

Code-Along-2

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```
# Load R packages for data science  
library(tidyverse)
```

```
## -- Attaching core tidyverse packages ----- tidyverse 2.0.0 --  
## v dplyr      1.1.4      v readr      2.1.5  
## v forcats    1.0.0      v stringr    1.5.1  
## v ggplot2    3.4.4      v tibble     3.2.1  
## v lubridate  1.9.3      v tidyr      1.3.0  
## v purrr      1.0.2  
## -- Conflicts ----- tidyverse_conflicts() --  
## x dplyr::filter() masks stats::filter()  
## x dplyr::lag()     masks stats::lag()  
## i Use the conflicted package (<http://conflicted.r-lib.org/>) to force all conflicts to become errors
```

```
# Data in starwars data-set starwars
```

```
# Salient features of the data-set  
?starwars
```

```
# Catch a glimpse starwars data-set  
glimpse(starwars)
```

```
## Rows: 87  
## Columns: 14  
## $ name      <chr> "Luke Skywalker", "C-3PO", "R2-D2", "Darth Vader", "Leia Or~  
## $ height    <int> 172, 167, 96, 202, 150, 178, 165, 97, 183, 182, 188, 180, 2~  
## $ mass      <dbl> 77.0, 75.0, 32.0, 136.0, 49.0, 120.0, 75.0, 32.0, 84.0, 77.~  
## $ hair_color <chr> "blond", NA, NA, "none", "brown", "brown, grey", "brown", N~  
## $ skin_color <chr> "fair", "gold", "white, blue", "white", "light", "light", "~  
## $ eye_color  <chr> "blue", "yellow", "red", "yellow", "brown", "blue", "blue",~  
## $ birth_year <dbl> 19.0, 112.0, 33.0, 41.9, 19.0, 52.0, 47.0, NA, 24.0, 57.0, ~  
## $ sex        <chr> "male", "none", "none", "male", "female", "male", "female",~  
## $ gender     <chr> "masculine", "masculine", "masculine", "masculine", "femini~  
## $ homeworld  <chr> "Tatooine", "Tatooine", "Naboo", "Tatooine", "Alderaan", "T~  
## $ species    <chr> "Human", "Droid", "Droid", "Human", "Human", "Human", "Huma~  
## $ films      <list> <"A New Hope", "The Empire Strikes Back", "Return of the J~  
## $ vehicles   <list> <"Snowspeeder", "Imperial Speeder Bike">, <>, <>, <>, "Imp~  
## $ starships  <list> <"X-wing", "Imperial shuttle">, <>, <>, "TIE Advanced x1",~
```

Starwars characters

Description

The original data, from SWAPI, the Star Wars API, <https://swapi.py4e.com/>, has been revised to reflect additional research into gender and sex determinations of characters.

Usage

```
starwars
```

Format

A tibble with 87 rows and 14 variables:

name

Name of the character

height

Height (cm)

mass

Weight (kg)

hair_color,skin_color,eye_color

Hair, skin, and eye colors

birth_year

Year born (BBY = Before Battle of Yavin)

sex

The biological sex of the character, namely male, female, hermaphroditic, or none (as in the case for Droids).

gender

The gender role or gender identity of the character as determined by their personality or the way

Figure 1: Question 1.5

```
# Access column "height"
starwars$height
```

```
## [1] 172 167 96 202 150 178 165 97 183 182 188 180 228 180 173 175 170 180 66
## [20] 170 183 200 190 177 175 180 150 NA 88 160 193 191 170 185 196 224 206 183
## [39] 137 112 183 163 175 180 178 79 94 122 163 188 198 196 171 184 188 264 188
## [58] 196 185 157 183 183 170 166 165 193 191 183 168 198 229 213 167 96 193 191
## [77] 178 216 234 188 178 206 NA NA NA NA NA
```

```
# Access column "mass"
starwars$mass
```

```
## [1] 77.0 75.0 32.0 136.0 49.0 120.0 75.0 32.0 84.0 77.0
## [11] 84.0 NA 112.0 80.0 74.0 1358.0 77.0 110.0 17.0 75.0
## [21] 78.2 140.0 113.0 79.0 79.0 83.0 NA NA 20.0 68.0
## [31] 89.0 90.0 NA 45.0 66.0 82.0 NA NA NA 40.0
## [41] NA NA 80.0 NA 55.0 15.0 45.0 NA 65.0 84.0
## [51] 82.0 87.0 NA 50.0 NA NA 80.0 NA 85.0 NA
## [61] NA 80.0 56.2 50.0 NA 80.0 NA 79.0 55.0 102.0
## [71] 88.0 NA NA NA 48.0 NA 57.0 159.0 136.0 79.0
## [81] 48.0 80.0 NA NA NA NA NA NA
```

```
# Access column "gender"
starwars$gender
```

```
## [1] "masculine" "masculine" "masculine" "masculine" "feminine" "masculine"
## [7] "feminine" "masculine" "masculine" "masculine" "masculine" "masculine"
## [13] "masculine" "masculine" "masculine" "masculine" "masculine" NA
## [19] "masculine" "masculine" "masculine" "masculine" "masculine" "masculine"
## [25] "masculine" "masculine" "feminine" "masculine" "masculine" "masculine"
## [31] "masculine" "masculine" "masculine" "feminine" "masculine" "masculine"
## [37] "masculine" "masculine" "masculine" "masculine" "masculine" "feminine"
## [43] "masculine" "masculine" "feminine" "masculine" "masculine" "masculine"
## [49] "masculine" "masculine" "masculine" "masculine" "masculine" "feminine"
## [55] "masculine" "masculine" "masculine" "masculine" NA NA
## [61] "masculine" "masculine" "feminine" "feminine" "feminine" "masculine"
## [67] "masculine" "masculine" "feminine" "masculine" "masculine" "feminine"
## [73] "feminine" "feminine" "masculine" "masculine" "feminine" "masculine"
## [79] "masculine" "masculine" NA "masculine" "masculine" "feminine"
## [85] "masculine" "masculine" "feminine"
```

