Week 04
RECAP & Quarto

API209: Summer Math Camp

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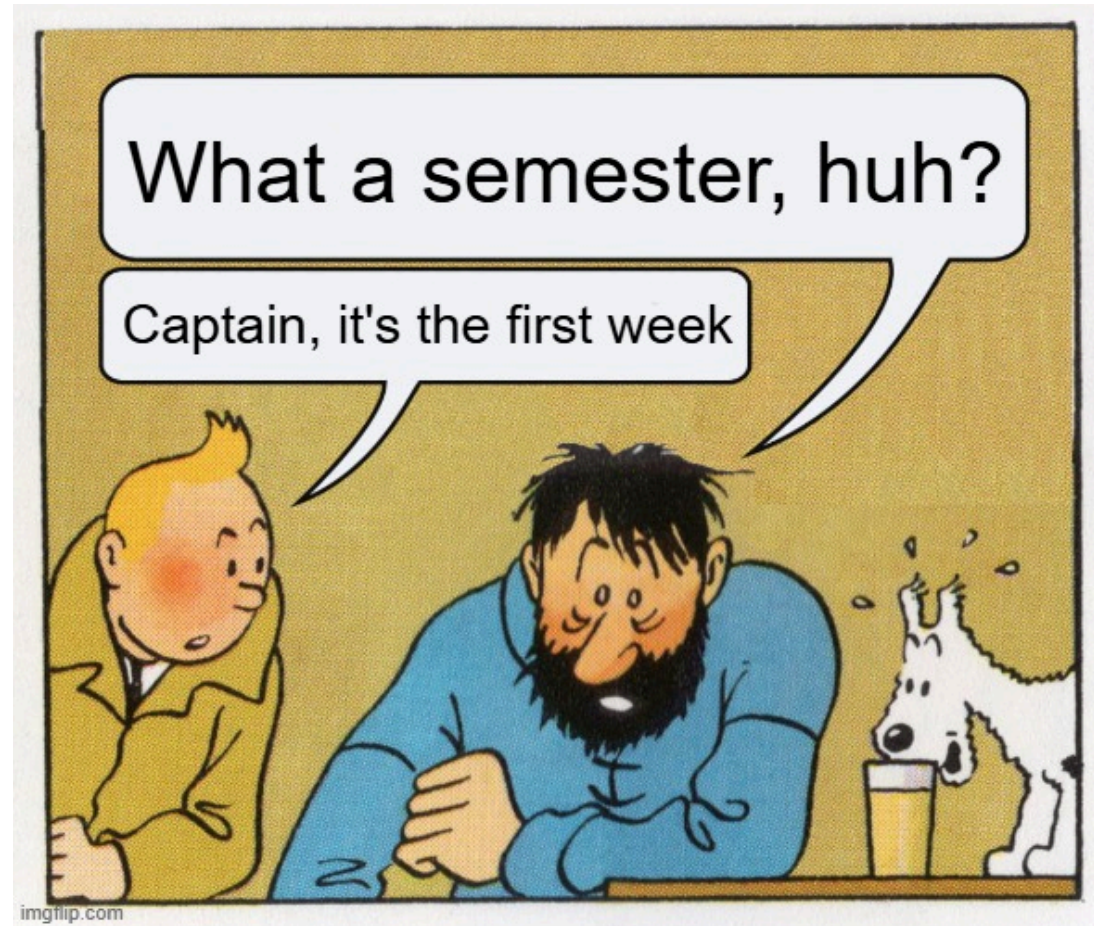
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RECAP

First week!

From the top!

- I am aiming to cover the *essentials.*

  → Recap about *essential* functions. (1 hour)

  → Recap about *Quarto* document. (1 hour)

  → Q&A (Rest of the session)

Checklist

✓ R installed?

Current version 4.4.1

✓ RStudio installed?

I'm on RStudio 2024.04.2+764 – This one has Quarto already installed.

✓ Have these packages?

`tidyverse`. For the PSet, you may use the `sf` package for maps.

Full Hands-on

- Today, we are going 1 by 1.

- I am going to present you with direct tips (and, maybe, hints) and;

- We are going to organize our scripts and/or quarto documents at the same time.

Tips for the Recap Session

- Follow along: Try running the code as we go through each example.

- Ask questions: There's no such thing as a bad question—this is a learning space!

- Take notes: Writing down key points will help solidify your understanding.

Loading Packages and Data

- What do we do first?

- We, *always*, begin by loading the necessary packages.

- For this set of exercises, we are going to use the starwars dataset.

- It should be already preloaded since it is part of the tidyverse package.

Loading packages and data

So our first chunk (or lines of code) should look like this:

00:30

Which option would get the you total height?

