707.01, Rice County, Minnesota        3028
41 27131070504 Census Tract 705.04, Rice County, Minnesota        3917
42 27131070101 Census Tract 701.01, Rice County, Minnesota        3417
43 27131070802 Census Tract 708.02, Rice County, Minnesota        3944
44 27131070102 Census Tract 701.02, Rice County, Minnesota        4201
45 27131070602 Census Tract 706.02, Rice County, Minnesota        5354
   B01003_001M B19013_001E B19013_001M                       geometry year
1          273       63989        9273 MULTIPOLYGON (((-93.19137 4... 2019
2          168       85952        2758 MULTIPOLYGON (((-93.40564 4... 2019
3          190       78343        4242 MULTIPOLYGON (((-93.52521 4... 2019
4          245       92321       14200 MULTIPOLYGON (((-93.16075 4... 2019
5          333       50368        9979 MULTIPOLYGON (((-93.17615 4... 2019
6          465       48403        7679 MULTIPOLYGON (((-93.29819 4... 2019
7          456       44417       10552 MULTIPOLYGON (((-93.30904 4... 2019
8          414       67868        9422 MULTIPOLYGON (((-93.27265 4... 2019
9          326       91667        8106 MULTIPOLYGON (((-93.52452 4... 2019
10         310       64479       12376 MULTIPOLYGON (((-93.22644 4... 2019
11         177      101359        4104 MULTIPOLYGON (((-93.5246 44... 2019
12         410       45230       12887 MULTIPOLYGON (((-93.30888 4... 2019
13         270       66188        9179 MULTIPOLYGON (((-93.16981 4... 2019
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15         536       63500        7351 MULTIPOLYGON (((-93.1909 44... 2020
16         703       67625       23325 MULTIPOLYGON (((-93.29829 4... 2020
17         473      104011        5648 MULTIPOLYGON (((-93.5246 44... 2020
18         218       73750       13139 MULTIPOLYGON (((-93.26704 4... 2020
19         296       86094        3438 MULTIPOLYGON (((-93.40564 4... 2020
20         244       79068        4902 MULTIPOLYGON (((-93.52518 4... 2020
21         525       52936       10436 MULTIPOLYGON (((-93.17615 4... 2020
22         199       96023       13649 MULTIPOLYGON (((-93.44292 4... 2020
23         437       63924        8715 MULTIPOLYGON (((-93.28272 4... 2020
24         425       49811       16864 MULTIPOLYGON (((-93.27265 4... 2020
25         566       51595        9615 MULTIPOLYGON (((-93.30904 4... 2020
26         341      100516       11630 MULTIPOLYGON (((-93.16075 4... 2020
27         440       46750       15457 MULTIPOLYGON (((-93.30888 4... 2020
28         295      100563       15809 MULTIPOLYGON (((-93.52452 4... 2020
29         377       62078        5270 MULTIPOLYGON (((-93.22644 4... 2020
30         421       47059       15456 MULTIPOLYGON (((-93.30888 4... 2021
31         435       56319        4333 MULTIPOLYGON (((-93.17615 4... 2021
32          321      105952        8429 MULTIPOLYGON (((-93.16075 4... 2021
33          409       57126       13968 MULTIPOLYGON (((-93.27265 4... 2021
34          714       47344        9579 MULTIPOLYGON (((-93.30904 4... 2021
35          622       61193       23977 MULTIPOLYGON (((-93.29829 4... 2021
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38          520      111711       10313 MULTIPOLYGON (((-93.5246 44... 2021
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41          537       67219        9805 MULTIPOLYGON (((-93.1909 44... 2021
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43          462       63679       12261 MULTIPOLYGON (((-93.28274 4... 2021
44          199       85789       20094 MULTIPOLYGON (((-93.44292 4... 2021
45          359       63835        4805 MULTIPOLYGON (((-93.22644 4... 2021
```

```
# Or a little more simply
2019:2021 |>
  purrr::map(MN_tract_data,
             county = "Rice",
             variables = c("B01003_001", "B19013_001")
            ) |>
  list_rbind()
```

```
Getting data from the 2015-2019 5-year ACS
Downloading feature geometry from the Census website.  To cache shapefiles for use in future

Getting data from the 2016-2020 5-year ACS


Downloading feature geometry from the Census website.  To cache shapefiles for use in future


