Assignment 4: Interactive Visual Variables (20 points)

**Due: 22.05.2022 8AM**

**Task 1: Scatterplot (12 points)**

Chart, scatter chart

Description automatically generated

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:**

**-** When some data variables (e.g. color hue) change for a datapoint or a group of datapoints that is being selected, helping to differentiate this point/group from the others in a visualization, there is a **selective effect**.

- A variable has an **associative effect** when we can perceive datapoints as a group even though they are different with respect to these variables. For example, if we represent datapoints as arrows that have a specific color depending on the group they belong to, the orientation of these arrows has an associate effect.

- Variables for which their values can be spontaneously ordered by the human eye like the position have an ordered effect. For example, in a histogram a bar that has it top edge point at a higher y-position are perceived as higher than ones with a lower one.

- The size of a datapoint can have a proportional effect when it is directly liked to the relative size with respect to the other datapoints. For example, a the higher influence if a datapoint can be expressed with a larger size.

**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:**

**-** Shape: For example, to encode the sex when the colors represent species or island.

- Use the color value for example to have a higher saturation when flipper length is higher given than the position and size is determined by the culmen\_lenght, culphen\_depht and body mass of the penguin.

* **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.