

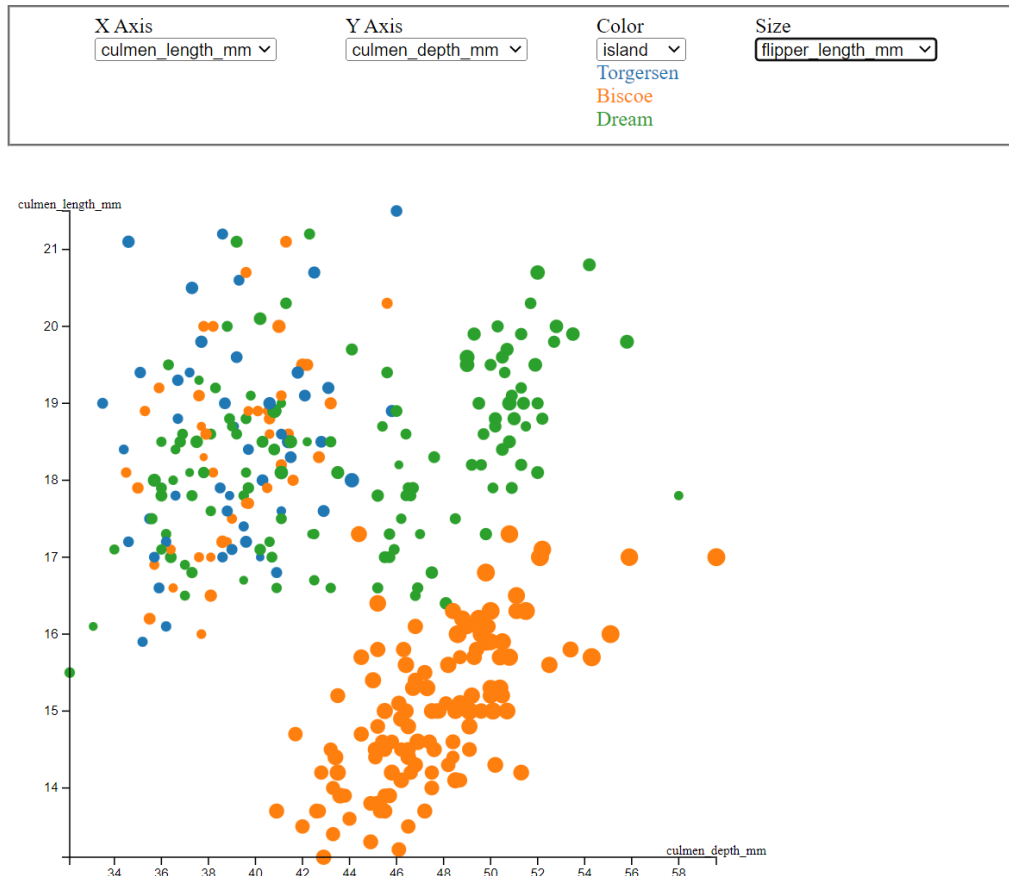
Assignment 4: Interactive Visual Variables

(20 points)

Due: 22.05.2022 8AM

Task 1: Scatterplot

(12 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. Attached to this exercise you will find a folder called *penguins* 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 above. 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 *penguins* there are **4** files:

- **index.html (0 Points)**
The main entry point of the visualization.
- **index.js (12 points)**
The main JavaScript entry point. All the coding tasks are in here.
- **index.css (0 points)**
Implements CSS Rules for specific elements.
- **data.js (0 points)**
Initializes a variable called *data* and reflects the dataset we want to visualize.

Please find the theoretical questions on the next page.

Task 2: Visual Variables

(8 points)

Task 2a) Shortly **name** and **describe four effects** of visual variables **in your own words** using one example of a visual variable each.

Answer:

1. **Size:** The size of visual elements can represent quantitative values. For instance, in a bubble chart, the size of the bubbles can indicate the magnitude of a specific variable. Larger bubbles represent higher values, while smaller bubbles represent lower values.
2. **Shape:** Different shapes can be used to represent different categories or groups. For example, in a scatter plot, circles can represent one category of data points, while triangles can represent another category, allowing viewers to quickly distinguish between different groups.
3. **Color:** Color can be used to encode various types of information, such as categorical or continuous data. For instance, in a heat map, different colors can represent different temperature levels, where cooler temperatures are depicted in shades of blue, while warmer temperatures are depicted in shades of red.
4. **Texture:** Texture refers to the visual patterns or surface characteristics of an element. It can be used to represent categorical or ordinal data. For example, in a chart depicting different types of fabric patterns, each pattern can have a unique texture to differentiate it from others.

Task 2b) Aside from the already implemented visual variables (Position, Size & Color) in Task 1, what are **two further visual variables** that could be used to encode more information on the scatterplot? Give two examples on which data dimension could be encoded by which visual variable.

Answer:

Following are two examples of further visual variables and the data dimension they can encode:

1. **Shape:** The shape of data points can be used to represent an additional categorical dimension. For instance, in a scatterplot comparing the culmen length and culmen depth, the shape of each data point could indicate the specie of the penguin. Circles could represent Adelie, triangles could represent Chinstrap and rectangles could represent Gentoo. This allows viewers to discern both culmen length and culmen depth information as well as the specie of each penguin.
2. **Transparency/Brightness:** The transparency or opacity of data points can be utilized to encode a continuous dimension or intensity level. For example, in a scatterplot visualizing flipper length across different species, the transparency of each data point could indicate the level of body mass. More transparent data points would represent lower body mass, while less transparent or more opaque data points would correspond to higher body mass. This provides an additional level of detail regarding body mass while still using position, size, and color for other data dimensions.

➔ **After putting in your answers, export the docx-File to PDF and upload it alongside the source code files.**

Submission: Zipped folder including all files of the programming exercise (index.html, index.js, index.css, data.js) and a PDF of the completed written exercise.

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