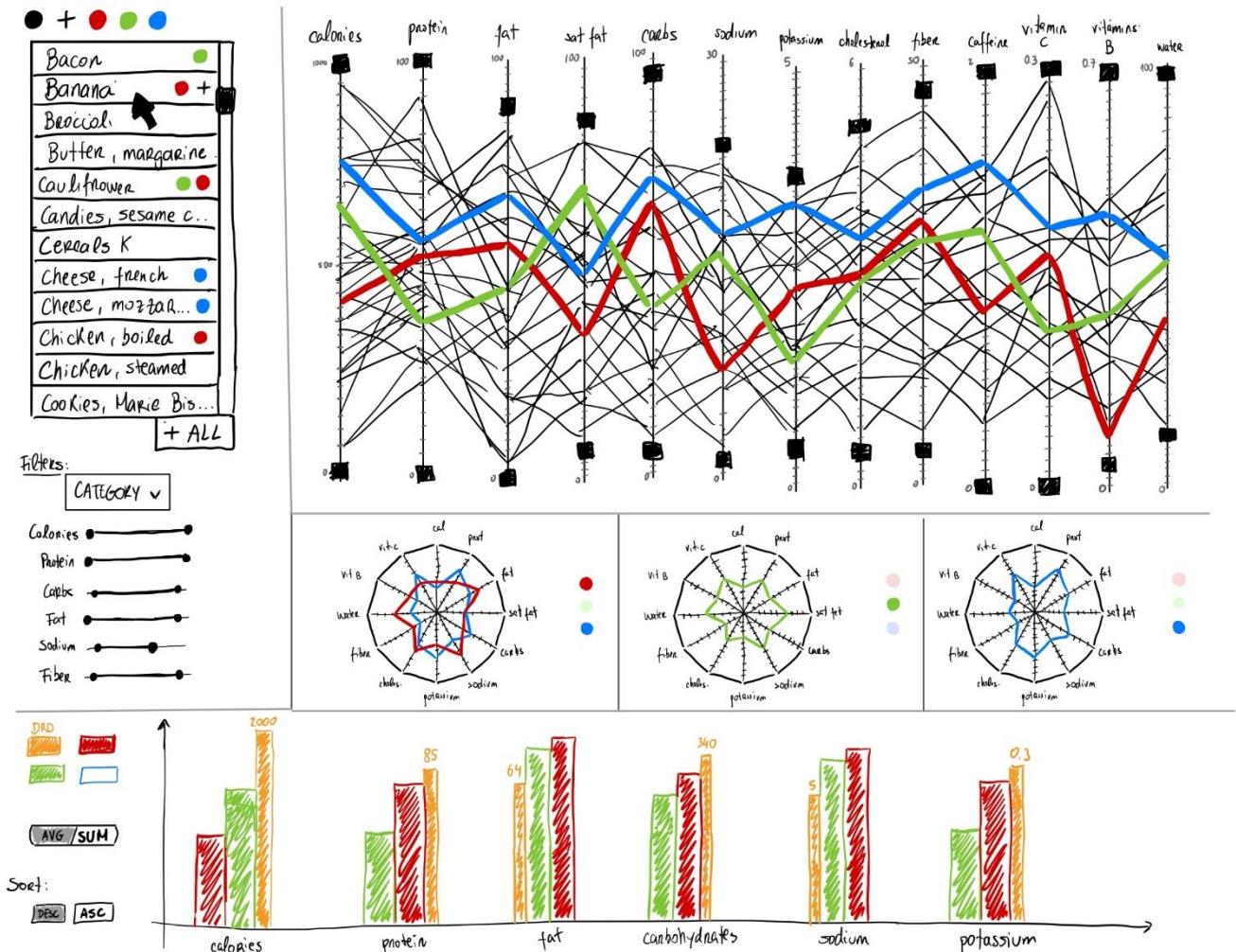


## Checkpoint III: Visualization Sketch

Group: G09

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### Overview



### Visual Encoding

We decided to represent our data using a **List** and three different plots/charts: **Parallel coordinates plot**, three **Star plots** and a **Multiple Bar chart**.

