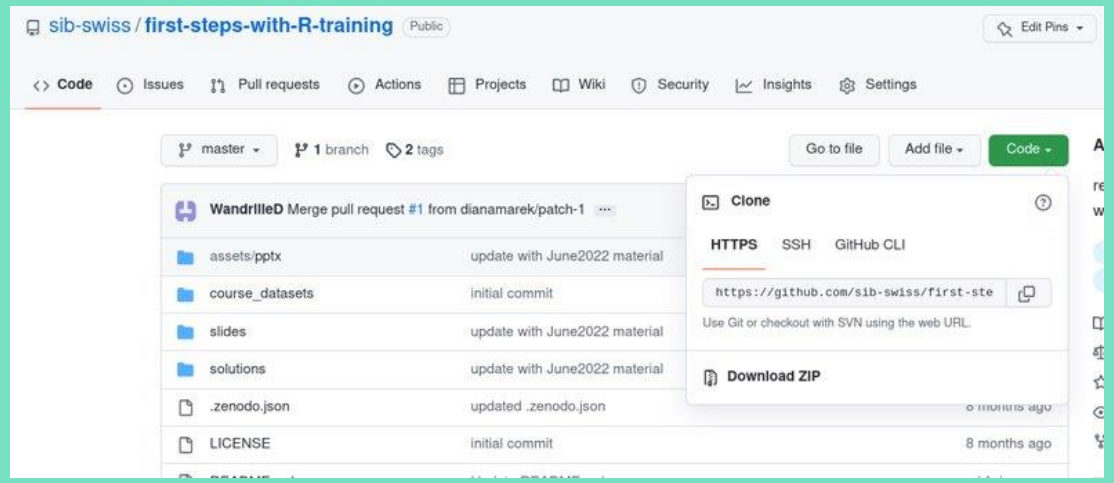
Let's practice - 1

1. **Outside Rstudio : prepare the course data for the exercises**
   Download the course material from :
   https://github.com/sib-swiss/first-steps-with-R-training
   Either use git clone OR click **Download ZIP**



   and **UNZIP** and then move the folder where you want it

2. **Inside Rstudio: project setup**
   In Rstudio, create a new project set in the folder of the course material you just recovered.

Let's practice - 2

1. **Prepare your first script**
    1. Open a script file and save it.
    2. Type or paste the following code

```
# First steps with R, ex1
w <- 3
h<- 0.5
area <- w*h
area
```

2. **Look at the script** (before running it) can you understand each line? What do you expect it to print to the console?

3. **Run the script** and explore Rstudio's feature:

    Run the script line-by-line or Run all lines at once by selecting them

Let's practice - 2bis

1. Look at your project option (Tools > Project Options). If needed, modify them to save your workspace and history and to restore them at startup.
2. Check that it works:
    1. Close Rstudio
    2. Double-click the .Rproj file
    3. Does the project open? Is your workspace empty?
3. Check other behaviours:
    1. Close your project
    2. Open your project again from Rstudio

Let's practice - 3

Open a new script and save it

1. Assign the values 6.7 and 56.3 to variable **a** and **b**, respectively
2. Calculate (2*a)/b+(a*b) and assign the result to variable **x**. Display the content of
3. Find out how to compute the square root of variables. Compute the square root of **a**, of **b**, and of **a/b**
4. Calculate:

- the logarithm of **x**
- the logarithm in base 2 of **x**

Let's practice - 4

1. Create two vectors:
   - **vector_a**, containing the values from −5 to 5
   - **vector_b**, from 0 to 1 by increment of 0.1

2. Calculate the (element-wise) sum, difference and product between the elements of **vector_a** and **vector_b**.
3. Calculate the sum of elements in **vector_a**.
4. Calculate the overall sum of elements in both **vector_a** and **vector_b**.
5. Identify the smallest and the largest value in **vector_a**
6. Identify the smallest and the largest value among both **vector_a** and **vector_b**.

7. Compute the overall mean of the values among both **vector_a** and **vector_b**.

Hint: Each task in exercises 1-7 can be performed in a single statement per vector
(the minimum and maximum count as 2 separate tasks)

Let's practice - 5

Open a new script and save it as "Ex5.R".

1. In your script, write and execute the commands

```
library(MASS) # loads the library MASS
data(bacteria) # loads the bacteria data set (from MASS)
```

   Check: You should have a variable named "bacteria" in your Environment.

2. What are the names of the columns of the **bacteria** data.frame ?
3. Use **[]** to select rows 100 to 119 of the column "ap" .
4. Use `$` to get the column "week" and check how many `0` values it has.

5. Optional : using a comparison operator and [], select the rows which correspond to a "placebo" treatment (in the "trt" column).

Let's practice – 6a

A dataset from mouse experiments at 18 weeks is available in the file ***mice_data.csv*** *in the* ***course_dataset*** *folder (courtesy of F. Schutz and F. Preitner)*. Let's explore the dataset to see what it contains.

1. Open a new script file in R studio, comment it and save it.
2. Have look at the csv file in R studio's file explorer. What do you need to check in order to be able to read in the file correctly?
3. Read the file into R, assign its content to object "mice_data". Examine the object.
4. How many observations and variables does the dataset have?
5. What is the structure of the dataset? What are the names and classes of the variables?

Let's practice – 6b

Continue from the mouse dataset used previously.

Use the following code if you do not have the dataframe already loaded

```
mice_data = read.csv("course_dataset/mice_data.csv")
```

1. Which variables appear to be categorical? Convert them to factors.
2. Get the summary statistics of "mice_data"
3. Use the function table() to compute the number of observations in different mouse groups.
    1. How many mice are included of each genotype (WT, KO)?
    2. How many mice are included per diet (HFD, CHOW)?
    3. Make a 2x2 table by genotype and diet crossed.

Let's practice – 6c

Continue from the mouse dataset used previously.

Use the following code if you do not have the dataframe already loaded

```
mice_data = read.csv("course_dataset/mice_data.csv")
```

1. Subsets
    1. Isolate the observations for the mice on high fat diet (HFD) using subset().
    2. Compute the average weights of the subset.
    3. Do the same for the mice on regular chow diet (CHOW).
    4. Export the data of each subgroup to a csv file.
2. Look at the results from the two previous exercises. What does this initial exploration of the data suggest about mouse weights?
3. ***Optional:*** Compute the means and standard deviations for WT and KO mouse weights using tapply(). Then do the same for CHOW and HFD groups.