

Assignment 4: Interactive Visual Variables and Human Perception

(20 points)

Due: 13.05.2024 10AM

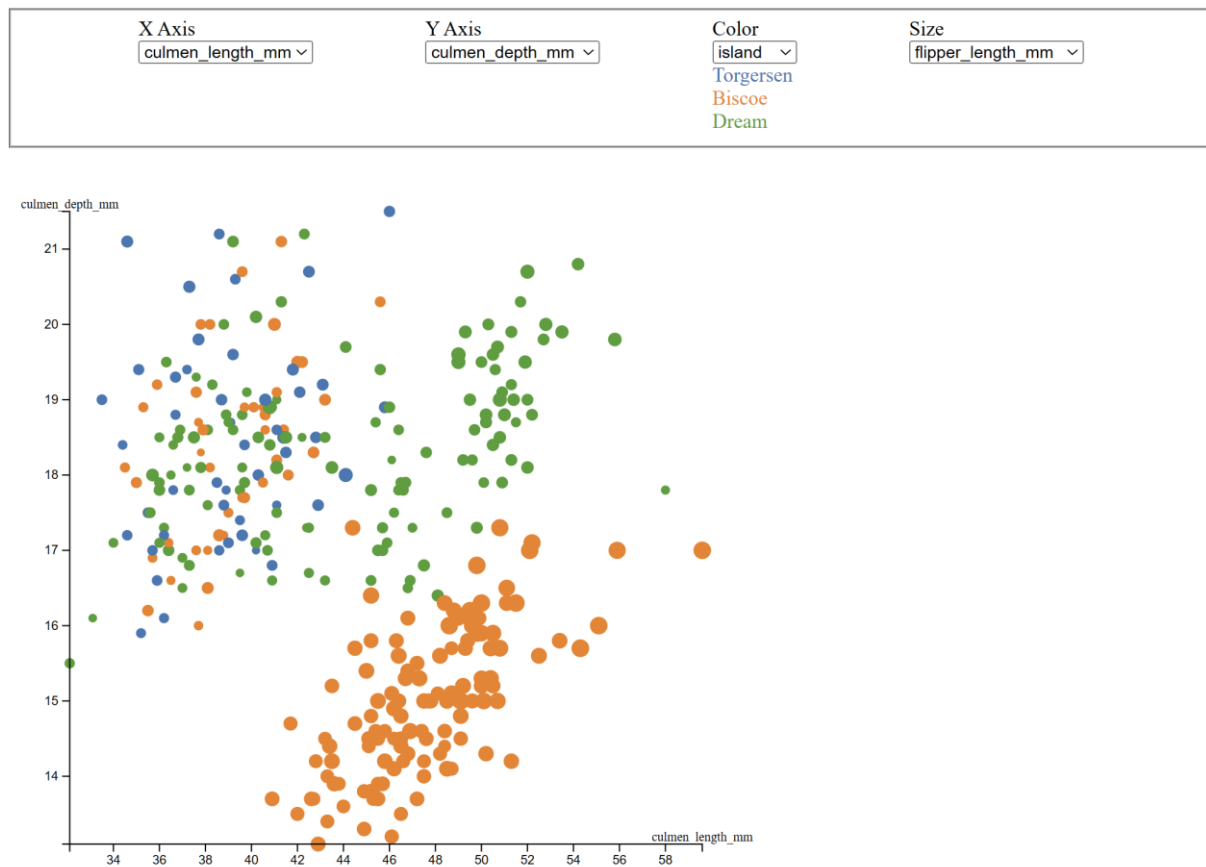


Figure 1: Scatterplot of penguin dataset.

Task 1: Theory

(10 points)

Task 1a) Aside from the already implemented visual variables (position, size & color hue) in Figure 1, what are **two further visual variables** that could be used to encode more information in the scatterplot? Give two examples on which data dimension could be encoded by which visual variable. (The dataset contains the following dimensions: "species", "island", "culmen_length_mm", "culmen_depth_mm", "flipper_length_mm", "body_mass_g", and "sex". You can inspect the data under *data.js*.)

Task 1b) Which **problems** could arise in Figure 1 when using **size** to encode

- i) "body_mass_g"?
- ii) "sex"?

Task 1c) Explain the principle of **pre-attentive processing** and its relevance in selecting appropriate visual variables for effective data communication.

Task 1d) Argue which **Gestalt Law(s)** contribute most to the **perception of clusters** in Figure 1? Set them in relationship to the implemented **visual variables** (position, size & color hue).

Task 2: Programming

(10 points)

Goal of this exercise is to implement an interactive scatterplot with D3, where the mapping of data dimensions to visual variables can be changed with dropdowns (see Figure 1). Attached to this exercise you will find a folder which contains an unfinished implementation of the scatterplot. Your task is to finish the implementation such that opening the *index.html* shows the scatterplot as depicted in Figure 1. To finish the implementation, follow the steps described as comments within the dedicated file. Each comment starting with *TASK* indicates a position you have to add code. Within the folder there are **4** files:

- **index.html**
The main entry point of the visualization.
- **index.js**
The main JavaScript entry point. All the coding tasks are in here.
- **index.css**
Implements CSS rules for specific elements.
- **data.js**
Initializes a variable called *data* and reflects the dataset we want to visualize.

Submission: Zipped folder including all files of the programming exercise (index.html, index.js, index.css, data.js) and a PDF/text file with the answers to the theoretical questions.

Please find yourself in Groups of **2 Students**. Only 1 member of the group must submit the exercise in ILIAS.