Question I

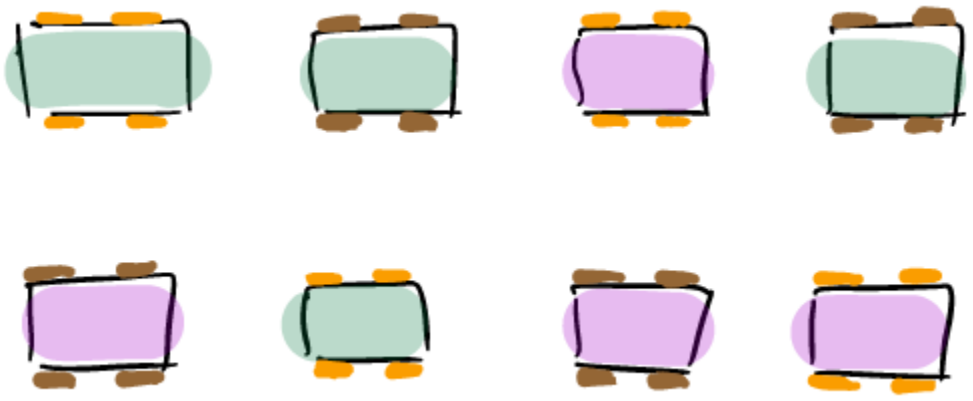
A car company wants to investigate the effect of two different tire types and two motor types on car performance.

The car company conducts this test on 8 identical cars. It samples 4 motors of each motor type and 16 tires of each tire type. The tire types and motor types are randomly and independently assigned to each car, so that each car has tires of only one type and such that we see every combination of tire and motor type twice. The response is top speed of each car.

This design is a …

Question I

- … a **completely randomized design** (with factorial treatment structure)



Question II

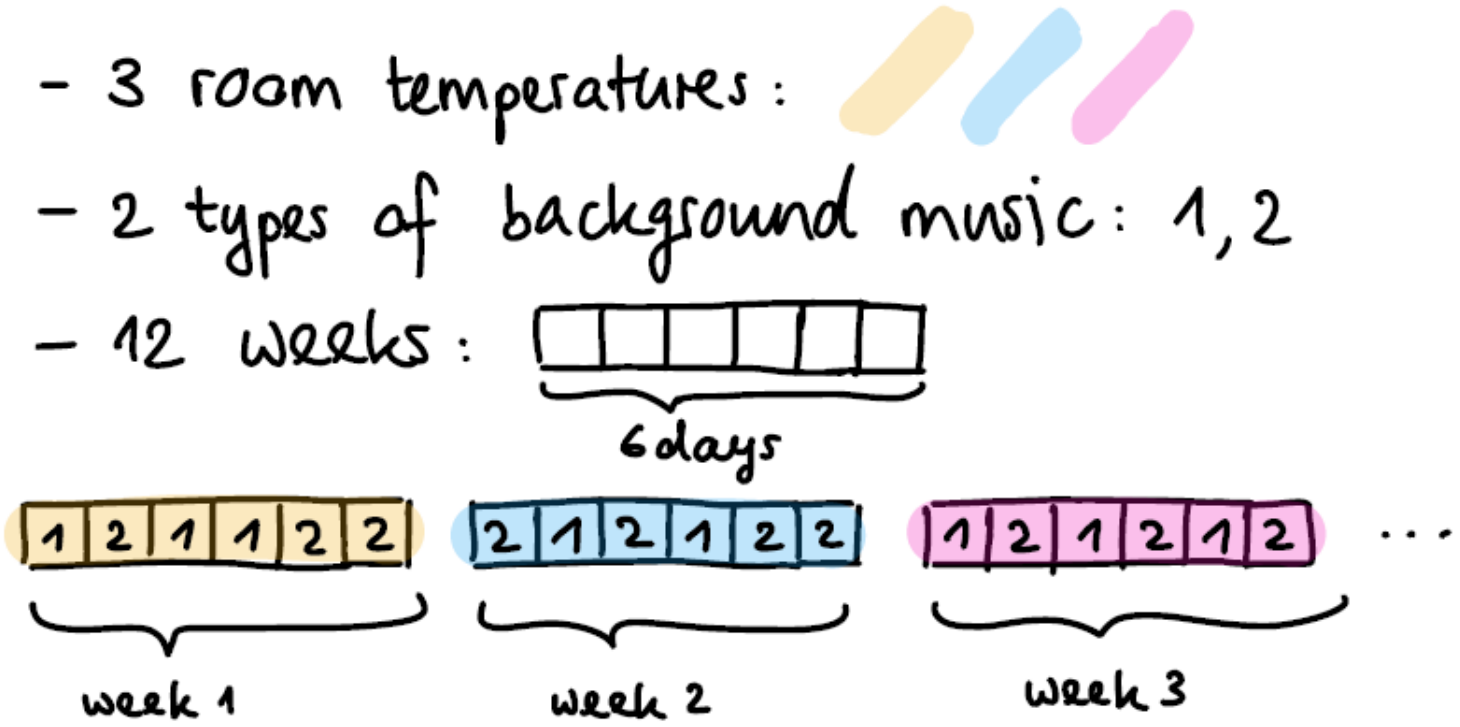
A supermarket wants to investigate the effect of **three different room temperatures** and **two types of background music** on the sales over the course of a day.

The supermarket conducts this experiment during **12 weeks**. First it randomly assigns each room temperature to **four** of the 12 weeks. As the supermarket is closed on Sunday, it randomly assigns each type of background music to **three** of the six working days (Monday-Saturday). During the 12 weeks the supermarket records the total volume of sales (in CHF) for each working day.

This design is a …

Question II

- … **split-plot design** with
  - weeks = whole plots; whole-plot factor: room temperature
  - days = split-plots; split-plot factor: background music



Question III

An audio company wants to test which headphone and which amplifier sounds best. They have 3 amplifiers and 4 headphones they want to test. To this end, they enlist 20 subjects. The company sets up a double-blind test in which every subject has to rate each headphone and amplifier combination exactly once (in random order).

This design is a …

Question III

- … **randomized complete block design** with subjects as blocks.
  - We have a factorial treatment structure in each block