```
# Access column "gender"
starwars$gender
```

```
## [1] "masculine" "masculine" "masculine" "masculine" "feminine" "masculine"
## [7] "feminine" "masculine" "masculine" "masculine" "masculine" "masculine"
## [13] "masculine" "masculine" "masculine" "masculine" "masculine" NA
## [19] "masculine" "masculine" "masculine" "masculine" "masculine" "masculine"
## [25] "masculine" "masculine" "feminine" "masculine" "masculine" "masculine"
## [31] "masculine" "masculine" "masculine" "feminine" "masculine" "masculine"
## [37] "masculine" "masculine" "masculine" "masculine" "masculine" "feminine"
```

```
## [43] "masculine" "masculine" "feminine" "masculine" "masculine" "masculine"
## [49] "masculine" "masculine" "masculine" "masculine" "masculine" "feminine"
## [55] "masculine" "masculine" "masculine" "masculine" NA NA
## [61] "masculine" "masculine" "feminine" "feminine" "feminine" "masculine"
## [67] "masculine" "masculine" "feminine" "masculine" "masculine" "feminine"
## [73] "feminine" "feminine" "masculine" "masculine" "feminine" "masculine"
## [79] "masculine" "masculine" NA "masculine" "masculine" "feminine"
## [85] "masculine" "masculine" "feminine"
```

```
# Rows of interest
```

```
filter_rows <- c("Luke Skywalker", "R2-D2", "Darth Vader") # Extract row corresponding to Luke Skywalker
starwars %>% filter(name%in%filter_rows)
```

```
## # A tibble: 3 x 14
##   name      height  mass hair_color skin_color eye_color birth_year sex  gender
##   <chr>      <int> <dbl> <chr>      <chr>      <chr>      <dbl> <chr> <chr>
## 1 Luke Sky~   172    77 blond      fair      blue        19  male  mascu~
## 2 R2-D2       96    32 <NA>      white, bl~ red         33  none  mascu~
## 3 Darth Va~   202   136 none      white     yellow      41.9 male  mascu~
## # i 5 more variables: homeworld <chr>, species <chr>, films <list>,
## #   vehicles <list>, starships <list>
```

```
# Rows of interest
```

```
filter_rows <- c("Luke Skywalker", "R2-D2")
# Extract rows in 'rows'
starwars %>% filter(name%in%filter_rows) %>% pull(films)
```

```
## [[1]]
## [1] "A New Hope"          "The Empire Strikes Back"
## [3] "Return of the Jedi"  "Revenge of the Sith"
## [5] "The Force Awakens"
##
## [[2]]
## [1] "A New Hope"          "The Empire Strikes Back"
## [3] "Return of the Jedi"  "The Phantom Menace"
## [5] "Attack of the Clones" "Revenge of the Sith"
## [7] "The Force Awakens"
```

```
# Number of rows in the data-set
```

```
nrow(starwars)
```

```
## [1] 87
```

```
ncol(starwars)
```

```
## [1] 14
```

```
dim(starwars)
```

```
## [1] 87 14
```

```
# Invoke the library
library(Tmisc)
# Filter data-set I in quartet
quartet %>% filter(set=="I")
```

```
##      set  x    y
## 1     I 10  8.04
## 2     I  8  6.95
## 3     I 13  7.58
## 4     I  9  8.81
## 5     I 11  8.33
## 6     I 14  9.96
## 7     I  6  7.24
## 8     I  4  4.26
## 9     I 12 10.84
## 10    I  7  4.82
## 11    I  5  5.68
```

```
# Invoke the library
library(Tmisc)
# Filter data-set I in quartet
quartet %>% filter(set=="II")
```

```
##      set  x    y
## 1    II 10  9.14
## 2    II  8  8.14
## 3    II 13  8.74
## 4    II  9  8.77
## 5    II 11  9.26
## 6    II 14  8.10
## 7    II  6  6.13
## 8    II  4  3.10
## 9    II 12  9.13
## 10   II  7  7.26
## 11   II  5  4.74
```

```
# Invoke the library
library(Tmisc)
# Filter data-set I in quartet
quartet %>% filter(set=="III")
```

```
##      set  x    y
## 1   III 10  7.46
## 2   III  8  6.77
## 3   III 13 12.74
## 4   III  9  7.11
## 5   III 11  7.81
## 6   III 14  8.84
## 7   III  6  6.08
## 8   III  4  5.39
## 9   III 12  8.15
## 10  III  7  6.42
## 11  III  5  5.73
```

```

# Invoke the library
library(Tmisc)
# Filter data-set I in quartet
quartet %>% filter(set=="IV")

```

```

##      set  x    y
## 1    IV  8  6.58
## 2    IV  8  5.76
## 3    IV  8  7.71
## 4    IV  8  8.84
## 5    IV  8  8.47
## 6    IV  8  7.04
## 7    IV  8  5.25
## 8    IV 19 12.50
## 9    IV  8  5.56
## 10   IV  8  7.91
## 11   IV  8  6.89

```