○ `sum(var)`

○ `sum(dataset$var, na.rm = TRUE)`

○ `starwars ▷ sum(height)`

○ `starwars ▷ sum(height, na.rm = TRUE)`

`00:30`

Similarly, which option would get you the average height?

○ `mean(var)`

○ `mean(dataset$var, na.rm = TRUE)`

○ `starwars ▷ mean(height)`

○ `starwars ▷ mean(height, na.rm = TRUE)`

`00:30`

Summing Values

```r
1  # Sum of height for all characters
2  total_height ← sum(starwars$height, na.rm = TRUE)
3  total_height
```

```
[1] 14143
```

- We use the `sum()` function to calculate the total height of all characters in the dataset. The `na.rm = TRUE` option ensures missing values are ignored.

- Notice that in this case I am assigning (←) the result to an object.

Creating New Variables

What do we use if we want to create new variables?

Subseting our data

Which function we use to subset our dataset (from the `tidyverse` package)?

Sorting

Use the same object, i.e., `tall_characters` to sort the characters. Number 1 should be the tallest chracter.

01:30

Grouping and Summarizing Data

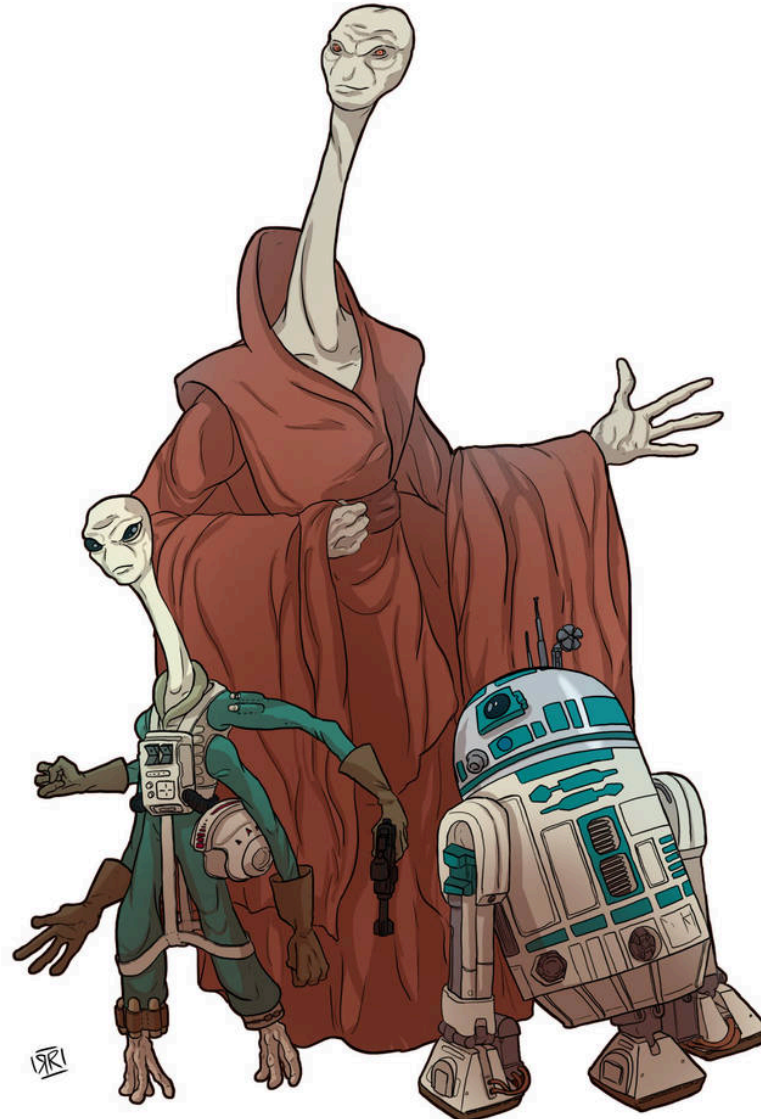Now, imagine we would like to know the average height by species in this universe. How do we do it?

01:30

Grouping and Summarizing Data

Now, imagine we would like to know the average height by species in this universe. How do we do it?

