# Lesson: Case study, descriptive analytics

In this lesson, we will work with descriptive analytics techniques using the Bike Sharing Dataset and see how these techniques can be used to solve business problems.

The data set is available on the course webpage, in Modules/Week 1/ Data sets for Weeks 1-6.

Aims:

By the end of the lesson, you should be able to:

* Understand the basic concepts and techniques of descriptive analytics.
* Apply descriptive analytics to a real-world dataset using R and ggplot2.
* Interpret and communicate the results of their analyses in a business context.
* Recognize trends and summarize data sets.
* Create data visualizations to effectively communicate findings.

Work in groups of 2-3 to solve the exercises below. Some hints on the R code useful for solving the exercises are provided in the Quarto file.

## Exercise 1

Create a relevant plot to see how does bike rental usage developed over time.

Discuss how understanding of this trend might help in planning resources.

Hints:

* First, load the data.
* Think what variables in the data are relevant to the business problem.
* What are the types of these variables, numerical or categorical?
* Think what plot and what summaries are relevant for the business problem.

## Exercise 2

Business problem: Is there a relationship between temperature and the number of bike rentals?   
Create a plot that describes the relationship between temperature and the number of bike rentals.   
Analyze the strength and direction of the relationship and consider the implications for business operations during different temperature ranges.   
What other factors can be related to temperature and number of bike rentals and are easier to use in a long-term planning?

## Exercise 3

Business Problem: How do rental counts compare between members and nonmembers? Create boxplots and histograms and calculate summaries for the rental counts of members and nonmembers. Analyze the differences in behavior between these two user groups and consider strategies to convert nonmembers to members.

## Exercise 4

Business problem: How does the relationship between temperature and the number of bike rentals differ according to the season and customer type?

Consider faceting the scatterplot of rentals vs. temperature by customer type and weather situation. Are these any situations when the number of rentals does not seem to depend on temperature? Are there any differences in rentals between different seasons and customer types? What implications this might have for planning?

## Exercise 5

Business problem: What are the frequencies of different weather conditions?

Create a plot/calculate frequency that might help to know many days in the data were in a specific weather condition. Discuss: Consider how weather impacts bike rental business and how this information could be used for marketing or operational decisions.