```

# Invoke the library
library(Tmisc)

grouped_quartet <- quartet %>% group_by(set)

# Obtain the needed statistics
grouped_quartet %>%
  summarise(
    mean_x = mean(x),
    mean_y = mean(y),
    sd_x = sd(x),
    sd_y = sd(y),
    r = cor(x, y) )

```

```

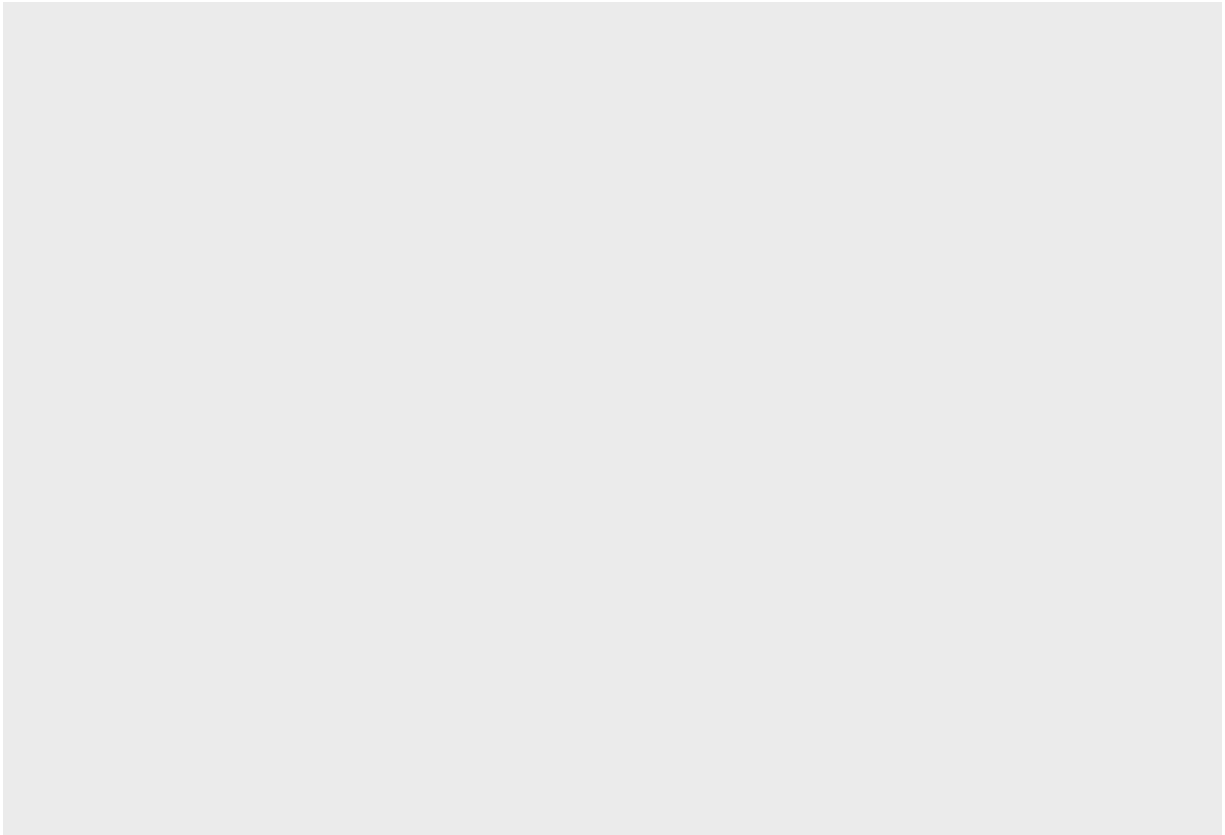