Getting data from the 2017-2021 5-year ACS


Downloading feature geometry from the Census website.  To cache shapefiles for use in future
```

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         GEOID                                        NAME B01003_001E
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4  27131070503 Census Tract 705.03, Rice County, Minnesota        3348
5  27131070601 Census Tract 706.01, Rice County, Minnesota        3526
```

```
6  27131070800    Census Tract 708, Rice County, Minnesota        8101
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30 27131070902 Census Tract 709.02, Rice County, Minnesota        3212
31 27131070601 Census Tract 706.01, Rice County, Minnesota        3775
32 27131070503 Census Tract 705.03, Rice County, Minnesota        3035
33 27131070702 Census Tract 707.02, Rice County, Minnesota        3738
34 27131070901 Census Tract 709.01, Rice County, Minnesota        5858
35 27131070801 Census Tract 708.01, Rice County, Minnesota        4618
36 27131070501 Census Tract 705.01, Rice County, Minnesota        4242
37 27131070300    Census Tract 703, Rice County, Minnesota        4657
38 27131070200    Census Tract 702, Rice County, Minnesota        5419
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43 27131070802 Census Tract 708.02, Rice County, Minnesota        3944
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1          273       63989        9273 MULTIPOLYGON (((-93.19137 4... 2019
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26         341      100516       11630 MULTIPOLYGON (((-93.16075 4... 2020
27         440       46750       15457 MULTIPOLYGON (((-93.30888 4... 2020
28         295      100563       15809 MULTIPOLYGON (((-93.52452 4... 2020
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30         421       47059       15456 MULTIPOLYGON (((-93.30888 4... 2021
31         435       56319        4333 MULTIPOLYGON (((-93.17615 4... 2021
32         321      105952        8429 MULTIPOLYGON (((-93.16075 4... 2021
33         409       57126       13968 MULTIPOLYGON (((-93.27265 4... 2021
34         714       47344        9579 MULTIPOLYGON (((-93.30904 4... 2021
35         622       61193       23977 MULTIPOLYGON (((-93.29829 4... 2021
36         380       79063       15272 MULTIPOLYGON (((-93.16981 4... 2021
37         296       83911        7244 MULTIPOLYGON (((-93.52522 4... 2021
38         520      111711       10313 MULTIPOLYGON (((-93.5246 44... 2021
39         274       90179        4919 MULTIPOLYGON (((-93.40564 4... 2021
40         358       82500       20934 MULTIPOLYGON (((-93.26775 4... 2021
41         537       67219        9805 MULTIPOLYGON (((-93.1909 44... 2021
42         270      108490        1768 MULTIPOLYGON (((-93.52452 4... 2021
43         462       63679       12261 MULTIPOLYGON (((-93.28274 4... 2021
44         199       85789       20094 MULTIPOLYGON (((-93.44292 4... 2021
45         359       63835        4805 MULTIPOLYGON (((-93.22644 4... 2021
```

OMDB example

```r
myapikey <- readLines("~/264_fall_2024/DS2_preview_work/omdb_api_key.txt")

# I used the first line to store my OMDB API key in .Renviron
# Sys.setenv("OMDB_KEY" = "paste my omdb key here")
myapikey <- Sys.getenv("OMDB_KEY")

# Find url exploring examples at omdbapi.com
url <- str_c("http://www.omdbapi.com/?t=Coco&y=2017&apikey=", myapikey)

coco <- GET(url)   # coco holds response from server
coco               # Status of 200 is good!

details <- content(coco, "parse")
details                         # get a list of 25 pieces of information
details$Year                    # how to access details
details[[2]]                    # since a list, another way to access
```

Now build a data set for a collection of movies

```r
# Must figure out pattern in URL for obtaining different movies
#  - try searching for others
movies <- c("Coco", "Wonder+Woman", "Get+Out",
            "The+Greatest+Showman", "Thor:+Ragnarok")

# Set up empty tibble
omdb <- tibble(Title = character(), Rated = character(), Genre = character(),
       Actors = character(), Metascore = double(), imdbRating = double(),
       BoxOffice = double())

# Use for loop to run through API request process 5 times,
#   each time filling the next row in the tibble
#  - can do max of 1000 GETs per day
for(i in 1:5) {
  url <- str_c("http://www.omdbapi.com/?t=",movies[i],
               "&apikey=", myapikey)
  Sys.sleep(0.5)
  onemovie <- GET(url)
  details <- content(onemovie, "parse")
  omdb[i,1] <- details$Title
  omdb[i,2] <- details$Rated
  omdb[i,3] <- details$Genre
  omdb[i,4] <- details$Actors
  omdb[i,5] <- parse_number(details$Metascore)
  omdb[i,6] <- parse_number(details$imdbRating)
  omdb[i,7] <- parse_number(details$BoxOffice)   # no $ and ,'s
}

omdb

#  could use stringr functions to further organize this data - separate
#    different genres, different actors, etc.
```

