# Interactive Exploration of Charts via Progressive Summary

Idea: Partition the apparent data in the chart area in both direction and granularity, with the objective of giving users the optionality toward exploring different areas of the chart. The navigation itself is handled as if one would explore a tree-like structure. For the sake of simplicity each node only has maximally two children.
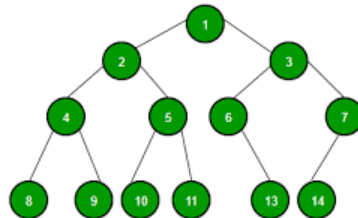
Ideally, this method of exploration will allow easy bypassing of granular details (e.g. individual data points or small clusters) if not requested by the user. This can be achieved with a level-order traversal like navigation, with progressive disclosure of more details after further advancing a level. If there is an area of particular interest to the user, then she can "drill down" to more granularity by navigating further down the hierarchy.

Some examples to illustrate this:

Bar Graphs (image below)
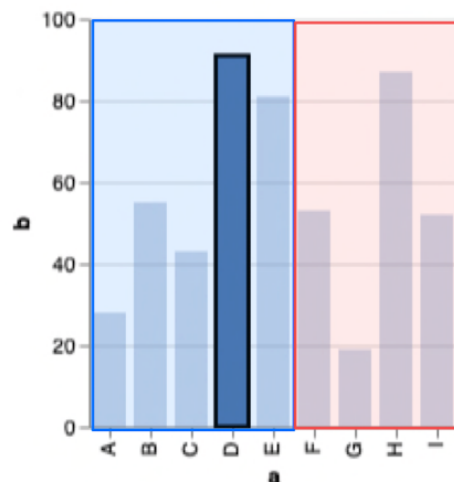
Root: In the above example, a "root" level description/node would describe the most general aspects about the above chart - axis labels, markings, number of bars (level 1 descriptions) with a general summary (e.g. D is the highest bar, at 90, while G is the lowest at 19"

Left of Root: There are five bars in the left group, with D being the highest at 90, while E is the second highest, at around 80

Right of Root: There are four bars in the right group, with H being the highest at 87, while F is the second highest at 55.

… and so on, with each child having at most two children of its own, each describing smaller groupings of chart bars.

Line Graphs (image below)
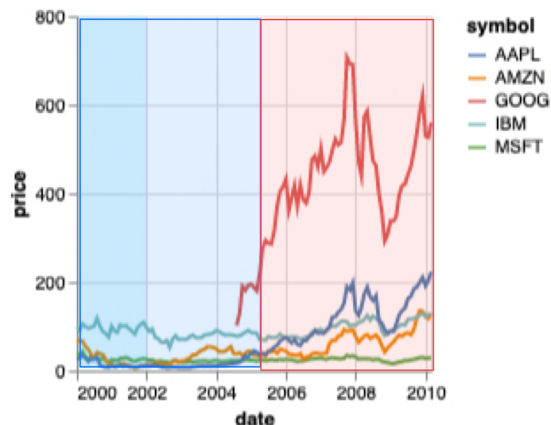
Root: Level 1 descriptions, brief summary about the chart itself.

Left of Root: Descriptions about the relatively static relationship between the lines compared to the right side.

Right of Root: Descriptions about high volatility of the different lines, especially GOOG.

.. and so on and so forth.

Some notes:

1. There is potentially a use for dynamically splitting up the data/chart area. For example in the above line graph the x-axis might be better split along before GOOG appears on the chart and after.
2. Some downsides that we've noted include
   a. loss of "visuospatial coherency" - though to what extent this matters given our target audience is up for debate
   b. there is some possibility for repetitiveness in the descriptions when navigating in-order traversal. (e.x. For the bar chart, we repeat that D is the highest bar)