## # A tibble: 4 x 6
##   set   mean_x mean_y sd_x sd_y    r
##   <fct> <dbl> <dbl> <dbl> <dbl> <dbl>
## 1 I      9   7.50  3.32  2.03 0.816
## 2 II     9   7.50  3.32  2.03 0.816
## 3 III    9   7.5   3.32  2.03 0.816
## 4 IV     9   7.50  3.32  2.03 0.817

```

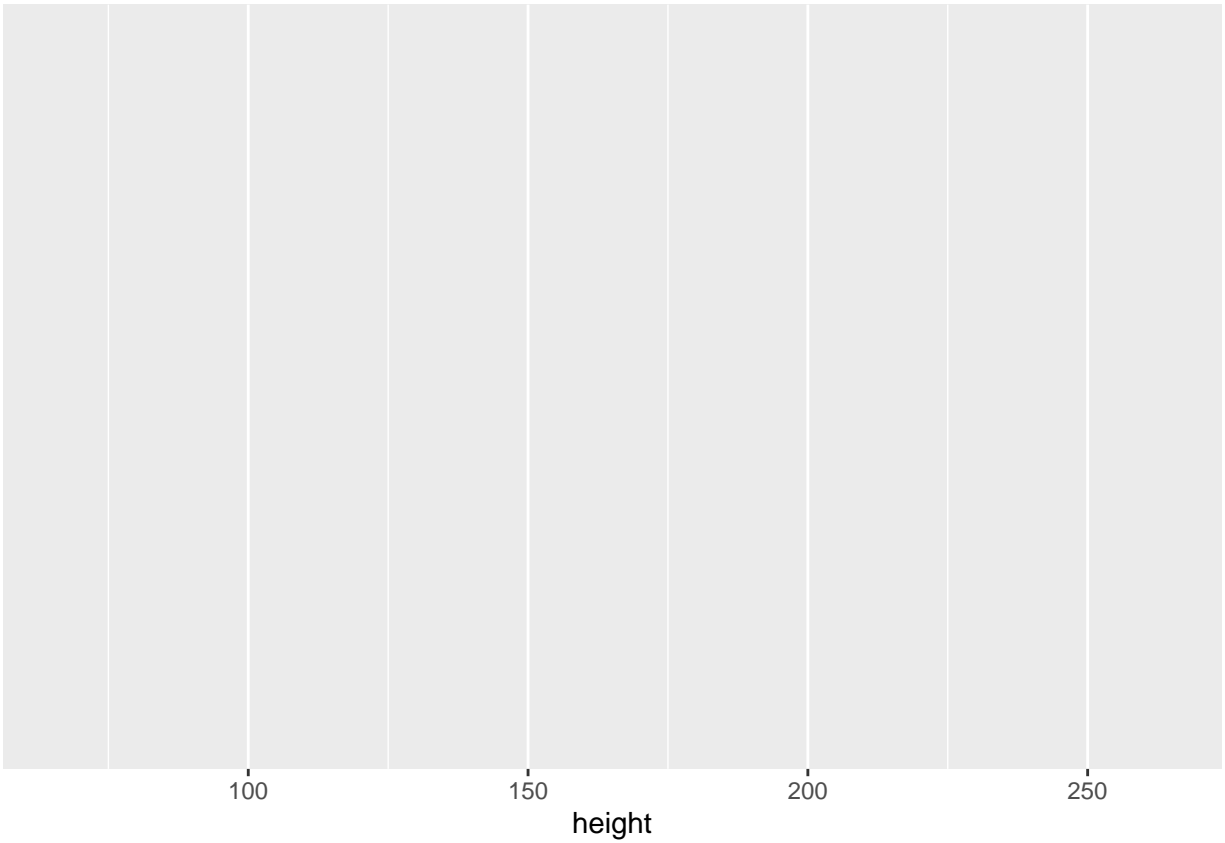
```