The **Parallel coordinates plot** takes into account 12 attributes of the food items. Each one of them can be filtered by adjusting the lower and upper bounds. By doing that, not only the lines in the plot are filtered but also the items shown in the **List**. An example would be: imagine you only want see products with less than 100 and over 50 calories. You can do that by adjusting the upper bound of *calories* to reach the 100 calorie mark and drag the lower bound to 50.

In the **List**, there is a button which lets the user create groups of items and define a color(hue) and a title for the group. By defining these groups, the items selected appear as whole in every plot/graph and the values of each attribute are the average of the grouped items. The user can also filter the list

using the list's filters. Note that even if you filter the **List** by changing the **Parallel coordinates plot** (or by using the list's filters), the content of the defined groups does not change even though some of them might stop appearing in the list. If the line that represent the group in the **Parallel coordinates plot** is outside the filters, the line changes its saturation to a lower one. (Example in the storyboard)

The three **Star plots** give more detailed information about the selected groups of foods created by the user, specifically the group's 12 main attributes. In every **Star plot**, there is a button for each group (its color) that can be pressed to show the group characteristics in the selected plot. Pressing the button changes the saturation of the color. It is possible to compare multiple groups in the same **Star plot** as well as compare them in different plots by selecting or deselecting the group color. A selected group has the color with higher saturation.

Finally for the **Multiple Bar chart**, the x-axis has the main six attributes that have the daily recommended dosage in the reference table. The chart combines all the groups of foods selected by the user and compares them with each other and with their recommended daily intake. Our customization lets the user sort the bars of every component ascending (ASC) or descending (DESC); and choose to see the average values (AVG) of that group or the sum (SUM) of its values. We also added the possibility to select which groups appear in the chart by pressing the rectangular buttons on the left. A filled rectangle implies that the group is selected.

## Answering the Questions

- Do food items with a high **protein percentage** and **low calories per serving** generally have a **low percentage of saturated fat**?

We can use the filters on the **Parallel coordinates plot** to select which items will appear. Knowing this we just need to filter for high protein and low calories. Afterwards we can observe all idioms to see if the filtered items have a low percentage of saturated fat.

- How does the **total fat** and **sodium** influence the **cholesterol** of an item?

On **Parallel coordinates plot** adjust the *fat* and *sodium* upper bonds and check the *cholesterol* levels for that specific filtration. We can also observe the **Multiple Bar chart** and compare each attribute to see if there is a direct influence on cholesterol.

- Does **fiber rich starchy food** tend to have less **cholesterol**?

Select a group of all *Starchy foods* in the *Category* filter. Then, on the **Parallel coordinates plot** (or in the filters), adjust the *fiber* lower bound to get a filtered list of fiber rich starchy foods. Next, observe the levels of *cholesterol* in the **Multiple Bar chart** by their Average or Sum of the group of foods.

- Is **water rich food** **healthier**?

We create a group by selecting all food items filtered by a high water percentage. Afterwards we can compare them with the average daily intake of their attributes, present in the **Multiple Bar chart**, to see if they are considered "healthy" i.e. have a good balance of the main macronutrients compared to the recommended.

- Does **caffeine** reduce the presence of **B-vitamins**, **vitamin C** and **minerals** in the food?

Using the filters on the **Parallel coordinates plot** we increase the *caffeine* level. Afterwards we can observe the *vitamins B*, *vitamin C* and minerals (*sodium* and *potassium*) levels on the filtered items. This observation can be made in the **Parallel coordinates plot** as well as in the **Star plots**.

- Is **fish** generally **less caloric** than **meat** with a low **fat percentage**?

We start by creating a group with all of the *Fish* items, then create another group with the *Meat* items filtered by low *protein*. After this, both groups can be compared using the **Star plots** or in the **Multiple Bar chart**. (Representation in the following Storyboard)

