Overview

Now we have produced some hierarchical graphics and experimented with colour and labels we will explore ways in which layout can be varied and consider the effects of such variation.

Layouts that use the order of treemap elements to represent and relate information are introduced.

Ways of relating layouts are presented to help us explore design decisions.

Preparation

Unlock the session 3 GUI in **HiDE** to gain access to additional interface functionality.

You will be using the **US ELECTION** data set again in this session.

This is a more open-ended session than the previous two and now that you know how to use the software to vary the design you should feel free to explore the various options that are available and decisions that you are able to make.

Please discuss the implications and your ideas with your colleagues and the instructors.

Jot down ideas and SAVE designs regularly as images.

Don't forget to use what you have learned about colour and text when visualizing.

Activity 1 – Varying the hierarchy

Create a false hierarchy from the **US ELECTION** data set using the region, year, and party variables.

Fix the size of nodes in all but the final level of the hierarchy for now, which should be sized according to number of votes.

You can use **HiDE** *Design Codes* to achieve particular combinations of Layout, Hierarchy, Size, Order and Colour in this session. The *Design Code* to load the above design is: **N Z G**

Change the false hierarchy to make comparisons. You can do so with the 'swap' functionality in the **HiDE** interface or the *Design Codes* provided:

- year / region / party: **Z T Q**
- party / region / year: **D B D**

Think about which hierarchies enable us to make which kinds of comparisons, and thus address which kinds of research questions.

Make a note of your thoughts and reactions here – does layout have an effect?

Now vary the sizes of nodes at all levels and once again change the false hierarchy to make comparisons.

- region / year/ party - sized by number of votes: **T Z S**
- year / region / party - sized by number of votes: **X L H**
- party/ region / year- sized by number of votes: **R M N**

How do these treemaps vary from those that we produced with fixed node sizes?

Which different lines of enquiry might they (each) support?
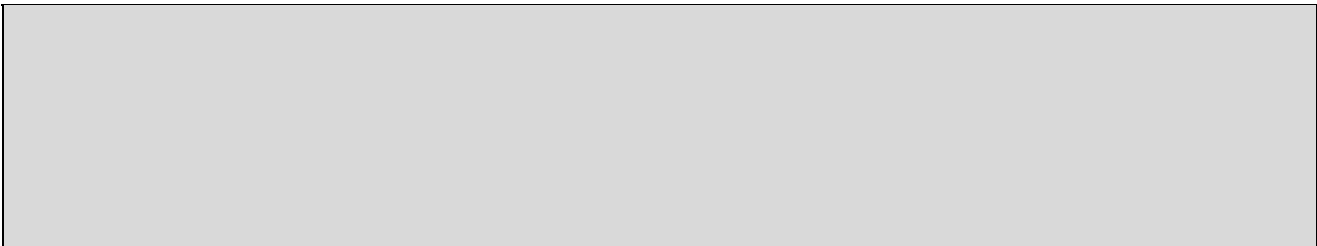
Activity 2 – Varying the Treemap: Layout and Order

One Dimensional Ordering

We can order the way in which nodes of a treemap are laid out at any level.

Ordering may be one or two dimensional – linear or spatial.

For example, create a treemap that uses a false hierarchy of year / region / party: **L N Y**

Use the **HiDE** interface to order this mosaic plot in alternative ways:

- level 1 (year) by population: **B G Q**
- level 1 (year) by number of votes: **Q K M**
- level 1 (year) by year: **L K W**
- level 2 (region) by longitude: **G Z F**

The US regions are not particularly well ordered by longitude and we are using a top-to-bottom ordering for regions in our hierarchy.
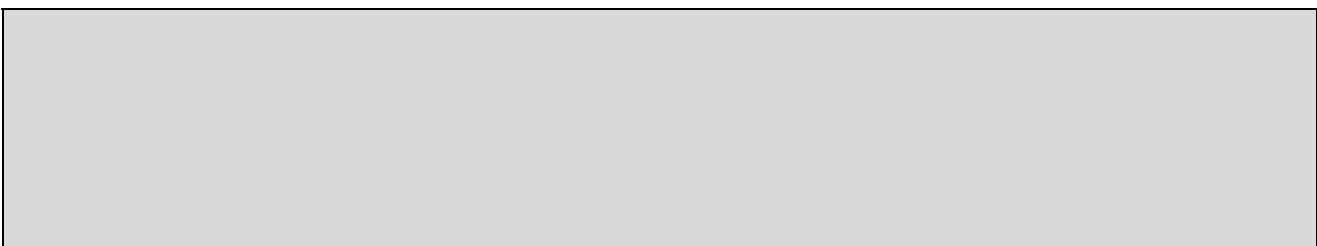
Let's change the vertical ordering to show regions from top to bottom with latitude: **K H L**

