ASSIGNMENT 4 (20 POINTS)

• This assignment will be solved individually or in groups of two students. You must upload your solution (**html and Rmd files**) at Aula Digital, be sure to include your full name at the top of your solution. NO NAME, NO GRADE!

• **Due date**: December 13th, 2023 at 23.55h.

• **NO late assignments will be allowed.**

To complete this assignment create a .Rmd file with your answers. Once completed, generate an .html document and upload both documents at Aula Digital in the space provided. Make sure your name is visible at the top of the document and show your R code.

This assignment uses the `penguindata` dataset that you can find in the DATASET folder.

The dataset includes measurements taken for penguins in Palmer Archipelago. Variable information: size (flipper length, body mass, bill dimensions), and sex.

- bill_length_mm: a number denoting bill length (millimeters)
- bill_depth_mm: a number denoting bill depth (millimeters)
- flipper_length_mm: an integer denoting flipper length (millimeters)
- body_mass_g: an integer denoting body mass (grams)
- sex: a factor denoting penguin sex (female, male)
- year: an integer denoting the study year (2007, 2008, or 2009)

Consider the following **research question**: How can the penguins be grouped?

To answer this question you will consider different clustering models, both partitional and hierarchical. For each method, use different parameters and compare the different models obtained and comment your results. How do the results from the different methods compare? Make a comment on the number of clusters used.
The document you turn in should explain data preprocessing, application of several learning models (and use of different parameters), comparison of model's results and a conclusion. The conclusion summarises all the work done and what you have learned. The purpose of a conclusion is to restate the central idea and supporting arguments of the work done. A conclusion closes the assignment stating how you have achieved the proposed objectives. Comment on anything interesting about the work done.