Each person should have 5x5 tibble with different movies and different variables.

08_table_scraping.qmd

On Your Own 2.2-2.4

2. We would like to create a tibble with 4 years of data (2001-2004) from the Minnesota Wild hockey team. Specifically, we are interested in the "Scoring Regular Season" table from this webpage and the similar webpages from 2002, 2003, and 2004. Your final tibble should have 6 columns: player, year, age, pos (position), gp (games played), and pts (points).

You should (a) write a function called `hockey_stats` with inputs for team and year to scrape data from the "scoring Regular Season" table, and (b) use iteration techniques to scrape and combine 4 years worth of data. Here are some functions you might consider:

- `row_to_names(row_number = 1)` from the `janitor` package
- `clean_names()` also from the `janitor` package
- `bow()` and `scrape()` from the `polite` package
- `str_c()` from the `stringr` package (for creating urls with user inputs)
- `map2()` and `list_rbind()` for iterating and combining years

Try following these steps:

[SKIP] 1) Be sure you can find and clean the correct table from the 2021 season.

2) Organize your `rvest` code from (1) into functions from the `polite` package.

3) Place the code from (2) into a function where the user can input a team and year. You would then adjust the url accordingly and produce a clean table for the user.

4) Use `map2` and `list_rbind` to build one data set containing Minnesota Wild data from 2001-2004.

```
library(janitor)

robotstxt::paths_allowed("https://www.hockey-reference.com/teams/MIN/2001.html")
```

```
[1] TRUE
```

```
url <- str_c("https://www.hockey-reference.com/teams/MIN/2001.html")
player_url <- read_html(url)
player_stat <- html_nodes(player_url, css = "table")
html_table(player_stat, header = TRUE, fill = TRUE)
```

```
[[1]]
# A tibble: 2 x 29
  Team  AvAge    GP     W     L     T    OL   PTS `PTS%`    GF    GA   SRS   SOS
  <chr> <dbl> <int> <int> <int> <int> <int> <int>  <dbl> <int> <int> <dbl> <dbl>
1 Minn~  27.4    82    25    39    13     5    68  0.415   168   210 -0.42  0.09
2 Leag~  27.8    82    36    32    10     4    86  0.525   226   226 NA    NA   
# i 16 more variables: `GF/G` <dbl>, `GA/G` <dbl>, PP <int>, PPO <int>,
#   `PP%` <dbl>, PPA <int>, PPOA <int>, `PK%` <dbl>, SH <int>, SHA <int>,
#   S <int>, `S%` <dbl>, SA <int>, `SV%` <dbl>, PDO <lgl>, SO <int>

[[2]]
# A tibble: 2 x 22
  Team  `S%`  `SV%` PDO   CF    CA    `CF%` xGF   xGA   aGF   aGA   axDiff SCF  
  <chr> <lgl> <lgl> <lgl> <lgl> <lgl> <lgl> <lgl> <lgl> <lgl> <lgl> <lgl>  <lgl>
1 Minn~ NA    NA    NA    NA    NA    NA    NA    NA    NA    NA    NA     NA   
2 Leag~ NA    NA    NA    NA    NA    NA    NA    NA    NA    NA    NA     NA   
# i 9 more variables: SCA <lgl>, `SCF%` <lgl>, HDF <lgl>, HDA <lgl>,
#   `HDF%` <lgl>, HDGF <lgl>, `HDC%` <lgl>, HDGA <lgl>, `HDCO%` <lgl>

[[3]]
# A tibble: 38 x 11
   No.   Player   Birth Pos     Age Ht       Wt `S/C` Exp   `Birth Date` Summary
   <chr> <chr>    <chr> <chr> <int> <chr> <int> <chr> <chr> <chr>        <chr>  
 1 40    Chris A~ ca CA D        25 6-0     205 L/-   R     June 26, 19~ 0 G, 0~
 2 45    Peter B~ cs CS RW       27 6-0     185 R/-   R     September 5~ 4 G, 2~
 3 3     Ladisla~ cs CS D        25 6-2     190 L/-   1     March 24, 1~ 2 G, 5~
 4 31    Zac Bie~ ca CA G        24 6-5     205 -/L   3     September 1~ 0-1-0,~
 5 36    Sylvain~ ca CA LW       26 6-2     215 L/-   3     May 21, 1974 3 G, 2~
 6 5     Brad Bo~ ca CA D        28 6-1     205 L/-   3     May 5, 1972  0 G, 1~
 7 32    Brian B~ us US LW       27 5-10    186 L/-   1     November 28~ 0 G, 0~