Make a note of your thoughts on changing the order to show some geography …
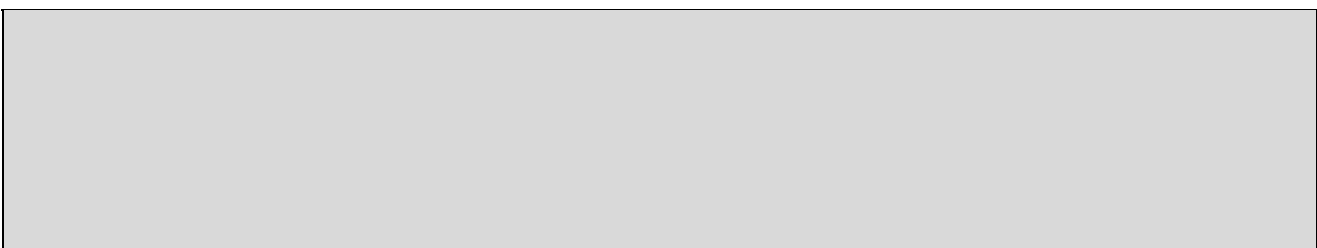
Let's use the horizontal ordering to show number of votes: **G D G**

Make a note of your thoughts on changing the order to show number of votes …

Two Dimensional Ordering

Whilst we are using both spatial dimensions to represent one-dimensional orders in the final example here, some treemap layout techniques have been designed specifically to order nodes in two dimensions.

Let's use the 'spatially ordered' approach at the level at which regions occur to see their approximate geography.

Begin with the fixed size mosaic plot. The fixed sizes help us make comparisons between the relative proportions of votes per party, per year, per region: **G M M**

Now let's arrange the regions spatially. The fixed sizes of the regions still help us make comparisons between the relative proportions of votes per party, per year, per region, but we may now be able to detect geographic patterns: **D J Y**

Change the spatial resolution and try the same geographic ordering for electoral divisions: **H Y W**

We can also change from fixed sizes to use the size 'visual channel' to show number of votes per:

- year: **B S Q**
- division: **B R X**

Doing so may help us see the absolute proportions and differences in voting patterns for the three parties.

Think about the pros and cons of 1D and 2D ordered treemaps.

What do we gain? What do we lose?

When might fixed or proportional symbols sizes be appropriate?

We can geographically arrange units at state level also.

Consider the following examples spatial treemaps of number of votes by state / year / party:

- states with size fixed: **L Q K**
- states sized by population: **Y Z T**
- states sized by electoral college votes: **H J Q**
- states sized by land area: **G J W**

What does each of these alternatives emphasize - how do they compare to each other?

How do they compare with more traditional maps of the US at state level?

Activity 3 – Animated transition

Smooth animated transitions between different hierarchies, layouts and orders may be useful in helping us relate design alternatives and explore the effects of design.

They may even be beneficial in enabling us to explore data.

Switch on 'animated transitions' and re-do *Activity 2* above. Do your answers differ now?

Do you think that animated transitions help with exploring … the design space? the data set?

Under what circumstances?

You may want to consider how to design an experiment to evaluate their impact?

Now experiment with different approaches to 'easing'.

Comment on the different methods and how we might use and evaluate them …

Let's now use animated transitions to see the effects of sizing nodes in the treemap through the hierarchy:

- Load a treemap of year / region / party ordered by year / latitude / votes: **Q Y T**
- Now let's size the regions (height) by number of votes: **J Q B**
- Size the years (width) by number of votes: **N J T**

Can you infer anything by seeing the data represented through these designs and the transitions between them?