Which spicies has the largest average height?
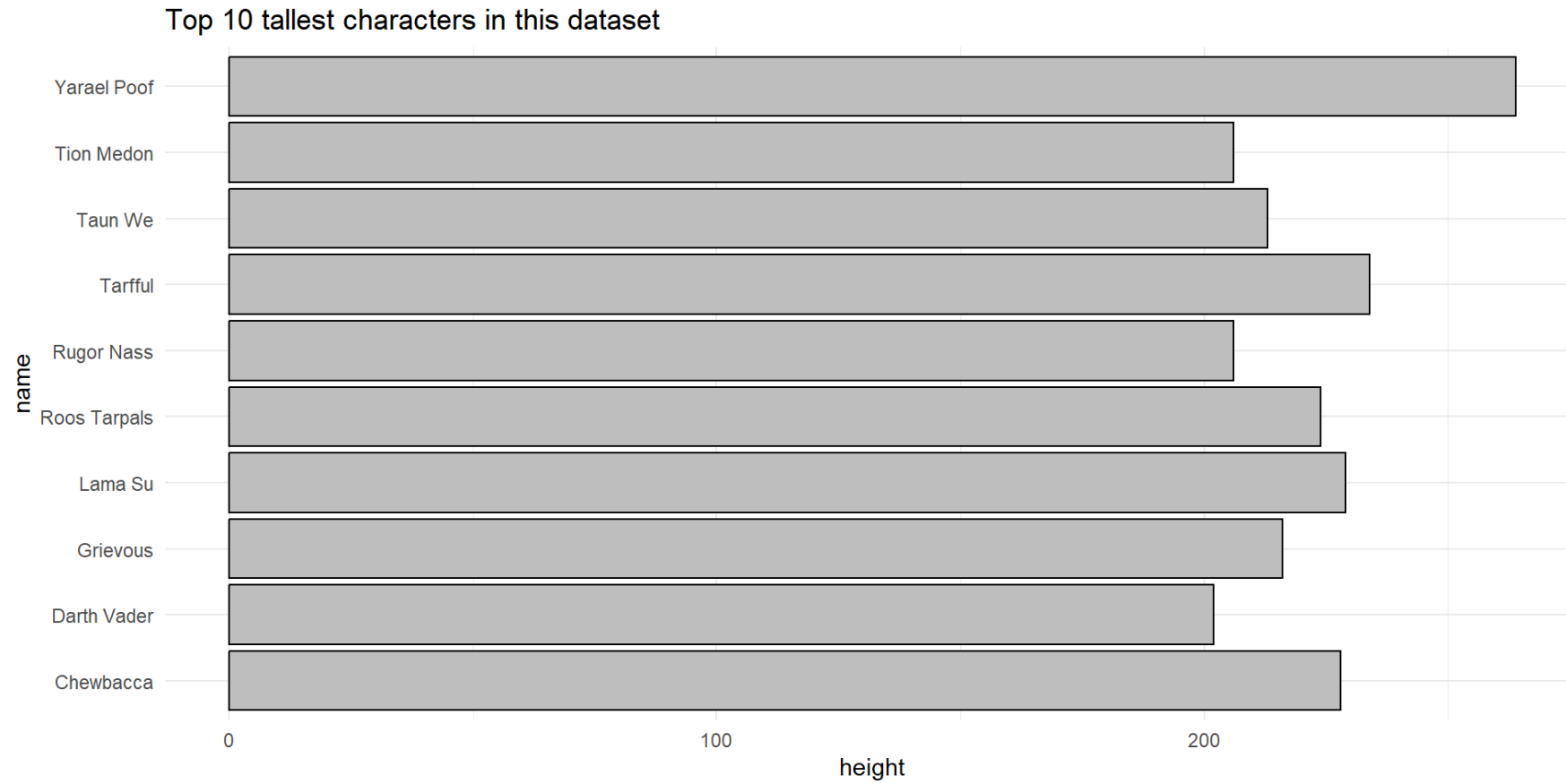
The Quermian

Visualization with `ggplot2`

Let's visualize the tallest characters. use the object `tall_characters` to create a plot of the character name (categorical, y axis) vs their height (x axis).