# Plot the data
ggplot(data=starwars)

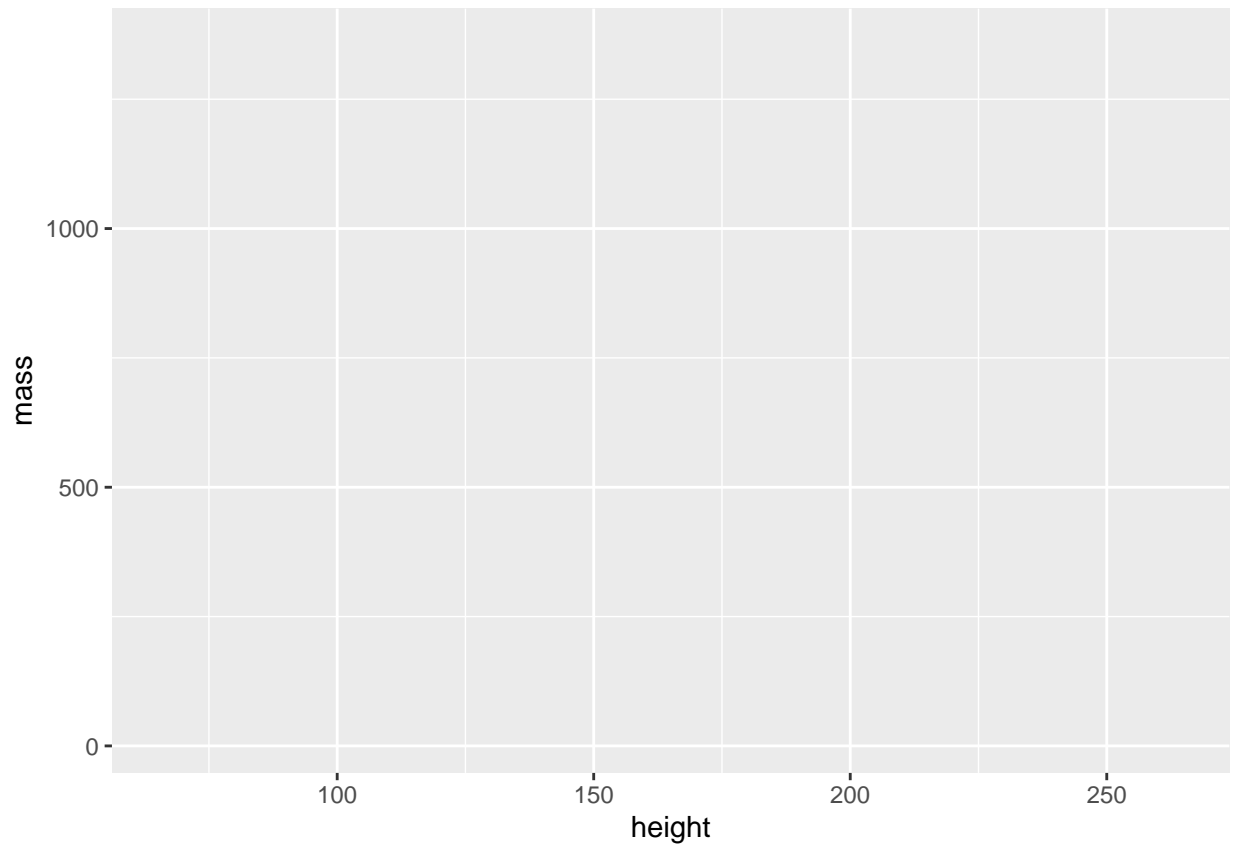
```



```
# Plot height along x-axis  
ggplot(data=starwars,mapping=aes(x=height))
```

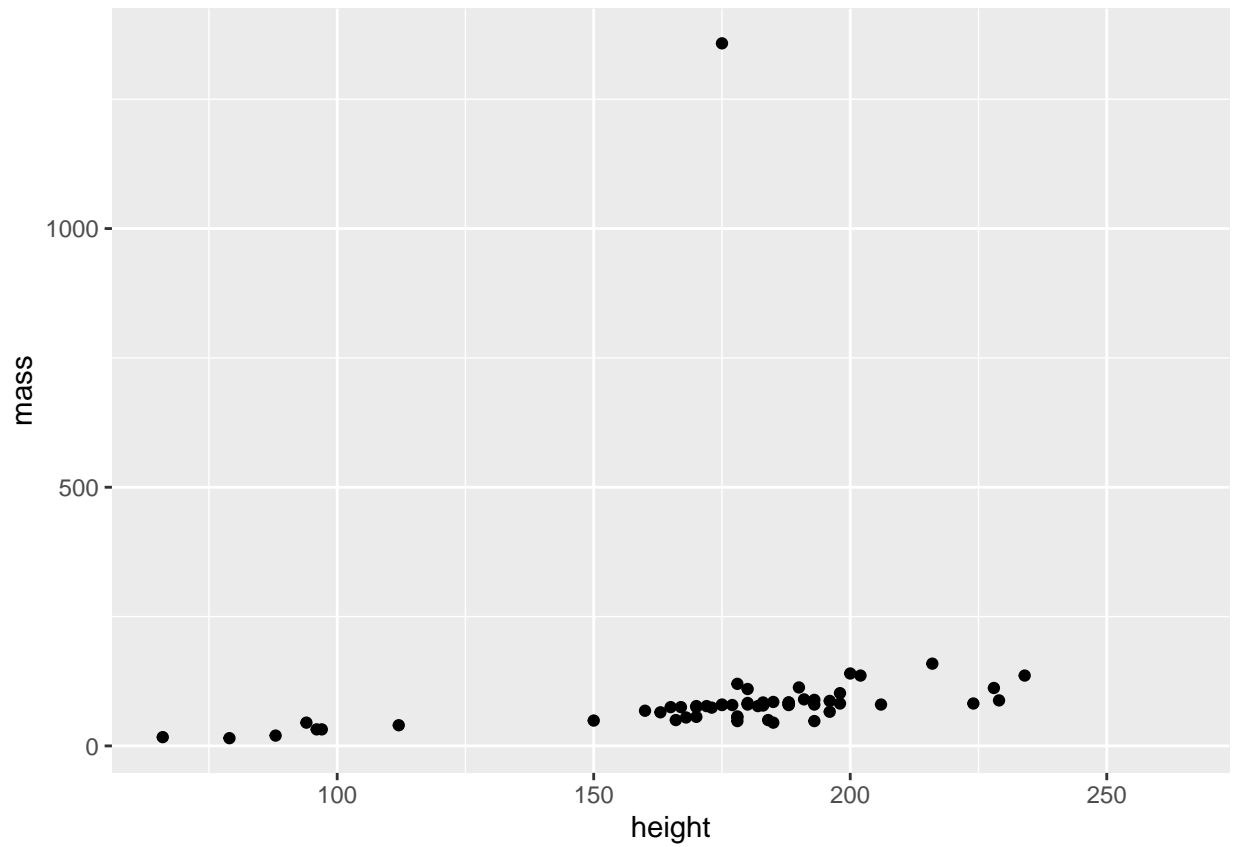