 8 15    J.J. Da~ ca CA D        35 5-10    192 L/-   15    October 12,~ 0 G, 0~
 9 34    Jim Dowd us US C        32 6-0     180 R/-   9     December 25~ 7 G, 2~
10 11    Pascal ~ ca CA LW       21 6-1     205 L/-   R     April 7, 19~ 1 G, 0~
# i 28 more rows

[[4]]
# A tibble: 40 x 22
   ``    ``    ``    ``    ``    Scoring Scoring Scoring ``    ``    Goals Goals
   <chr> <chr> <chr> <chr> <chr> <chr>   <chr>   <chr>   <chr> <chr> <chr> <chr>
 1 Rk    Play~ Age   Pos   GP    G       A       PTS     +/-   PIM   EVG   PPG
 2 1     Scot~ 31    RW    58    11      28      39      6     45    7     2
 3 2     Mari~ 18    LW    71    18      18      36      -6    32    12    6
 4 3     Ľubo~ 32    D     80    11      23      34      -8    52    7     4
 5 4     Wes ~ 30    C     82    18      12      30      -8    37    11    0
 6 5     Fili~ 24    D     75    9       21      30      -6    28    5     4
 7 6     Darb~ 28    LW    72    18      11      29      1     36    14    3
 8 7     Jim ~ 32    C     68    7       22      29      -6    80    7     0
 9 8     Antt~ 27    LW    82    12      16      28      -7    24    10    0
10 9     Stac~ 26    C     76    7       20      27      3     20    6     1
# i 30 more rows
# i 10 more variables: Goals <chr>, Goals <chr>, Assists <chr>, Assists <chr>,
#   Assists <chr>, Shots <chr>, Shots <chr>, `Ice Time` <chr>,
#   `Ice Time` <chr>, `` <chr>

[[5]]
# A tibble: 6 x 22
  ``    ``     ``    `Goalie Stats` `Goalie Stats` `Goalie Stats` `Goalie Stats`
  <chr> <chr>  <chr> <chr>          <chr>          <chr>          <chr>
1 "Rk"  Player "Age" "GP"           "GS"           W              L
2 "1"   Manny~ "26"  "42"           ""             19             17
3 "2"   Jamie~ "29"  "38"           ""             5              23
4 "3"   Derek~ "21"  "4"            ""             1              3
5 "4"   Zac B~ "24"  "1"            ""             0              1
6 ""    Team ~ ""    ""             ""             25             44
# i 15 more variables: `Goalie Stats` <chr>, `Goalie Stats` <chr>,
#   `Goalie Stats` <chr>, `Goalie Stats` <chr>, `Goalie Stats` <chr>,
#   `Goalie Stats` <chr>, `Goalie Stats` <chr>, `Goalie Stats` <chr>,
#   `Goalie Stats` <chr>, `Goalie Stats` <chr>, `Goalie Stats` <chr>,
#   `Goalie Stats` <chr>, `Goalie Stats` <chr>, `` <chr>, `` <chr>
```

```
[[6]]
# A tibble: 35 x 18
   ``    ``                ``    ``    ``    Adjusted Adjusted Adjusted Adjusted
   <chr> <chr>             <chr> <chr> <chr> <chr>    <chr>    <chr>    <chr>
 1 Rk    Player            Age   Pos   GP    G        A        PTS      GC
 2 1     Scott Pellerin    31    RW    58    12       30       42       14.7
 3 2     Marián Gáborík    18    LW    71    20       19       39       16.1
 4 3     Ľubomír Sekeráš   32    D     80    12       25       37       13.4
 5 4     Wes Walz          30    C     82    20       13       33       14.5
 6 5     Filip Kuba        24    D     75    10       22       32       11.5
 7 6     Jim Dowd          32    C     68    8        23       31       10.6
 8 7     Darby Hendrickson 28    LW    72    20       12       32       14.2
 9 8     Antti Laaksonen   27    LW    82    13       17       30       11.7
10 9     Stacy Roest       26    C     76    8        21       29       10.1
# i 25 more rows
# i 9 more variables: `Plus/Minus` <chr>, `Plus/Minus` <chr>,
#   `Plus/Minus` <chr>, `Plus/Minus` <chr>, `Plus/Minus` <chr>,
#   `Point Shares` <chr>, `Point Shares` <chr>, `Point Shares` <chr>, `` <chr>
```

```r
html_table(player_stat, header = TRUE, fill = TRUE)[[4]]
