Introduction to programming – Activity 3

Getting started

- ☐ Double-click on the file *Activity3.R*
- ☐ Make sure your working directory is set to Activity3
- ☐ In the R console, type:

```
source("Activity3.R")
```

Main exercise

This week, you will discover how to generate multiple plots automatically, using R! You will need to understand the script Activity3.R first, then look at the frames printed for you and record the runners' position in Excel. Finally, you will use the **Activity3_frames.R** script to make plots automatically.

- ☐ First, understand what the **Activity3.R** code is doing. Put the cursor on the first line of code and press **Run.** Repeat for each line until you get to the end of the script – do you see how the comments make sense?

- ☐ Look at the frames that were printed for you and play with the variables `x_position_start`, `y_position_start`, and `road_height` to see if you can match the position of the runner in frame 1. Hint: notice that the position of the runner's back shoe is what matters!
- ☐ Record the position of the runner for each frame that you want to create here, divide the frames between all team members and use **Activity3.R** to check your guess if you want:

Frame	x	y
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

☐ Open Excel. At the top of column A, type **x**, and at the top of column B type **y**. Enter the 10 x and y positions you recorded below, as in the following example:

	A	B
1	x	y
2		
3		

☐ Save you Excel spreadsheet as a **.csv** file, e.g. File > Save as … Name it **Runner_positions.csv**.

☐ Open the **Activity3_frames.R** script by double-clicking on it.

☐ Fix the height of the road (`road_height`) and **save your changes**.

☐ In the R console, type `source("Activity3_frames.R")`. Did you record the right positions for your runner? If so, congratulations! If not, no problem, simply go fix your .csv file.

Advanced activities – if your group is done early

☐ **Change the color of the road.** Hint: the road is currently `"black"`. What color will you choose?

☐ **Let's try to understand how this movie worked.** Remove the `#` in front of the last four lines of your script, save your changes, and type `source("Activity3_frames.R")`.

```
#print(paste("myframe:", myframe))
#print(paste("x_position:", x_position))
#print(paste("y_position:", y_position))
#print("...")
```

☐ Do you see that the value of the variables `myframe`, `x_position`, and `y_position` changes for every plot? Where did you specify the x_position and y_position?

☐ Understand how `runner_positions$x[myframe]` works. To do so, copy-paste it in the R Console and replace `myframe` by a number from 1 to 10. How do these compare to the x positions you recorded earlier? Can you use the number 20? In the R Console, type one line at a time:

```
runner_positions
runner_positions$x
runner_positions$y
```

☐ **Make new frames with the modifications you want.** Make a new folder in the Activity3 folder and move all your frames in it to save them. Modify the Activity3_frames.R script as much as you want to create your own frames (e.g. road height, color of the road, comment with `#` the lines that put the guiding lines and axes so they disappear, etc.).