```
# Plot mass along y-axis  
ggplot(data=starwars,mapping=aes(x=height,y=mass))
```

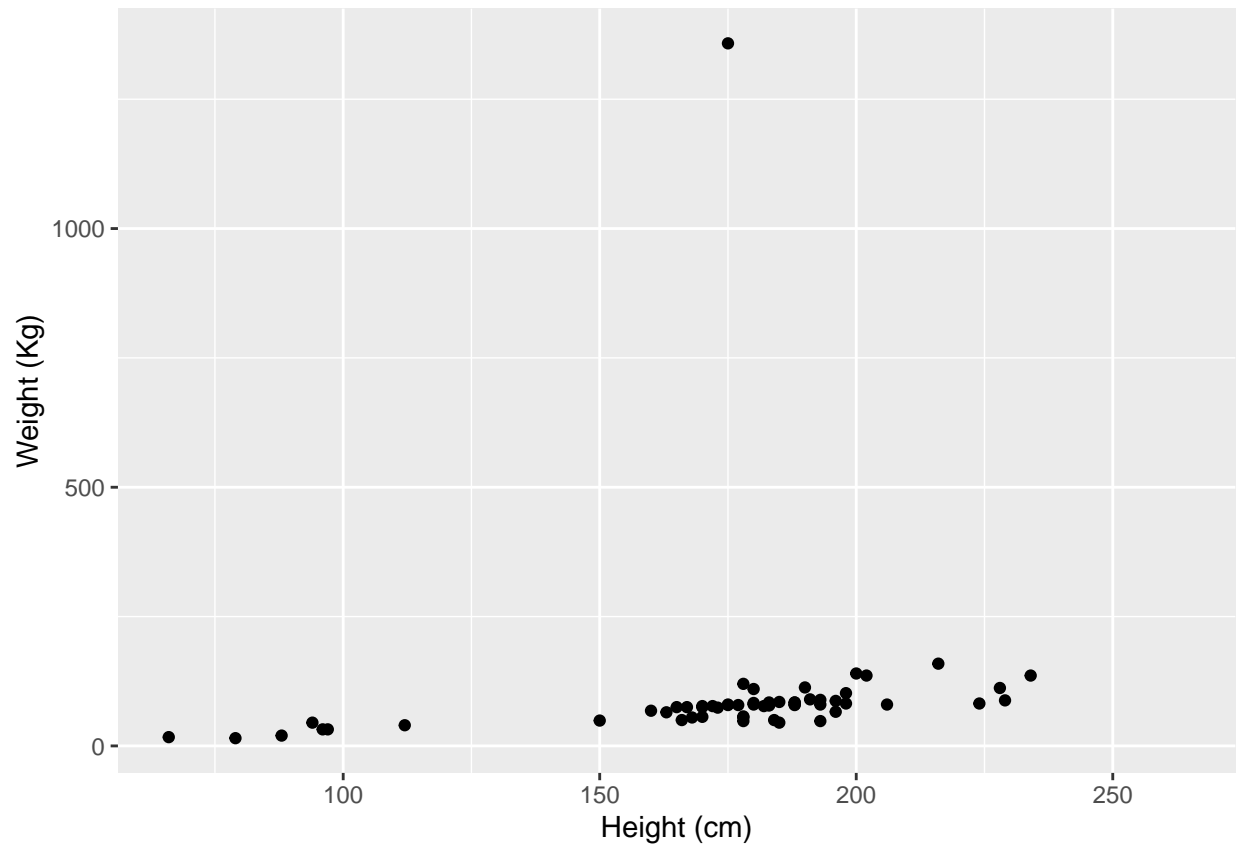
```
ggplot(data=starwars,mapping=aes(x=height,y=mass)) +  
  geom_point()
```

```
## Warning: Removed 28 rows containing missing values ('geom_point()').
```



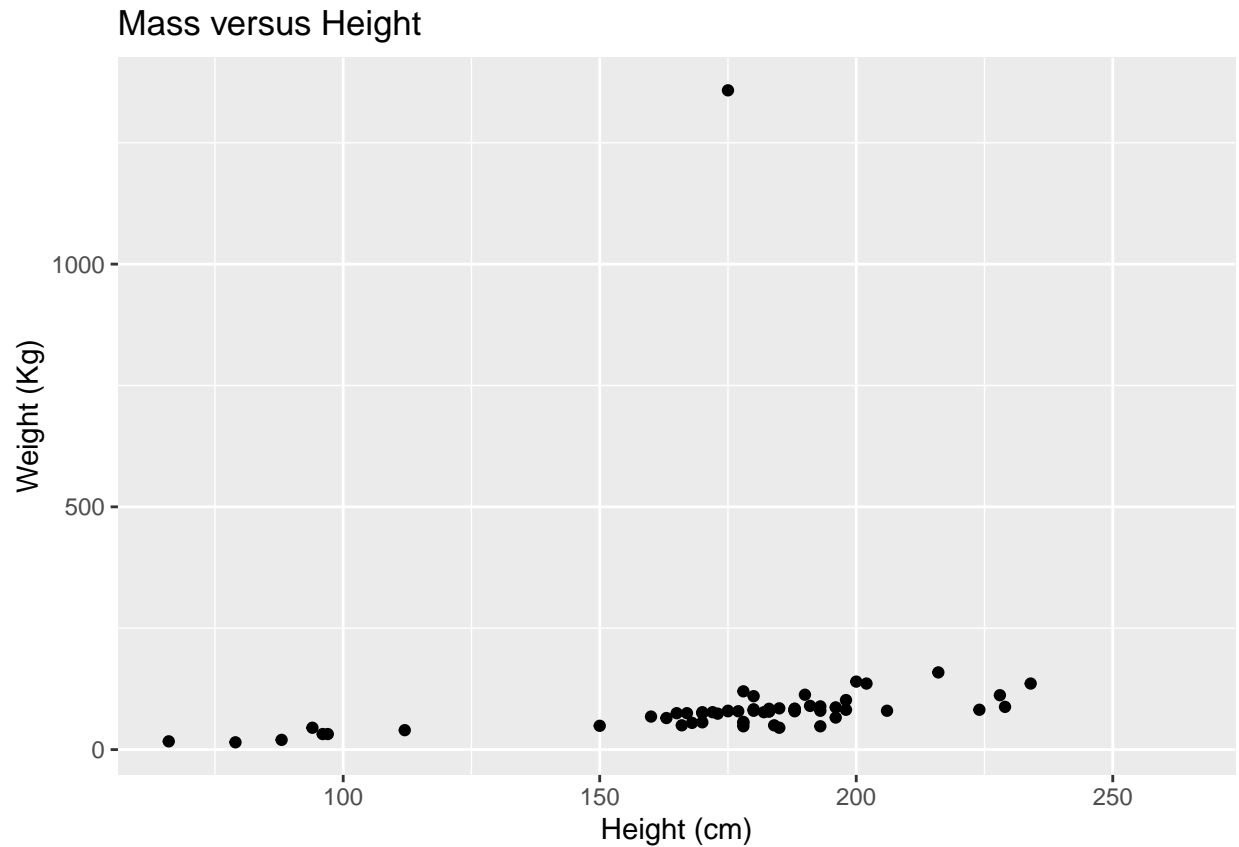
```
ggplot(data=starwars,mapping=aes(x=height,y=mass)) + geom_point() +  
  labs(x="Height (cm)",y="Weight (Kg)")
```