```

```
# A tibble: 40 x 22
   ``    ``    ``    ``    ``    Scoring Scoring Scoring ``    ``    Goals Goals
   <chr> <chr> <chr> <chr> <chr> <chr>   <chr>   <chr>   <chr> <chr> <chr> <chr>
 1 Rk    Play~ Age   Pos   GP    G       A       PTS     +/-   PIM   EVG   PPG
 2 1     Scot~ 31    RW    58    11      28      39      6     45    7     2
 3 2     Mari~ 18    LW    71    18      18      36      -6    32    12    6
 4 3     Ľubo~ 32    D     80    11      23      34      -8    52    7     4
 5 4     Wes ~ 30    C     82    18      12      30      -8    37    11    0
 6 5     Fili~ 24    D     75    9       21      30      -6    28    5     4
 7 6     Darb~ 28    LW    72    18      11      29      1     36    14    3
 8 7     Jim ~ 32    C     68    7       22      29      -6    80    7     0
 9 8     Antt~ 27    LW    82    12      16      28      -7    24    10    0
10 9     Stac~ 26    C     76    7       20      27      3     20    6     1
# i 30 more rows
# i 10 more variables: Goals <chr>, Goals <chr>, Assists <chr>, Assists <chr>,
#   Assists <chr>, Shots <chr>, Shots <chr>, `Ice Time` <chr>,
#   `Ice Time` <chr>, `` <chr>
```

```r
html_table(player_stat, header = TRUE, fill = TRUE)[[4]] |>
  row_to_names(row_number = 1)
```

```
# A tibble: 39 x 22
   Rk    Player       Age   Pos   GP    G     A     PTS   `+/-` PIM   EVG   PPG
   <chr> <chr>        <chr> <chr> <chr> <chr> <chr> <chr> <chr> <chr> <chr> <chr>
 1 1     Scott Pell~ 31    RW    58    11    28    39    6     45    7     2
 2 2     Marián Gáb~ 18    LW    71    18    18    36    -6    32    12    6
 3 3     Ľubomír Se~ 32    D     80    11    23    34    -8    52    7     4
 4 4     Wes Walz    30    C     82    18    12    30    -8    37    11    0
 5 5     Filip Kuba  24    D     75    9     21    30    -6    28    5     4
 6 6     Darby Hend~ 28    LW    72    18    11    29    1     36    14    3
 7 7     Jim Dowd    32    C     68    7     22    29    -6    80    7     0
 8 8     Antti Laak~ 27    LW    82    12    16    28    -7    24    10    0
 9 9     Stacy Roest 26    C     76    7     20    27    3     20    6     1
10 10    Aaron Gavey 26    C     75    10    14    24    -8    52    9     1
# i 29 more rows
# i 10 more variables: SHG <chr>, GWG <chr>, EV <chr>, PP <chr>, SH <chr>,
#   SOG <chr>, SPCT <chr>, TOI <chr>, ATOI <chr>, Awards <chr>
```

```r
player_tibble <- html_table(player_stat, header = TRUE, fill = TRUE)[[4]] |>
  row_to_names(row_number = 1) |>
  clean_names()
player_tibble
```

```
# A tibble: 39 x 22
   rk    player       age   pos   gp    g     a     pts   x     pim   evg   ppg
   <chr> <chr>        <chr> <chr> <chr> <chr> <chr> <chr> <chr> <chr> <chr> <chr>
 1 1     Scott Pell~ 31    RW    58    11    28    39    6     45    7     2
 2 2     Marián Gáb~ 18    LW    71    18    18    36    -6    32    12    6
 3 3     Ľubomír Se~ 32    D     80    11    23    34    -8    52    7     4
 4 4     Wes Walz    30    C     82    18    12    30    -8    37    11    0
 5 5     Filip Kuba  24    D     75    9     21    30    -6    28    5     4
 6 6     Darby Hend~ 28    LW    72    18    11    29    1     36    14    3
 7 7     Jim Dowd    32    C     68    7     22    29    -6    80    7     0
 8 8     Antti Laak~ 27    LW    82    12    16    28    -7    24    10    0
 9 9     Stacy Roest 26    C     76    7     20    27    3     20    6     1
10 10    Aaron Gavey 26    C     75    10    14    24    -8    52    9     1
# i 29 more rows
# i 10 more variables: shg <chr>, gwg <chr>, ev <chr>, pp <chr>, sh <chr>,
#   sog <chr>, spct <chr>, toi <chr>, atoi <chr>, awards <chr>
```

