Assignment 2

Task 1 - *Basics and Interaction*

Answer the following questions.

1. **Explain in detail the InfoVis Reference Model. What are the strengths of this model?**

   The InfoVis reference model consists of 4 parts. Data transformation, Visual Mapping, View transformations and Interaction.

   The aim of data transformation is to transform the raw data into a more structured form inorder to make it easier to map the data to a visual form. For example converting raw data into tables.

   The aim of visual mapping is to reflect the data table with the help of visual structures, elements and graphical properties. The mapping should be effective and expressive. The important thing is that the visual mapping should help the user understand and it should not be a cognitive load for the user.

   View transformations support the users to modify and extend visual structures beyond static representation. View transformation is about including elements that enables the user to filter the data, for example by category or level of detail. This means controlling the viewpoint by moving, zooming or cutting visual angle. This ensures that the user can get an overview and detail by modifying the visual structures.

   The interaction is highly related to the view transformation but the aim is for the user to interact and change the view to get more or other information by using and changing the settings of the view transformation elements.

   strengths:

   - The data transformation part simplifies the process of mapping data to visual representations which makes it easy to understand.
   - The model ensures that the user understands and that the visual mapping does not create a cognitive load.
   - The model encourages the user to interact with the data by modifying the visual structures. It also includes elements for filtering data.
   - By interacting with the data the user can do an in-depth exploration on top of the high-level understanding.
   - The model is adaptable to different types of data.

weakness: It does not directly consider domain or user properties.

2. **What kind of interactions are supported by Range Sliders? Is there a way to improve them to show more information? Make a short list of pros and cons.**

Interactions that are supported by range sliders are called dynamic queries. With range sliders one can filter data by a specific range inorder to show different cases.

The slider should contain labels of the start and end values but also the size of the steps. One can visualize an overview of the data distribution within the slider (data visualization slider)

pros:

- change the range so the most important/interesting values are visible
- easy to understand and a fast and natural interaction

cons:

- if there is a fixed step size important visualization can be lost
- the speed or precision of the slider can affect how usable it is
- hard to specify Boolean expressions

3. **In most visualization systems selecting or highlighting a data object in a specific view leads to a highlight in another view. What is this interaction technique called? What are its advantages?**

This interaction technique is called brushing and linking. This facilitates the search and the user gets a consistent display in a very intuitive way. It can be especially useful when the data contains multiple dimensions since the user can identify patterns, outliers or how the selected points relate to other views.

Task 2 - *Sketching a Visual Encoding*
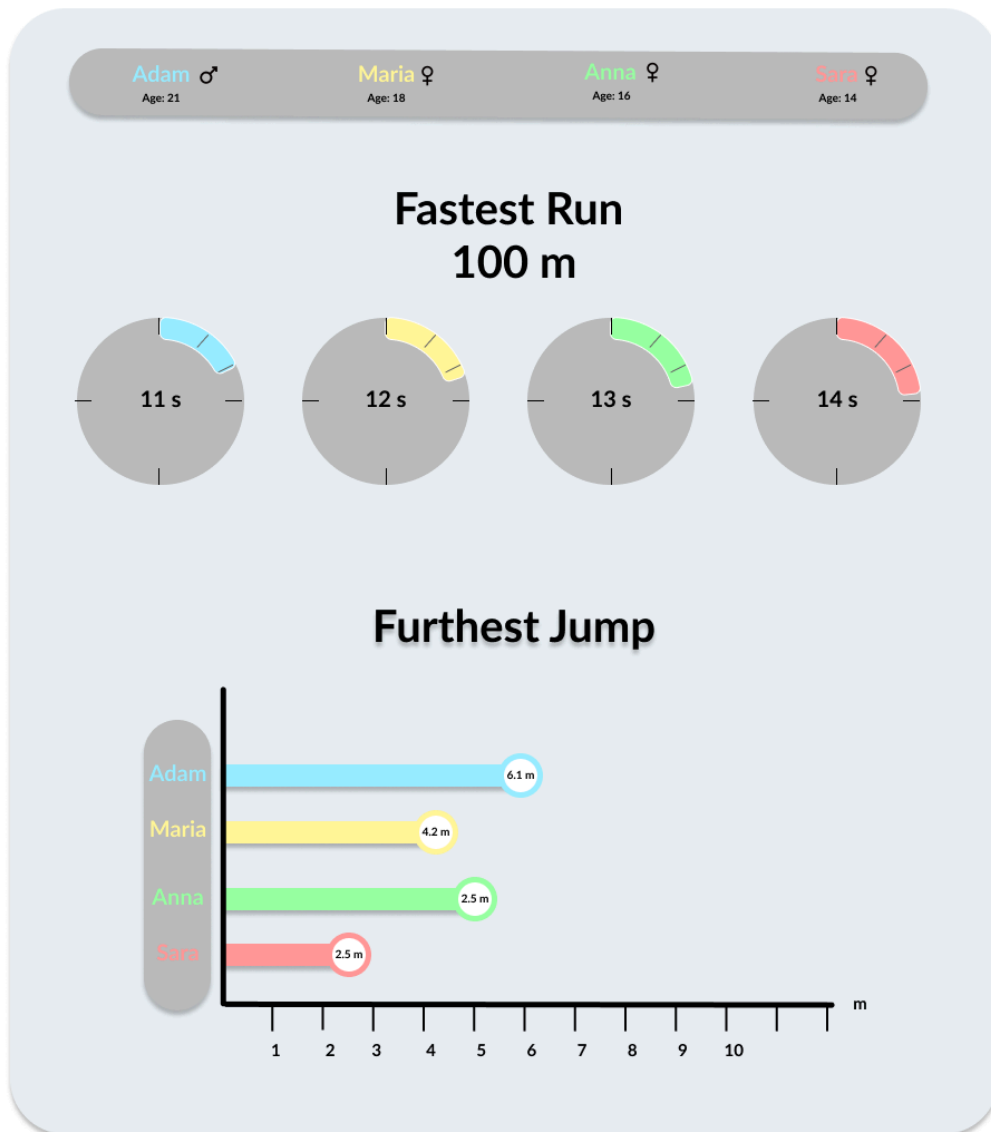
Analyze the sketch, considering whether it is suitable according to the alignment between chosen visual features:

- *attribute types/values (in terms of expressiveness and effectiveness),*
- *semantics of the attributes (an important part of data abstraction), and*
- *information density (we strive for a balance between maximizing information density and avoiding cognitive overload*

All data from the table are visible in the two sketches. Color-coding has been used to easily categorize the data by person. The top-bar is used to display the name, age and gender of the participants. The information about age and gender has a fairly small text since we did not consider it to be of high importance.

Since the data have different units (seconds and meters) we choose to divide the two data sets in order to increase the effectiveness. We also think the color coding contributes to an increased effectiveness.
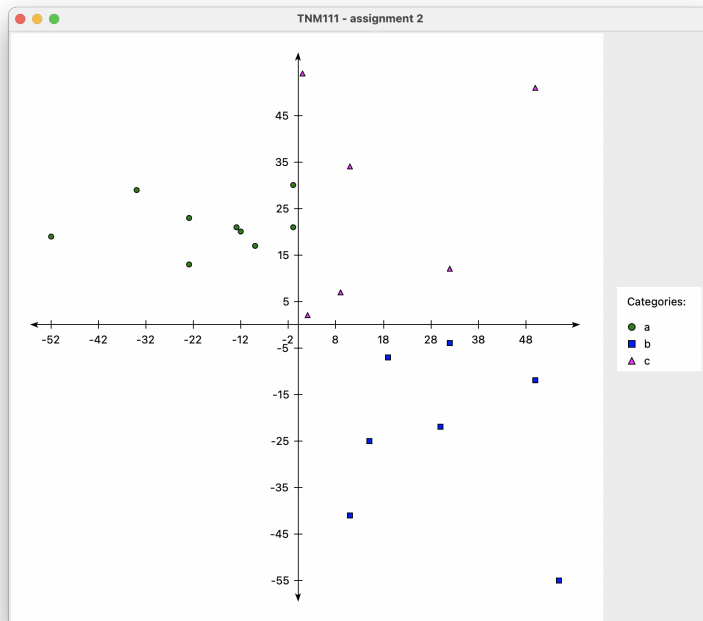
The two visualizations are designed to reflect the different types of visualization. The first one is supposed to reflect a timer clock that easily visualize the small differences. The second is supposed to reflect the length and only the length. The x-axis displays an overview of the length while the individual jumps are more specific. We chose to do this since the differences once again were very small. By doing this you quickly get an overview of who jumped the longest and then more exact information by looking at the individual plots.