```
## Warning: Removed 28 rows containing missing values ('geom_point()').
```



```
ggplot(data=starwars,mapping=aes(x=height,y=mass)) +  
  geom_point() +  
  labs(x="Height (cm)",y="Weight (Kg)",  
  title="Mass versus Height")
```

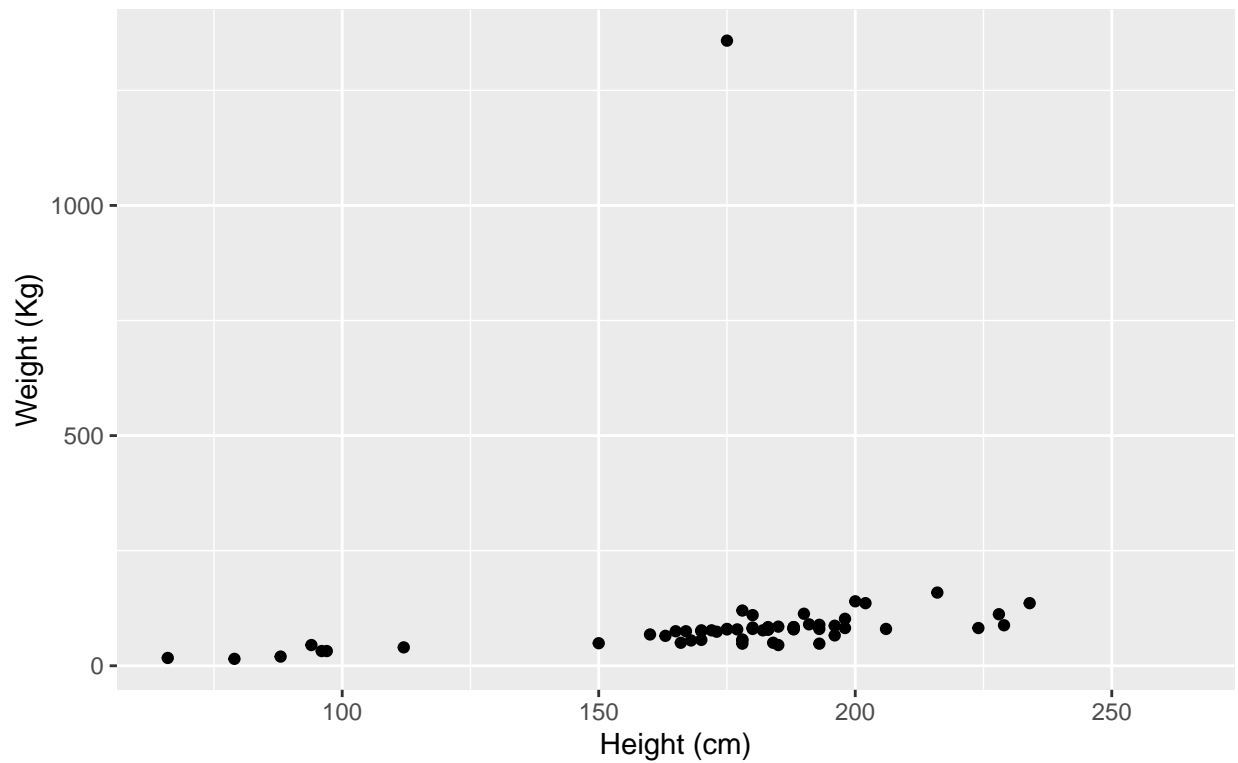
```
## Warning: Removed 28 rows containing missing values ('geom_point()').
```



```
ggplot(data=starwars,mapping=aes(x=height,y=mass)) +  
  geom_point() +  
  labs(x="Height (cm)",y="Weight (Kg)",  
       title="Mass versus Height",  
       caption="Source: tidyverse/ starwars dataset")
```

```
## Warning: Removed 28 rows containing missing values ('geom_point()').
```

Mass versus Height



Source: tidyverse/ starwars dataset

```
# Invoke the package  
library(shiny)  
# Run an example from the library  
runExample("01_hello")
```