```r
# 2.2) perform the steps above with the polite package
session <- bow("https://www.hockey-reference.com/teams/MIN/2001.html", force = TRUE)
```

```
result <- scrape(session) |>
  html_nodes(css = "table") |>
  html_table(header = TRUE, fill = TRUE)
player_tibble <- result[[4]] |>
  row_to_names(row_number = 1) |>
  clean_names()
player_tibble
```

```
# A tibble: 39 x 22
   rk    player      age   pos   gp    g     a     pts   x     pim   evg   ppg
   <chr> <chr>       <chr> <chr> <chr> <chr> <chr> <chr> <chr> <chr> <chr> <chr>
 1 1     Scott Pell~ 31    RW    58    11    28    39    6     45    7     2
 2 2     Marián Gáb~ 18    LW    71    18    18    36    -6    32    12    6
 3 3     Ľubomír Se~ 32    D     80    11    23    34    -8    52    7     4
 4 4     Wes Walz    30    C     82    18    12    30    -8    37    11    0
 5 5     Filip Kuba  24    D     75    9     21    30    -6    28    5     4
 6 6     Darby Hend~ 28    LW    72    18    11    29    1     36    14    3
 7 7     Jim Dowd    32    C     68    7     22    29    -6    80    7     0
 8 8     Antti Laak~ 27    LW    82    12    16    28    -7    24    10    0
 9 9     Stacy Roest 26    C     76    7     20    27    3     20    6     1
10 10    Aaron Gavey 26    C     75    10    14    24    -8    52    9     1
# i 29 more rows
# i 10 more variables: shg <chr>, gwg <chr>, ev <chr>, pp <chr>, sh <chr>,
#   sog <chr>, spct <chr>, toi <chr>, atoi <chr>, awards <chr>
```

```
# 2.3) write function to scrape data from a single year for a specific team
hockey_stats <- function(team = "MIN", year = 2001) {
  url <- str_c("https://www.hockey-reference.com/teams/",team,"/",year,".html")
  session <- bow(url, force = TRUE)

  result <- scrape(session) |>
    html_nodes(css = "table") |>
    html_table(header = TRUE, fill = TRUE)
  player_tibble <- result[[4]] |>
    row_to_names(row_number = 1) |>
    clean_names() |>
    mutate(year = year) |>
    select(player, year, age, pos, gp, pts)
  player_tibble
}
```

```r
hockey_stats("MIN", 2001)
```

```
# A tibble: 39 x 6
   player             year age   pos   gp    pts  
   <chr>             <dbl> <chr> <chr> <chr> <chr>
 1 Scott Pellerin     2001 31    RW    58    39   
 2 Marián Gáborík     2001 18    LW    71    36   
 3 Ľubomír Sekeráš    2001 32    D     80    34   
 4 Wes Walz           2001 30    C     82    30   
 5 Filip Kuba         2001 24    D     75    30   
 6 Darby Hendrickson  2001 28    LW    72    29   
 7 Jim Dowd           2001 32    C     68    29   
 8 Antti Laaksonen    2001 27    LW    82    28   
 9 Stacy Roest        2001 26    C     76    27   
10 Aaron Gavey        2001 26    C     75    24   
# i 29 more rows
```

```r
# 2.4) use map function to scrape data from 2001 to 2004 and combine into
#   a single data set
teams <- rep("MIN", 4)
years <- 2001:2004
temp <- map2(teams, years, hockey_stats)
hockey_data_4yrs <- list_rbind(temp)
hockey_data_4yrs
```

```
# A tibble: 141 x 6
   player             year age   pos   gp    pts  
   <chr>             <int> <chr> <chr> <chr> <chr>
 1 Scott Pellerin     2001 31    RW    58    39   
 2 Marián Gáborík     2001 18    LW    71    36   
 3 Ľubomír Sekeráš    2001 32    D     80    34   
 4 Wes Walz           2001 30    C     82    30   
 5 Filip Kuba         2001 24    D     75    30   
 6 Darby Hendrickson  2001 28    LW    72    29   
 7 Jim Dowd           2001 32    C     68    29   
 8 Antti Laaksonen    2001 27    LW    82    28   
 9 Stacy Roest        2001 26    C     76    27   
10 Aaron Gavey        2001 26    C     75    24   
# i 131 more rows
```

