Introduction to programming – Activity 5

Getting started

☐ Double-click on the file *Activity5.R*

☐ Make sure your working directory is set to Activity5

☐ In the R console, type:

```
source("Activity5.R")
```

Main exercise

This week, you will need to work with your team members to reproduce the maze that was printed for you. Start by trying to solve your task by yourself, then make sure to help others and/or ask for help. This is how scientists and video game designers work!

☐ First, divide the tasks: we have 4 wall colors (4 students, 1 student per color) and the start/end positions (1 student). Take note of your responsibility:

_____

Wall workers

☐ On the maze that was printed for you, write down a number (from 1 to 11) on each wall that you need to build. Then, just like for the star in Activity 2, take note of the x- and y-coordinates for the start (x1, y1) and end (x2, y2) of each line. The choice of color is **blue**, **black**, **gold**, and **magenta**. Record the information for the walls you are working on below:

Wall color: _____

Line	x1	y1	x2	y2
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				

☐ Open Excel and **label the columns x1, y1, x2, and y2**. Type the information above below the appropriate column.

☐ Save your file as **.csv** in the Activity5 folder, with the name **Walls_color.csv**. Replace the word **color** by the wall color you are responsible for (**blue**, **black**, **gold**, or **magenta**).

☐ In **Activity5.R**, find the line that has your wall color. Remove the # at the beginning and add the name of the Excel file you just created. Hint: replace the word color by **blue**, **black**, **gold**, or **magenta**, depending on your color. **Save your changes**.

```
walls_color = read.csv("Walls_color.csv")  # color walls
```

☐ Just like with the star, find the line that adds the segments. Copy-paste it, remove the # at the beginning of both lines and replace the word color by **blue**, **black**, **gold**, or **magenta**, depending on your color. **Save your changes.**

```
segments(walls_color$x1, walls_color$y1, walls_color$x2, walls_color$y2,
         col = "color", lwd = 4)  # color walls
```

☐ Type `source("Activity5.R")`. Were your walls added in the right place? If not, ask your mentor for help.

Start and end workers

☐ Look at the sample maze that was printed for you. Record the position of the runner and the finish flags below; these will be the x- and y-coordinates for the start (x_start, y_start) and for the end (x_end, y_end). As before, remember to use the bottom left corner of the image for reference.

Runner (start):	x_start = _____	y_start = _____
Finish flags (end):	x_end = _____	y_end = _____

☐ Open Excel and **label the columns x_start, y_start, x_end, and y_end**. Type the information above below the appropriate column.

☐ Save your file as **.csv** in the Activity5 folder, with the name **Positions.csv**.

☐ In **Activity5.R**, find the line that loads the positions. Remove the # at the beginning and add the name of the Excel file you just created. **Save your changes**.

```
positions = read.csv("")  # start and end positions
```

☐ As the start and end worker, you are also responsible for loading the runner and finish flag images into the program. **Find the lines that identify the file names for the runner and finish flag.** Remove the # at the beginning and **add the names of the picture files**. Hint: they are in the Activity5 folder and end with **.png**.

```
fname_runner = ""  # runner file
fname_finish = ""  # flag file
```

☐ Now, you can remove the # at the beginning of the lines under `# Load images` and `# Plot the runner/flag at the start/end`

```
img_runner <- readPNG(fname_runner)  # load runner
img_finish <- readPNG(fname_finish)  # load finish

rasterImage(img_runner, positions$x_start+0.1,
positions$y_start+0.1,
            positions$x_start+0.8, positions$y_start+0.8)

# rasterImage(img_finish, positions$x_end+0.05,
positions$y_end+0.05,
            positions$x_end+0.9, positions$y_end+0.9)
```

☐ Type `source("Activity5.R")`. Were the runner and finish flags added in the right place? If not, ask your mentor for help.

Everyone

☐ Decide on a name for your maze and change the `NoName` in
`dev.copy(png, "Maze_by_Team_NoName.png", width = 500, height = 500)`

☐ When all is done, type `source("Activity5.R")` and compare your results with the maze that was printed for you.

Advanced Advanced activities – if your group is done early

☐ **Change the color of the walls.** You don't need to change the file names, simply change the argument `col = "color"` to something different.

☐ **Play last week's game.**

☐ **Help others.**