```
# Invoke the package  
library(shiny)  
# Run an example from the library  
runExample("06_tabsets")
```

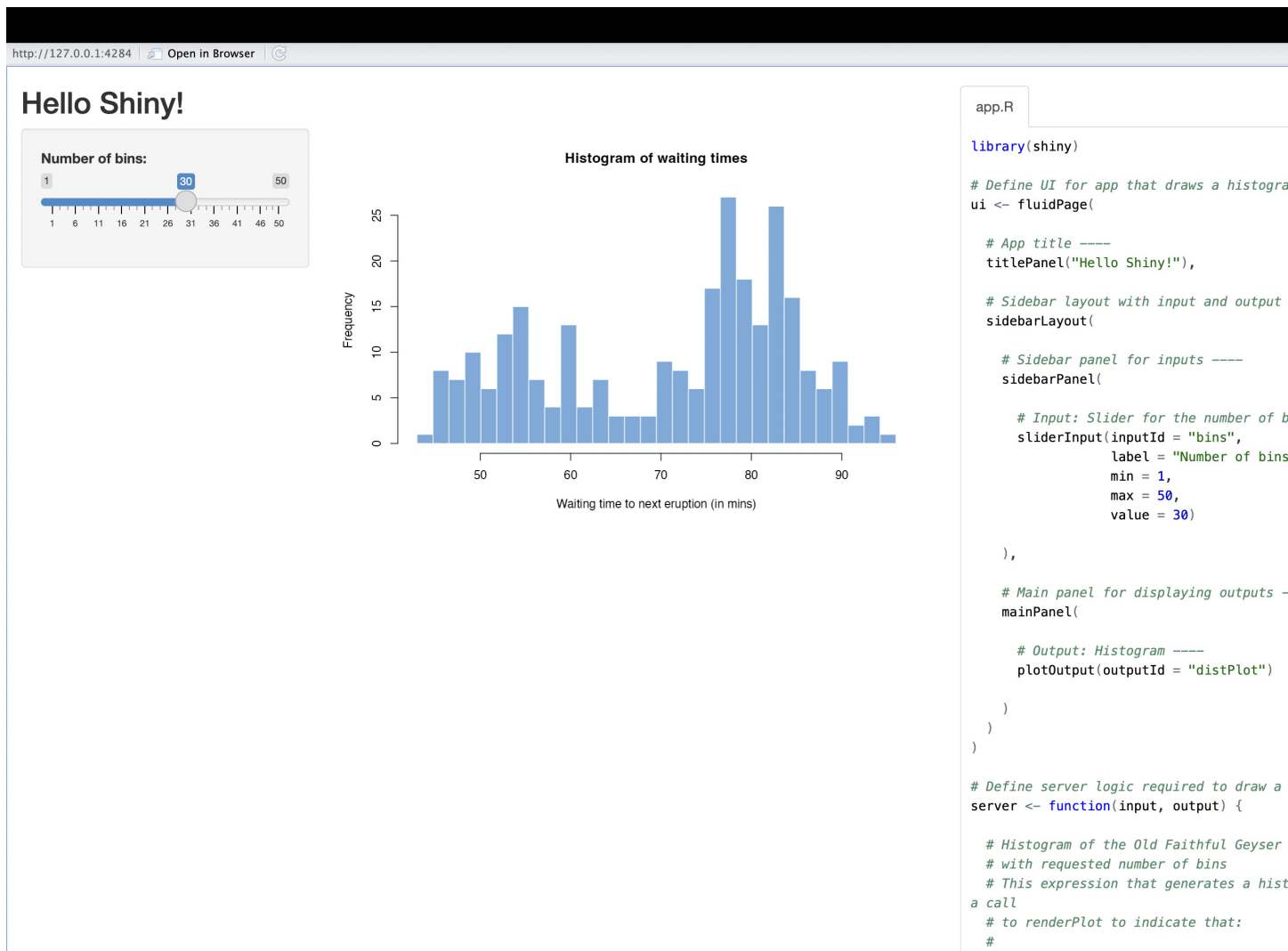


Figure 2: Question 1.5

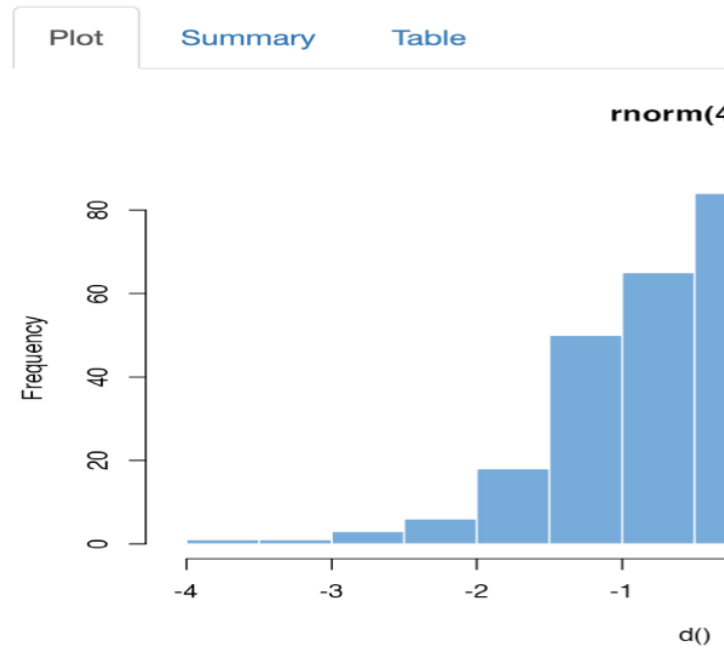
Tabsets

Distribution type:

☒ Normal
☐ Uniform
☐ Log-normal
☐ Exponential

Number of observations:

1 455 1,000



This example demonstrates the `tabsetPanel` and `tabPanel` widgets.

Notice that outputs that are not visible are not re-evaluated until they become visible. Try this:

1. Scroll to the bottom of the `server`

app.R

```
library(shiny)

# Define UI for random distribution app
ui <- fluidPage(
```

Figure 3: Question 1.5