R lab assignment

Provide answers to the following questions in a separate R script. Make sure to comment your code and provide explanations for each step. The R script should be named `r_lab_username.R` where `username` is your username at Dalarna University in lowercase letters.

Deadline can be found in the designated hand-in folder on the course website.

Question 1

Add parentheses, i.e., change the order of operations, so as to alter the following expression to make it equal to `-300` when being evaluated.

```
x <- 5
y <- 4*x
z <- y / 2

# Add parentheses here:
result <- z + y * x - z + x

# Print current result
print(paste0("Current result: ", result))
```

```
## [1] "Current result: 105"
```

```
print(paste0("Expected result: -300"))
```

```
## [1] "Expected result: -300"
```

Questions 2

Given the `mpg` dataset from the `ggplot2` package, find out which cars have the third highest and third lowest fuel efficiency, provided that the fuel efficiency is measured in the `cty` column.

Remove these cars from the dataset and save the resulting dataset as `mpg_new`.

Questions 3

Create a new column in the `mpg_new` dataset called `average mileage` that contains the average of the `cty` and `hwy` columns.

Compare the average milage and the `cty` and `hwy` milage using boxplots.

Question 4

Create a user-defined function that takes an manufacturer as input and returns the average mileage of the cars produced by that manufacturer.

Use the function to find the average mileage of cars produced by manufacturer `"audi"` .

Loop over all the manufacturers in the `mpg_new` dataset and store the average mileage of each manufacturer in a new dataframe called `average_mileage_df` . Then plot the results in a barplot. Add the x-axis labels vertically by setting `las = 2` and remove the x-axis label by setting `xlab = ""` .

Finally, produce the same plot, but sort the manufacturers by average mileage in descending order.

Question 5

Create a while loop that simulates a coin toss which will continue until the coin lands on heads 5 consecutive times in a row (not in total, but 5 consecutive times in a row without landing on tail) as well as logging the total number of coin tosses.

Pause the loop for 0.5 seconds after each iteration using the `Sys.sleep()` function and print the following: Current number of consecutive heads, current number of consecutive tails, and current total number of tosses.

To simulate a coin toss, you can use the `sample()` function to randomly select either `"heads"` or `"tails"` character strings. Remember to use `?sample` to check the documentation of the `sample()` function and understand how to use it.

Please note that, with some bad luck, this loop can run for a long time. If you want to stop the loop, you can interrupt the R session by pressing the stop button in RStudio or by pressing `Ctrl + C` in the console.

You can also test your code by setting the number of consecutive heads to a lower number, e.g., 2, to see if the loop works as expected. This is what is referred to as a sentinel value, which is a value that is used to terminate the loop.

End of lab assignment.