09_web_scraping.qmd

Pause to Ponder - 3 items on NIH News Releases right before the On Your Own section

[**Pause to Ponder:**] Create a function to scrape a single NIH press release page by filling missing pieces labeled ???:

```r
# Helper function to reduce html_nodes() |> html_text() code duplication
get_text_from_page <- function(page, css_selector) {
    page |>
      html_nodes(css_selector) |>
      html_text()
}

# Main function to scrape and tidy desired attributes
scrape_page <- function(url) {
    Sys.sleep(2)
    page <- read_html(url)
    article_titles <- get_text_from_page(page, ".teaser-title")
    article_dates <- get_text_from_page(page, ".date-display-single")
    article_dates <- mdy(article_dates)
    article_description <- get_text_from_page(page, ".teaser-description")
    article_description <- str_trim(str_replace(article_description,
                                                ".*\\n",
                                                "")
                                    )

    tibble(
        title = article_titles,
        date = article_dates,
        description = article_description
    )
}
```

[**Pause to Ponder:**] Use a for loop over the first 5 pages:

```r
pages <- vector("list", length = 5)

for (i in 1:5) {
    base_url <- "https://www.nih.gov/news-events/news-releases"
    if (i==1) {
        url <- base_url
    } else {
        url <- str_c(base_url, "?page=", i-1)
    }
    pages[[i]] <- scrape_page(url)
}

df_articles <- bind_rows(pages)
head(df_articles)
```

```
# A tibble: 6 x 3
  title                                                   date       description
  <chr>                                                   <date>     <chr>
1 Kidney transplantation between donors and recipients w~ 2024-10-16 NIH-funded~
2 Mpox vaccine is safe and generates a robust antibody r~ 2024-10-16 NIH clinic~
3 NIH and FDA leaders call for innovation in development~ 2024-10-15 Commentary~
4 Alzheimer's disease may damage the brain in two phases  2024-10-15 NIH-funded~
5 First wave of COVID-19 increased risk of heart attack,~ 2024-10-10 NIH-funded~
6 NIH launches large study to tackle type 2 diabetes in ~ 2024-10-09 Effort to ~
```

[**Pause to Ponder:**] Use map functions in the purrr package:

```
# Create a character vector of URLs for the first 5 pages
base_url <- "https://www.nih.gov/news-events/news-releases"
urls_all_pages <- c(base_url, str_c(base_url, "?page=", 1:4))

pages2 <- purrr::map(urls_all_pages, scrape_page)
df_articles2 <- bind_rows(pages2)
head(df_articles2)
```

```
# A tibble: 6 x 3
  title                                                   date       description
  <chr>                                                   <date>     <chr>
1 Kidney transplantation between donors and recipients w~ 2024-10-16 NIH-funded~
2 Mpox vaccine is safe and generates a robust antibody r~ 2024-10-16 NIH clinic~
3 NIH and FDA leaders call for innovation in development~ 2024-10-15 Commentary~
4 Alzheimer's disease may damage the brain in two phases  2024-10-15 NIH-funded~
5 First wave of COVID-19 increased risk of heart attack,~ 2024-10-10 NIH-funded~
6 NIH launches large study to tackle type 2 diabetes in ~ 2024-10-09 Effort to ~
```