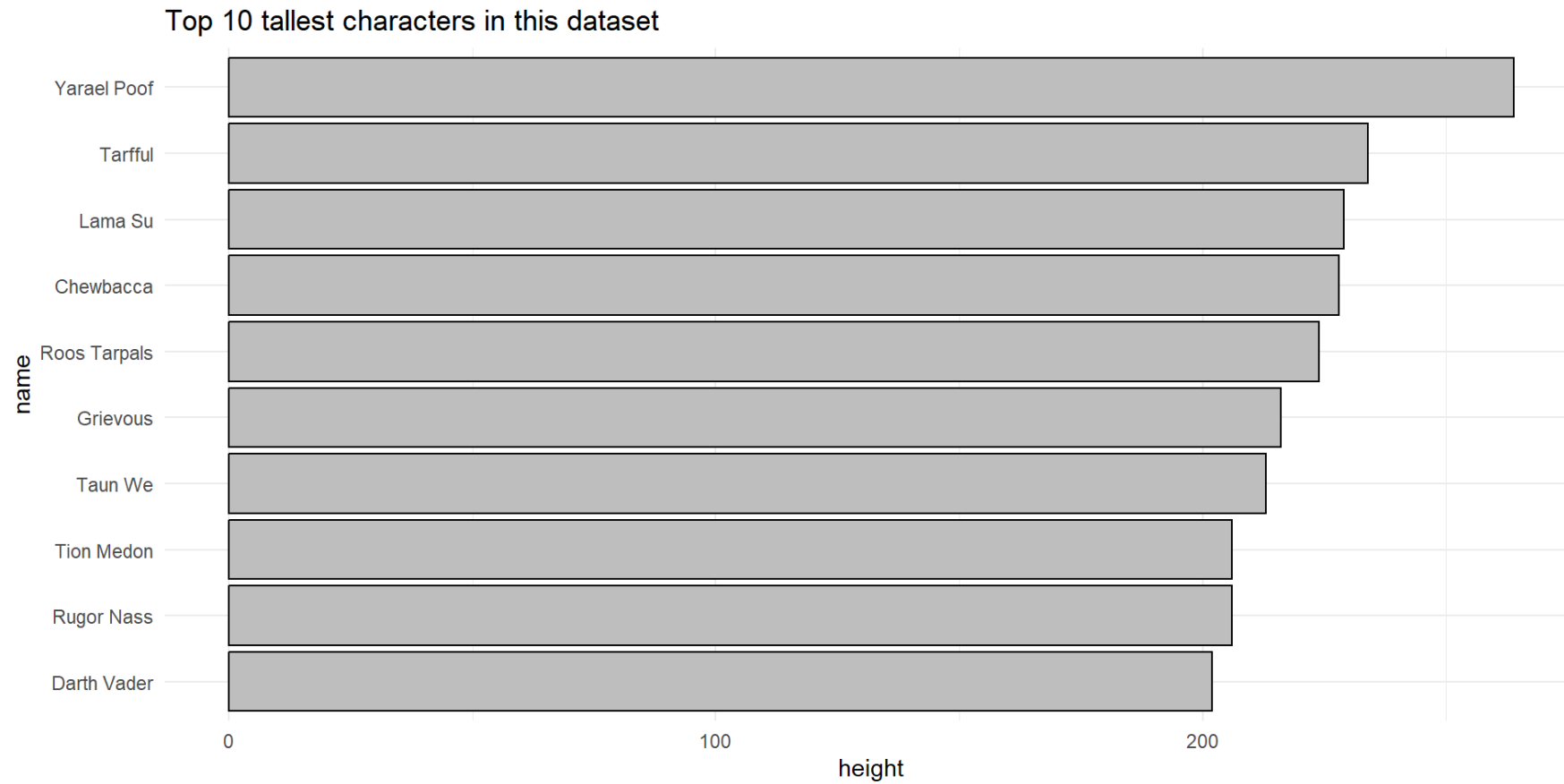05:00

Visualization with `ggplot2`

Top 10 tallest characters in this dataset

How do we arrange the plot?

You can use google. Hint: `factor()`

05:00

How do we arrange the plot?

Top 10 tallest characters in this dataset

Quarto

Quarto Tip 1: Always Render Your Document

- **Render frequently**: Make sure to render your Quarto document often to catch issues early.

- Use the **Render button** in RStudio or type `Ctrl + Shift + K` on your keyboard. `Cmd + Shift + K` on Mac.

- Rendering ensures your code works and produces the correct output before you submit or share your document.

Quarto Tip 2: Loading Packages Correctly

- **Load your packages at the top of the document**. This makes sure that all the functions you need are available when you run your code.

Example:

```
1  library(tidyverse)
```

- If a package isn't loaded, the functions from that package won't work, leading to errors in your document.

Quarto Tip 3: Code and Answer Boxes

- In your problem set, you'll often see two boxes:

  → **Your code here**: This is where you'll write and run your R code.

  → **Your answer here**: This is where you'll explain your results or interpretations in plain text.

Example:

```
1  # Your code here
2  starwars ▷
3    select(name, height)
```

```
# A tibble: 87 × 2
  name               height
  <chr>               <int>
1 Luke Skywalker        172
2 C-3PO                 167
3 R2-D2                  96
4 Darth Vader           202
5 Leia Organa           150
6 Owen Lars             178
7 Beru Whitesun Lars    165
8 R5-D4                  97
9 Biggs Darklighter     183
```

Quarto Tip 4: Using the Visual Editor

- Quarto provides a **visual editor** to make writing markdown easier.

- You can access it by clicking the **Visual** button at the top of your document.

- The visual editor helps format your text, add headings, lists, and code chunks without needing to remember the exact markdown syntax.

That's it! Good Luck!