By keeping the two visualizations apart we don't have to worry about clustering and we could categorize and divide the information in a way that the most important is displayed in an easy and understandable way.
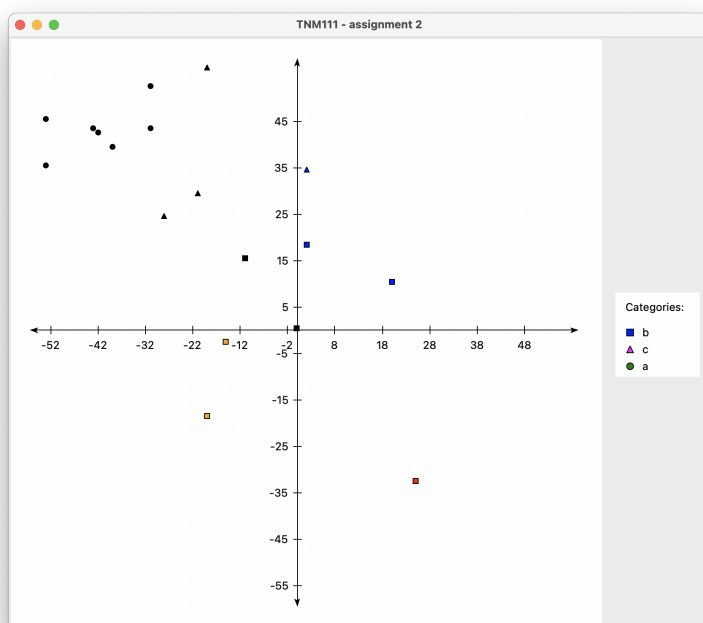
As a side note we are aware that the colors don't have the best contrast but the thing we wanted to display was the color-coding to categorize the data.
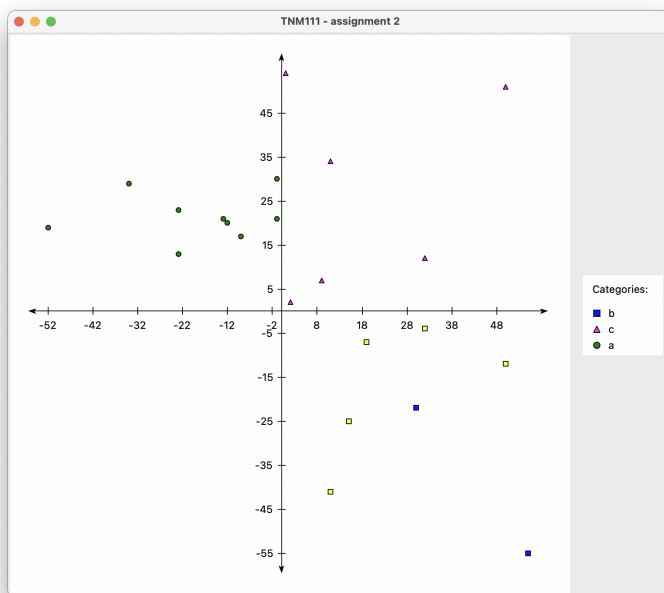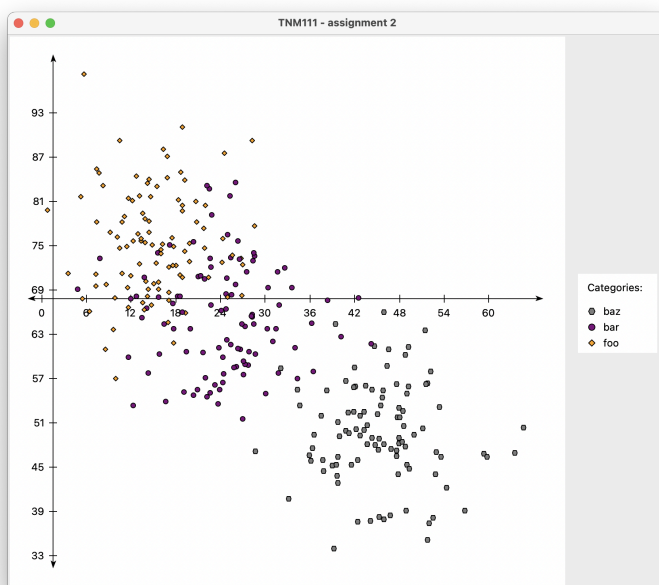
Task 3 pictures

Plot of data1.csv:

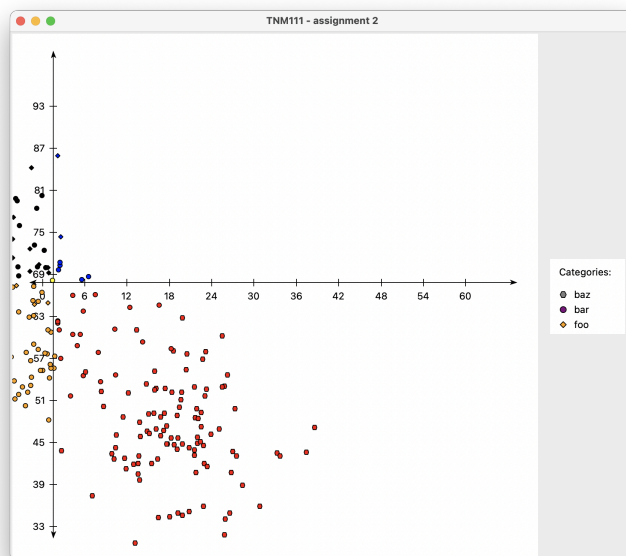Plot of data1.csv when a point is left-clicked:

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Plot of data1.csv when a point is right-clicked:

Plot of data2.csv:

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Plot of data2.csv when a point is left-clicked:

Plot of data2.csv when a point is right-clicked: